

*Kwl..I cj # Dbqab -z*  
SCHOOL OF AGRICULTURE AND RURAL DEVELOPMENT  
*ersj vt`k Dsgy wekte`ij q*

**BAE 1306**

***gvtQi Pvl I e`e`vcbv***  
**AQUACULTURE AND MANAGEMENT**

*tKvm Wtfj c#gU*

*tj LK*  
***W. tgv Avbqvij Bmj vg***  
*A`vKqvKvj Pvi wefVM*  
*ersj vt`k Kwl..wekte`ij q*  
***W. tgv mgQj Avj g***  
*wdkvvi R eifqij wR GU tRtbwUKAn wefVM*  
*ersj vt`k Kwl..wekte`ij q*

*m=uv`K*  
***W. tgv kun Avj g mi Kvi***  
*Kwl..I cj # Dbqab -z*  
*ersj vt`k Db# wekte`ij q*

*i Pbv%kj x m=uv`K I mgšqKvi x*  
***W. tgv tZvcl%j Bmj vg***  
*Kwl..I cj # Dbqab -z*  
*ersj vt`k Db# wekte`ij q*

*m=uv`K (wZxq ms`i Y)*  
***W. G. tK. Gg. AvRv` kun***  
*Kwl..I cj # Dbqab -z*  
*ersj vt`k Db# wekte`ij q*

*G tKvm@BwU tidvwi KZR wbi x # Yi ci ersj vt`k Db# wekte`ij tqi Kwl.*  
*I cj # Dbqab -z Gi QvT`i Rb` gwZ ntqtQ/*



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*gvtQi Pvl I e'e'vcbv*  
AQUACULTURE AND MANAGEMENT

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*Kvl..I cj # Dbqb 'j*  
SCHOOL OF AGRICULTURE AND RURAL DEVELOPMENT



*ersj vt`k D>gy3 nek|e`'ij q*



B A E 1306

**গৃহীত পলি ইকোলজি**  
**AQUACULTURE AND MANAGEMENT**

গৃহীত পলি ইকোলজি একটি গুরুত্বপূর্ণ বিষয়। এটি জলচর প্রাণীর চাষ এবং পরিচালনা নিয়ে কাজ করে। এতে মাছ, মুরগি, কুমড়া ইত্যাদি চাষ করা হয়। এছাড়াও জলচর প্রাণীর পরিবেশ এবং স্বাস্থ্যের কথা বিবেচনা করতে হয়। এটি একটি উৎপাদনমূলক শিল্প। এতে চাষকারীরা আর্থিক উপার্জন করে। এছাড়াও এটি পরিবেশের জন্য উপকারী। এতে জলচর প্রাণীর পরিবেশ বজায় রাখা যায়। এটি একটি উৎসাহজনক শিল্প। এতে চাষকারীরা আর্থিক উপার্জন করে। এছাড়াও এটি পরিবেশের জন্য উপকারী। এতে জলচর প্রাণীর পরিবেশ বজায় রাখা যায়। এটি একটি উৎসাহজনক শিল্প। এতে চাষকারীরা আর্থিক উপার্জন করে। এছাড়াও এটি পরিবেশের জন্য উপকারী। এতে জলচর প্রাণীর পরিবেশ বজায় রাখা যায়।

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# mPcĪ

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## **cW ubt`Rbv**

ÒgvtQi Pvl I e'e`rcbv0 tKvm@Bul wtkl fite Kul. I cj u Dbqab `z Gi weGMGW tclMdtgi QvIt`i Rb` tj Lv ntqtQ| Avcub Rvbb, `i-uk`jtY uk`jtKi mve`jtYK Dcw`wZ tbB| ZvB cvtVi tKvrbv KwVb wclq thb Avcbvi eStZ Amear bv nq tmw`tK `wó tiLB tKvm@Bul tj Lv ntqtQ| tKvm@BulI AwzK I Dc`rcbv ZvB c`vj Z cv`eB t`tK wKQyv wfbæaitbi| thtnZzmiwmi uk`jtKi mrvh` QvovB tKvm@Bul AvcbvtK ubtR cto eStZ nte, ZvB GwU Kxfite coteb c0tgB Zv tRtb wbb| GtZ tKvm@Bul cotZ I eStZ Avcbvi mear nte|

### **eBulI iJctiLv**

ÒgvtQi Pvl I e'e`rcbv0 tKvm@Bul `kwU BDubtU wef<sup>3</sup>| c0ZwU BDubtU GKwaK cvW itqtQ| cvW msL`v wbañ Y Kiv ntqtQ c0ZwU BDubtU wclqe`i I ci wbfP Kti| BDubtU cvW, tj vtK Avj v`v Kti mrvrbv ntj I Gt`i gta` GKwU thwMmF` itqtQ|

### **BDubtU fvgKv**

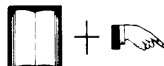
c0ZwU BDubtU iijZB itqtQ GKwU fvgKv| fvgKvq BDubtU wclqe`i DfIk` Ges, iZj mst`jtC Ztj aiv ntqtQ| BDubUwZ Kx Kx wclq wbtq Avtj vPbv Kiv ntqtQ mst`jtC Zvi I DfjL itqtQ| GtZ Avcub BDubtU iijZB tRtb hrt`Qb cvtVi gj- Avtj vP`mP Kx?

### **cvtVi DfIk`**

j`jt` Kiteb c0ZwU cvtVi iijZ GK ev GKwaK mjbw`0 DfIk` t`qv AvtQ| c0ZwU DfIk`tK tKs`a Ktib cvtVi wclqe`mnRfite eY0v Kiv ntqtQ| cvW tkfI cvtVi DfIk`, tjv AR0 Kiv mæe ntqtQ Kx bv Zv wbtR wbtRB gj`vqb Kiteb| GRb` cvW tkfI `gj`vqb ckwaitqtQ| GtZ Avcub cvWU KZUKæStZ cvi tjb Zv wbañ Y Kitz cvi teb|

### **AvBKtbi e`envi**

cvtVi wclqe`, tjv GK`wóZ eStS tbqvi Rb` c0qvRb Abynti tKvm@BulI wewfbæRvqMvq wewfbæaitbi c0ZxK ev AvBKb e`envi Kiv ntqtQ, hv t`tL Avcub mntRB wclqe`i Dc`rcbv Ges Avcbvi Ki Yxq Kx Zv eStZ cvi teb| wbtgæG tKvm@Btq e`eüZ wewfbæaitbi AvBKtbi A`wbt`R Kiv ntjv-



= cob I j`jt` Kily



= Avenk`K cvW/mvi gg©



= Qwe t`Lly



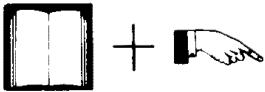


## BDubU 1 grm" m"u`

evsj v`tki gvbtj i c"NYR Avigtj i c"vb Dm nt"Q gvQ| m"y- AZxZ ntZ gvQ evOwj i c"vb Avigtj Dm wntmte cw i PZ ntj l gvQ fvtZ evOwj K\_wU eZgvtb gvrbmB etj wetePZ bq| AmsL" b`-b`x, Lvj-vej, nvl o-evl o, cKz tWvev BZ"wr Rjvktq cY"Gt`tki Av\_ fvgvRK Dbqb, µgeaGvb RbmsL"vi c"p Pwn`v ci-Y, Kgms`tbi mthvM mwO l `et`wkK gyt ARfb grm" m"u` i , iZj Acw mvg| evsj v`tki Af`slxy Rjvktq c"q 260 cRmZi wgvv cwbi gvQ, 12 cRmZi wete`kx gvQ Ges mvgv`K Rjvktq ev tjvrv cmbtZ i tqfQ 475 cRmZi gvQ| AZ`sl m"vebvq G grm" m"u` m"u`K`Avbj vf KiZ ntj gvQ Pftl i BwZnm, , iZj Ges t`kx l wete`kx gvQ i cw i PwZ m"u`K`Rvrv c"qRb|

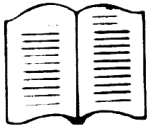
G BDubtU gvQ Pftl i BwZnm Ges Gi , iZj gvQ i tkYwvbm, wgvv cwbi l tjvrv cwbi gvQ i Zwj Kv, evsj v`tki A\_ wvZK , iZj m"ubogvtQ i Zwj Kv Ges Pftl vcthvMx t`kx l wete`kx gvQ i cw i PwZ m"u`K`e`hvi Z Avtj vPbv Kiv ntqfQ|

### cW 1.1 gvQ Pftl i BwZnm Ges , iZj; G cW tktl Avcwb -



- gvQ Pftl i BwZnm eYbv KiZ cvi`eb|
- gvQ Pftl i , iZj; e"vL"v KiZ cvi`eb|

### gvQ Pftl i BwZnm



c"lg KLB gvQ Pftl i ynq, Zv mwKfvt Rvrv hvqwb| Zte wLbce<sup>®</sup> 2000 mtj Pxb t`tk Kwlg fvt gvQ i wlg dlvrv ntZv etj c"ny cvl qv hvq| wLbce<sup>®</sup>475 mtj i AvtM gvQ Pftl Kx tKSkj Zriv e`enri KiZv Zv Rvrv hvqwb| H eQi tdb jvB (Fan Lai) bvgK GKRb Pxbv f`tjvK Kgb Kvc<sup>®</sup>(KwvP) gvQ Pftl i Dci c"lg Mtel Yvgj-K MŠ' (treatise) cKvk Ktib| H cKvkvi GKw Kvc wvUK jvBtefvtZ i wvZ AvtQ hv l Dnri BstivR Abgv` Kiv nqwb| m"eZ c"p"i wlvj cvBb, Rvcvb, firi Z BZ"wr t`tki tjvK AtbK ce`\_tkB gvQ Pftl Kti Avm`Q, hv l G e"vcvti c"nyw` ZZ `uo bq| Pxbv me"lg tMvi wctki cRbb Kti | tkg tcvKvi Pftl i cvkvcnk Pxb t`tk gvQ Pftl c"vi jvf Kti Kvi Y tkg tcvKvi i KKw l Dv"Oo (gj) gvQ i Lv` wntmte e"eüZ ntZv Ges GLbl nt"Q|

tdb jvB (Fan Lai)  
bvgK GKRb Pxbv  
f`tjvK Kgb Kvc<sup>®</sup>  
(KwvP) gvQ Pftl i Dci  
c"lg Mtel Yvgj-K MŠ'  
(treatise) cKvk Ktib|

Pxbv th c"vZ e`enri KiZv Zv wvfbvvt Dc`vcv Kiv ntqfQ| M"gvY RbMY b`x t`tk gvQ i wlg msMh KiZv| AtbK mgq Wvzviv cwbi wtpi MZ<sup>®</sup>t`tk gvQ i wlg msMh KiZv| Zte tenki fiv mgtq b`xtZ Rvj, gv`j, MtQi tSv BZ"wr tdtj tcvrv tQtK tZvjv ntZv| gvQ i wlg l tcvrv Wtgi cmbtZ ivLv ntZv Ges cti e`emvxt`i KvQ wvµq Kiv ntZv| e`emvqv wvfbvRvqMvq tcvrv msMh KiZv| gvQ Pftl i e`emvqv KvQ t`tk tcvrv µq Kti wtrt`i cKzi Qvov| thnZztcvrv kbv<sup>3</sup> Kiv RvbZ bv ZvB GKB mt\_ wvfbogvtQ i tcvrv GKB cKzi Qvov ntZv| th mg`l gvQ ZLb Pftl Kiv ntZv Zvi gta` wvfbv Kvc<sup>®</sup>gvQ, m"vgb, UvDU Dvj - LthvM" tKvb tKvb AAtj gRvi GK tKSkj Aej`b Kiv ntZv gjMxi wvgti wvZti me wQvtei Kti tLvmvU dtkv Kti Dnri wvZi gvQ i wlg w`tq fivZ<sup>®</sup> Kti Avevi eÜ Kiv ntZv| Gici wvGvU gjMxi mvrth` KtqK w`tbi Rb` Zv w`tq wvgt i wvZ cmbtZ (hv AvtM t`tkB mhZvc Oviv Mig Kiv \_vtK) tQto t`qv ntZv| ävtK GLvrbB

cwi ciltbi mthm t`qv ntZv Ges hZqY chstbr tcvbr cktzi Qovoi Dchj nq ZZw`b chst  
Gt`i tK H WtqB i vLv ntZv| tcvbr gvQtK gmtji Wvj Ges Wltgi Kzng Lveri t`qv ntZv|

tivgvbiv Avevi Avi GK metkl ai tbi cxwz e`envi KitZv| Zviv GKB cktzi wefbaRvtZi  
gvQ tQto w`Z| GtZ Giv GKwU Ab`wutK Lvl qvi mthm tcZ| th`tjv tetP`vKZ tm`tjvB  
Zviv e`envi KitZv| Zviv grtQi Rb` wefbaLveri l mieivn KitZv| GgbwK Zviv KZ`v tmi  
gvsm chstgvQtK tLtz w`Z|

gvQ Prl wki (arts) ga`hjm miv BDtvc Qmqtq hvq Ges AtbK Dbz cxwz Ave`Z.ntZ  
\_vtK| tm mgq maviYZ agtq ev cweT Ntii mt`B cktz`vKZ| agRvjvq emevmKvix  
hvRtKi mSL`vi l ciB cktzi AvKvi wbfP KitZv| Zte Kxfvte cktz`e`v`cvbr ntZv G  
e`v`v`ti Zviv tKvb tiKW`i tL hvbvb|

ga`BDtvtci Kvc`gvQtci clg cktz`vcb Kiv nq tPtKvk- vfwKqvq 1358 mtj | cieZr`  
400 eQi chst`H cktz`tjvB gvQ Prtli tK`te`yOj | ga`hjmI tktli w`tK Wg wcbPb  
(Dom Pinchon) bigK GKRB agf`RK me`c`lg Kwlg Dcvtq UfDU gvQtci cRbb NUvb  
etj avi Yv Kiv nq|

w`DfWUvm Mvi wj K  
(Theodatus Garlick)  
hy`i vto`me`lg  
mdj fite gvQtci Kwlg  
cRbb NUvb Ges 1857  
mtj wZvb Kwlg cRbtbi  
Dci Mtel Yv cEU  
(treatise) cKvk Kti |

BDtvc t`tK gvQ Prl chj Awfeimx`i (Emigrant) gva`tg hy`i vto`t`c`Q Ges tmLvtb  
gvQ Prtli Rb` chst tcvbr mieivni wbgfE n`vPmi`vcb Kiv nq| w`DfWUvm Mvi wj K  
(Theodatus Garlick) hy`i vto`me`lg mdj fite gvQtci Kwlg cRbb NUvb Ges 1857  
mtj wZvb Kwlg cRbtbi Dci Mtel Yv cEU (treatise) cKvk Ktib|

fvi Zetl`mngZ AvKviti ntj l cktzi Ges nt` gvQ Prl wLtoi Rtb#i 350 eQi cteB`iiy  
ntqtQ etj Rvbr hvq| cieZr`mg`q fvi tZ gvQ Prl Avil Rbuc`Zv cqv| Rvbr hvq th,  
gw`t`i cktzi l wbgqZfvte tcvbr Qvov ntZv| ga`hjm fvi Zetl`gvQ Prtli e`v`v`ti tZgb  
tKvb Z` cvl qv hvq br|

wbKU AZxtZ G Dcgnvt`tk Gm.Gj`tnviv (S.L. Hora) me`c`lg gvQ Prtli tPov Ktib|  
RwZms`Ni mnvqZiv wZvb 1949 mtb`OM`sgUj xq gvQtci cktzi Prl`kxl`R GKwU Avtj vPbr  
mfvi AvtqvRb Ktib| cieZr`Z wfgvPrv, wR.Gj`wgt, Avj xKb`n Gm.w. wms, wSsi vb, GBP.  
tP`ajx`c`ly gvQ Prtli metkl Ae`vb i`v`Lb|

evsj vt`tk gvQ Prtli BwZnm Ar`w`tbi | Zte bwiRi Avntg` (1947-1960) bZb fite  
Gt`tk gvQ Prtli tMvoicEb Ktib| wZvb ZLbKivi grm`mzvni b`t`Ub`W`U w`h`y`nb| bwiRi  
Avntg` gvQ Prtli Dci ht`o`iaZ t`b Ges Kwlg fite tcvbr`Zvii nivr gvQ Prtli Kv`R  
A`SZ`y`Ktib|



RvZxq Avtqi kZKiv  
clq 5.2 fvm Ges KwL.  
m`u`ntZ Avtqi kZKiv  
20 fvm Avtm grm`  
m`u` t`tK|

**Ablyj b (Activity)** t evsj vt`tk gvQ Prtli BwZnm eY`v`Kily| gvQ Prl`tK ifc`j`x`wec`e  
ejv nq tKb- Zv hy`p`mnKviti Dc`vcb Kily (Ably`100 ka)|

**gvQ Prtli`iaZj**

evsj vt`tki RvZxq A`BwZi Db`q`b, cyo`mieivn, Kgms`vb Ges`et`w`kK g`y`AR`b grm`  
m`u` GKwU metkl`iaZ`c`y`f`igKv cvj b Kti AvntQ| RvZxq Avtqi kZKiv clq 5.2 fvm  
Ges KwL.m`u`ntZ Avtqi kZKiv 20 fvm Avtm grm`m`u` t`tK| c`KwZK l cwi`tekMZ

Kul. I cj Dbaqb ֿճ

KvitY evsj vt՝ tk grm՝ Drcv՝ tbi me՝ Z.t՞ղԴ i իտ՞Q | grm՝ mաւ՝ Ri x Abjvqx Af՝ Տի xY Rj vktqi cwi gvY cձ 43.08 j Պ tn±i, Gi gta՝ c- vebf ugm n gՅ Rj vkq 40.47 j Պ tn±i Ges DcKj xq յՔսւ Lvgi mn ex Rj vkq 2.61 j Պ tn±i | ZUt i Lv ի՝ tK 200 bւ UK՝ ij gvBj chՏ՞ me՝ Z. GKv՝ Տ A\_ Պ յ ZK Gj vKmn (exclusive economic zone) mivj՝ K Rj vktqi cwi gvY cձ 1.66 j Պ eM՞ Ktj vglvri | GZ me՝ -Z.Rj vkq \_vKv m՞ Eլ 1962 n՞ Z 1980 m՞ t j i gta՝ gvbt՞ i ՝ յ bK gv\_ւ cQygv՞ Qi cձ 33 Mձ n՞ Z 20 Mձ nւ m cvq |

cյոցv b Dbaqb, Kgմs՝ յb eյք, ՛ et՝ ւկK gյ՞ ARՅ Ges Av\_ Պ vgvRK Dbaq՞ tbi t՞ղԴ gvQ Pր՞ t i \_ i ա՞ j Acւi mvg |

**cյոցv b Dbaqb**

gv՞ Q fր՞ Z evOւ j cճ ՛ ev՞ K՝ i mZ՝ Zv GLb L՞ j R cvl qv ՝ ջri | GKmgq յ Qj hLb G՞ t՞ ki gvbt՞ i Lv՝՝ Zւ j Kւ q gvQ cձ յ b I Aveւ k՝ K Dcv՝ յb յ n՞ t m՞ te ՝ յb tcZ | RbmsL՝ vi AmրfւեK eյք Ges km՝ c՞ Y i Drcv՝ b evov՞ Z յ M՞ t q gv՞ Qi mePiY t՞ղԴ a՞ sm n l qri dtj eZ՞ ջ t b gv\_ւ cQygvQ f՞ղԴ Yi nvi A՞ t b K K՞ t g t M՞ t Q | cյոց meAvb՞ t՝ i g՞ Z, GKRB evsj vt՝ kxi cձ Z յ b Kgct՞ Պ 45.3 Mձ tcձ յ b M՞ յ Y Kiv Dր՞ Z | Gi gta՝ Kg c՞ Պ GK-ZZxqsk (15.1 Mձ) n՞ te cձ YR tcձ յ b | evsj vt՝ tk cձ YR tcձ յ b tbi kZKiv 80 fւ M Av՞ m gvQ ev gvQ RvZxq ՛ ՛ յ t՞ tK | A\_ Պ 12 Mձ tcձ յ b Av՞ m gvQ t՞ tK | gv՞ Q kZKiv 16.5 fւ M tcձ յ b \_v՞ tK | Zւ n՞ t j 12 Mձ tcձ յ b cvl qri Rb՝ 73 Mձ gvQ cձ Z յ b tL՞ Z n՞ te | A\_P eZ՞ ջ t b gvQ f՞ղԴ Yi Mo nvi gv՞ 36 Mձ | GKgv՞ Dba՞ c x յ Z t Z gvQ Pր l K՞ t i B t Ke j gv՞ Qi Nւ յ WZ t g յ յ t b v Ges cյոցv b Dbaqb mա՞ ՛ |

evsj vt՝ tk cձ YR tcձ յ b tbi kZKiv 80 fւ M Av՞ m gvQ ev gvQ RvZxq ՛ ՛ յ t՞ tK | A\_ Պ 12 Mձ tcձ յ b Av՞ m gvQ t՞ tK | gv՞ Q kZKiv 16.5 fւ M tcձ յ b \_v՞ tK | Zւ n՞ t j 12 Mձ tcձ յ b cvl qri Rb՝ 73 Mձ gvQ cձ Z յ b tL՞ Z n՞ te |

**Kgմs՝ յb eյք**

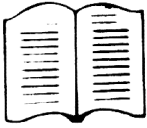
eZ՞ ջ t b evsj vt՝ tk i kZKiv cձ 8 Rb t j vK gvQ aiv ev gvQ mաւ՞ xq Kւ՞ R i m՞ 1/2 Rւ oZ Av՞ t Q | Dba՞ Rj vkq Ges tցւ n v I Mfxi mgյ՞ t՞ tK gvQ Avni Y K՞ t i B Gme t j vK RւեK v յ beր՞ K t i \_v՞ tK | Zte vevfba Kւ i յ Y cձ ZKj Ae՝ v mւո n l qv՞ Z Dba՞ Rj vkq t՞ tK gvQ aiv cwi gvY nւ m cv՞ ՞ Q | Zv B G t m± t i Kg՞ ms՝ յ t b i m՞ յ յ M M K՞ t g hր՞ ՞ Q | evsj vt՝ tk i Avbր՞ P Kւ bր՞ P AmsL՝ c՞ յ ՛ z - t Wvev Av՞ t Q | G՞ t i AւաKւ sk cւ i Z՝՝ 3 Ae՝ t q ev Aւ bւե o Pր՞ t i AՏ՞ f յ | յ bւե o gvQ Pր l tKՏ k j cձ ջ յ M K i t j gv՞ Qi Drcv՝ b A՞ t b K eյք tcZ | յ bւե o gvQ Pր l Kgմս՞ P ev՝ յ v q՞ t b i Rb՝ c՞ յ ՛ z Rb kւ՝ 3 cձ ջ յ Rb n՞ te | Av i Gfր՞ te B Kgմs՝ յ t b i m՞ յ յ M eյք Kiv i Rb՝ gvQ Pր l Kgմս՞ P M՞ յ Y K i t Z n՞ te |

gvQ Pր՞ t i D՞ յ j mաւե bր՞ t K Kւ՞ R j յ M՞ t q gv՞ Qi Drcv՝ b eյք i gvա՞ t g c՞ յ ՛ z et՝ ւկK gյ՞ ARՅ mա՞ ՛ |

՛ et՝ ւկK gյ՞ ARՅ ՛ Zւ i tcvkvK I Rb kւ՝ 3 i c՞ t i gvQ B cձ յ b ՛ ՛ յ hv t՞ tK c՞ յ ՛ z et՝ ւկK gյ՞ Aւ R՞ Z n՞ t ՞ Q | evsj vt՝ tk i i Bւ b Av՞ t q i kZKiv 5 fւ M Av՞ m gvQ I gvQ RvZxq cY՝ thgb յ Քսւ o i Bւ b t՞ tK | evsj vt՝ tk gvQ Pր՞ t i th mաւե b v i ի տ՞ Q Zր՞ t Kւ՞ R j յ M՞ t q gvQ Pր l t Rvi ՝ vi K i t Z cvi t j c՞ յ ՛ z et՝ ւկK gյ՞ ARՅ Kiv mա՞ ՛ |

**Av\_ Պ vgvRK Dbaqb**

evsj vt՝ tk M՞ t g M՞ A AmsL՝ c՞ յ ՛ z Oւ o t q Av՞ t Q | GK cւ i msL՝ յ b Abjvqx evsj vt՝ tk c՞ յ ՛ z i msL՝ յ 12 j Պ 80 nւ Rvi hvi tցւ U AvqZb 15 j Պ tn±i | Gme c՞ յ ՛ z i kZKiv 55 fւ M gvQ Pր՞ t i Av l Zւ q Avb v n՞ t q՞ Q Ges kZKiv Av i l 30 fւ M gvQ Pր՞ t i Av l Zւ q Avb v mա՞ ՛ | evKx 15 fւ M cւ Z Z | cւ Z Z ev Av cv Z gvQ Pր l A՞ t յ v M՝ Gme c՞ յ ՛ z i gւ j Kւ b v t՞ t k i cձ յ K Pր l x ev v e՞ n x b t՞ i n՞ t Z | ms՝ յ t i i gvա՞ t g G mg՝ l c՞ յ ՛ z gvQ Pր l K՞ t i v e՞ n x b t j v K t՞ i Av\_ ՞ mivgvRK Dbaqb Nւ յ t b v mա՞ ՛ | Kւ՞ R B evsj vt՝ tk gvQ Pր՞ t i h՞ \_ o \_ i ա՞ z i ի տ՞ Q |



**mvi gg** Pxb t`tk me<sup>c</sup>g gvQ Pvl iinyq etj cgvY cvl qv hvq/ tdb jvB (Fan Lai) bvgK GKRB Pxbv f`tjvK Kgb Kvc<sup>(KvncP)</sup> gvQi Dci c<sup>g</sup> Mtel Yvgj-K M<sup>s</sup> (treatise) c<sup>k</sup>vk Ktib/ ersj vt`tk gvQ P<sup>t</sup>li BvZvnm Ar w`tbi/ GKRB evOvj i c<sup>z</sup>w`b Kgc<sup>t</sup> 45.3 M<sup>g</sup> t<sup>c</sup>ub M<sup>h</sup>Y Kiv DvPZ/ gvQ kZKiv 16.5 f<sup>v</sup>M t<sup>c</sup>ub ev Avngl \_vtK/ ersj vt`tk c<sup>h</sup>YR t<sup>c</sup>ub<sup>t</sup>bi kZKiv 80 f<sup>v</sup>M Avfm gvQ ev gvQ Rivxq `e` t<sup>h</sup>K/ v<sup>b</sup>eo gvQ Pvl Kgm<sup>p</sup> ev`evq<sup>t</sup>bi Rb` c<sup>p</sup>z Rbk<sup>w</sup> c<sup>q</sup>vRb/ ersj vt`tk eZ<sup>g</sup>tb kZKiv c<sup>q</sup> 8 Rb tjvK gvQ aiv ev gvQ m<sup>u</sup>xq Kv<sup>t</sup>Ri m<sup>t</sup>\_ R<sup>w</sup>oZ/ c<sup>w</sup>ZZ c<sup>k</sup>z, tjv ms`v<sup>t</sup>i i gva<sup>t</sup>g gvQ Pvl K<sup>t</sup>i c<sup>h</sup>sK Pvlx ev v<sup>e</sup>nx<sup>b</sup> tjvK<sup>t</sup> i Av<sup>\_</sup>gv<sup>v</sup>rk Dbqb NU<sup>t</sup>bv m<sup>e</sup>/



### **cuVvEi gj'iqb 1.1**

**mWK DEti i ctk WK iPy (✓) ū b**

- 1/ gvQ Prl me<sup>c</sup>lg tKib t`tk i i yiq?
  - K) Pxb
  - L) BZij x
  - M) tPK cRvZŠ;
  - N) fvi Z
  
- 2/ fvi Zeł KLb gvQ Prl i i yiqiQj ?
  - K) ūLłó i Rłbłi 2000 eQi cte<sup>o</sup>
  - L) ūLłó i Rłbłi 350 eQi cte<sup>o</sup>
  - M) 1358 młj
  - N) 1940 młj
  
- 3/ GK Rb evOwj i cłZw b WK cwi gvY gvQ Lvl qv DłPZ?
  - K) 20 Młg
  - L) 33 Młg
  - M) 73 Młg
  - N) 93 Młg
  
- 4/ evsj t`tki i Bmb Avłqi kZKiv KZ Ask Avłm gvQ t`tk?
  - K) 3 fVM
  - L) 5 fVM
  - M) 6 fVM
  - N) 8 fVM



Kul. I c j D b q b ĩ ģ

cwi evi - t ÷ t M t ÷ v g u U w W  
D`vni Y - t ÷ t M t ÷ v g v t d u m t q U m (*Stegostoma fasciatus*)

eM® t`v q w j d i u g m  
cwi evi - t`v q w j w W  
D`vni Y - t`K w j I W b t m v i i v t K v q v n (*Scoliodon sorrakowah*) (n v ĩ i)

cwi evi - u ĩ i w b w W  
D`vni Y - u ĩ i b v t e- w P (*Sphyrna blochii*) (n v Z ĩ i n v ĩ i)

eM® U i t c w W b d i u g m  
cwi evi - U i t c w W b w W  
D`vni Y - G m t U ĩ w W c t U w i w R (*Astrape dipterygii*) (B t j K u U K t i)

t k Y x- A m u U K u \_ m  
D c t k Y x- G K u U b c t U w i w R  
D c- w e f i M- t U w j I m u U

eM® A m t U I M- m d i u g m  
cwi evi - b U c t U w i w W  
D`vni Y - b U c t U i m w P Z j v (*Notopterus chitala*) (w P Z j)

eM® B t j w c d i u g m  
cwi evi - B t j w c w W  
D`vni b- B j c m g v P b v U v (*Elops machnata*)

cwi evi - t g M t j w c w W  
D`vni Y - t g M j c m m v B u c b t q W m (*Megalops cyprinoides*)

cwi evi - A`j w e j w W  
D`v- A`j w e D j v f i j t c m (*Albula valpes*)

eM® A`v s, B j d i u g m  
cwi evi - A`v s, B j w W  
D`vni Y - A`v s, B j v t e s M t j b u m m (*Anguila bengalensis*)

cwi evi - g w i b u w W  
D`vni Y - g w i b, q v g W m v i w Z (*Moringua modgarti*)

cwi evi - g y r u b w W  
D`vni Y - j v B t K v W b u U m U v B j (*Lycodontis tile*)

cwi evi - A u d K u \_ w W

BD w U-1



D`vni Y - j`vgtbt÷vgv AwitqUwj m (*Lamnostoma orientalis*)

eM<sup>®</sup> Kycdi ugm

cwi evi - KycwW

D`vni Y - tUbsvtj vmv Bwj kv (*Tenualosa ilisha*)

cwi evi - ucñuUM`vmtUwi wW

D`vni Y - Bwj mv tgmj cUiv (*Ilisha megaloptera*)

cwi evi - Bsmj wW

D`vni Y - KBwj qv tBMtj ±v (*Coilia neglecta*)

eM<sup>®</sup> tMtbwvi bwPd i ugm

cwi evi - PnbwW

D`vni Y - P`vbtvm P`vbtvm (*Chanos chanos*)

eM<sup>®</sup> mvBucñbdi ugm

cwi evi - mvBucñbwW

D`vni Y - KvZj v KvZj v (*Catla catla*)

cwi evi - c`vi vmvBtj wvi bwPwW

D`vni Y - cñvi vmvBtj wvi bKvm tUbuKtj Uvm (*Parapsilorhynchus tentaculatus*)

cwi evi - mvBtj wvi bwPwW

D`vni Y - mvBtj wvi bKvm Mñmuj m (*Psylorhynchus gracilis*)

cwi evi - e`vj Uwi wW

D`vni Y - evj tUvi v evgñbKv (*Balitori burmanica*)

cwi evi - tKvneUwW

D`vni Y - ewUqv tWwi I (*Batia dario*)

cwi evi - evMwi wW

D`vni Y - ugmUvm tUsMvi v (*Mystus tengara*)

cwi evi - wj gj wW

D`vni Y - I gcK cre`v (*Ompok pabda*)

cwi evi - w`j weW

D`vni Y - AvBwj qv KBj v (*Ailia coila*)

cwi evi - c`vsMwmmwW

D`vni Y - cvstMwmmqvm cvstMwmmqvm (*Pangasius pangasius*)

Kul. I cj. Dbaq b ǝ

cwi evi - A'igen Bimic UuW

D`vni Y - A'igen Btmcm g'vs#Mtqm (*Amblyceps mangoies*)

cwi evi - imtmwi uW

D`vni Y - evMwi qm evMwi qm (*Bagarius bagarius*)

cwi evi - K'wi uW

D`vni Y - K'wi qm teU#Kvm (*Clarias batrachus*)

cwi evi - tn#Ui cubDmiUuW

D`vni Y - tn#Ui cubDm#Um dnmij m (*Heteropneustes fossilis*)

cwi evi - PviK uW

D`vni Y - PviKv PviKv (*Chaca chaca*)

cwi evi - A'wi uW

D`vni Y - A'wi qm MtMvi v (*Arius gagora*)

cwi evi - tc- v#Uwm uW

D`vni Y - tc- v#Uwmv #Kubqvm (*Plotosus canius*)

eM<sup>®</sup> m'vj gubdi ugm

cwi evi - m'vj #gub uW

D`vni Y - m'vj #gv Bwi uWqvm (*Salmo irideus*)

eM<sup>®</sup> Aj ycdi ugm

cwi evi - nvi cWbuUuW

D`vni Y - nvi cWb ubnwi qvm (*Harpadon nehereus*)

eM<sup>®</sup> mvBuc#bvWbuUdi ugm

cwi evi - #nigi 'igud uW

D`vni Y - nvB#t#vi 'igdlm R'vb\_c#Ui vm (*Hyporhamphus xanthopterus*)

cwi evi - tetj ub uW

D`vni Y - tR#bb#UWb Kvbimj v (*Xenentodon cancila*)

cwi evi - Ai vBvR uW

D`vni Y - Ai vBvR qm #gj w#Mgv (*Oryzias melastigma*)

cwi evi - mvBuc#bvWbuUuW

D`vni Y - Gdubqvm uWmcvi (*Aphanius dispar*)

cwi evi - cwmij uW

D`vni Y - M'vgenqv Gwclbm (*Gambusia affinis*)

BDubU-1

eM® umbtbi\_digi  
cwi evi - mbb`w\_wV  
D`vni Y - mcçcivK`vgcim ehiKwi bKvm (*Hippocampus brachyrhynchus*)

eM® mbeibipdi igm  
cwi evi - mbeibipwV  
D`vni Y - A`vgwçbvm Kipqv (*Amphipnous cuchia*)

eM® t`vi ucubdi igm  
cwi evi - c- vUçmçvij wV  
D`vni Y - c- vUçmçvij vm BvUkvm (*Platycephalus indicus*)

eM® cvi wmdi igm  
cwi evi - çmçUçigwV  
D`vni Y - çj wUm K`ij çKwi dvi (*Lates calcarifer*)

cwi evi - A`vgevmmwV  
D`vni Y - A`vgevmm bvgv (*Ambassis nama*)

cwi evi - çmi i vbwV  
D`vni Y - Gucubçdj vm g`vj vewi Kvm (*Epinephelus malabaricus*)

cwi evi - wj wvbwV  
D`vni Y - wj wvbw vknvgv (*Sillago shihama*)

cwi evi - çj vewwV  
D`vni Y - çj vçvçUm mçj bççgbmm (*Lobotes surinamensis*)

cwi evi - wçgy wV  
D`vni Y - çgvçWmm Kçvi mub (*Pomadasys commersonni*)

cwi evi - `úwi wV  
D`vni Y - A`vKvç`vc`vMi vm çj Uvm (*Acanthopagrus latus*)

cwi evi - mvBbwV  
D`vni Y - çvgv çvgv (*Pama pama*)

cwi evi - j çRbwV  
D`vni Y - j ççRbvm Rvb (*Lutjanus johni*)

cwi evi - K`vi svwV  
D`vni Y - ççMçj vmçcm Ki WvBçv (*Megalaspis cordyla*)

cwi evi - Uç- vUwV

gvçQi Pvl I e`e`vçbv

Kul. I c j ■ Dbqb ṽḡ

D`vni Y - Uḡ. vḡUm K`vUwi qvm (*Toxotes chatareus*)

cwi evi - ḡ`ḡUvd`vMvM

D`vni Y - ṽḡvḡUḡdMvm Avi Mvm (*Scatophagus argus*)

cwi evi - bvbvMvM

D`vni Y - bvbWvm bvbWvm (*Nandus nandus*)

cwi evi - ḡevMvM

D`vni Y - ḡevMm ḡevMm (*Badis badis*)

cwi evi - vMkuj vM

D`vni Y - I ḡi I ḡµvvgm bvBḡj vMUKvm (*Oreochromis niloticus*)

cwi evi - BḡKvbvM

D`vni Y - ḡi ḡgvi v ḡi ḡgvi v (*Remora remora*)

cwi evi - ḡMvevM

D`vni Y - ḡMḡmḡMveqvm vMDwi m (*Glassogobius giuris*)

cwi evi - UḡBvKDi vM

D`vni Y - UḡBvKDi vm nḡgj v (*Trichiurus haumela*)

cwi evi - ḡ`ḡgvevM

D`vni Y - mvBveqig ḡ UḡvUig (*Cybium guttatum*)

cwi evi - ḡḡḡgvmvM

D`vni Y - ḡḡḡgvmvM mvBḡbwi qvm (*Stromateus cinereus*)

cwi evi - PvbvM

D`vni Y - Pvbv c`vstUUvm (*Channa punctatus*)

cwi evi - A`vbvevbvUvM

D`vni Y - A`vbvevm ḡUḡḡḡvMvbqvm (*Anabas testudineus*)

cwi evi - ḡej bvUvM

D`vni Y - Kuj mv ḡclmḡqUvm (*Colisa fasciatus*)

eM<sup>®</sup> ḡUUḡI WbvUdi vgm

cwi evi - UḡBqvK`vbv vM

D`vni Y - UḡBqvK`vb\_vm evqvKuj qvUvm (*Triacanthus biaculeatus*)

cwi evi - ḡUUḡI WbvUvM

D`vni Y - ḡmḡj vḡbvWb c`vḡUvKv (*Chelonodon patoca*)

eM<sup>®</sup> uc- D`i v`bKuUdi ugm  
 cwi evi - mvBt`bv`M- vmiW  
 D`vni Y - mvBt`bv`M- vmm mvBt`bv`M- vmm (*Cynoglossus cynoglossus*)

cwi evi - t`mij W  
 D`vni Y - m`BbvCP`v c`vb (*Synaptura pan*)

eM<sup>®</sup> gvmUv`mg`ej di ugm  
 cwi evi - gvmUv`mg`ej W  
 D`vni Y - gvmUv`mg`ej vm Avi`gUvm (*Mastacembelus armatus*)

**ngVv cub I tj`bv cubi maviY uKQy`Q`i Zwij Kv**

**ngVv cubi g`Q`i Zwij Kv**

<u>μugK bs</u>	<u>evsj v big</u>	<u>e`AwbK big</u>
1	dij	<i>Notopterus notopterus</i>
2	uPZj	<i>Notopterus chitala</i>
3	i " B	<i>Labeo rohita</i>
4	KvZj v	<i>Catla catla</i>
5	g`Mj	<i>Cirrhinus mrigala</i>
6	Kvij evDm	<i>Labeo calbasu</i>
7	evUv	<i>Labeo bata</i>
8	f`Mbv	<i>Cirrhinus reba</i>
9	mi c`y`	<i>Puntius sarana</i>
10	t`QvUc`y`	<i>Puntius stigma</i>
11	gnv`kvj	<i>Tor tor</i>
12	gv, i	<i>Clarias batrachus</i>
13	uks	<i>Heteropneustes fossilis</i>
14	t`Usi v	<i>Mystus tengara</i>
15	AvBi	<i>Mystus aor</i>
16	cve` v	<i>Ompok pabda</i>
17	KB	<i>Anabas testudineus</i>
18	UmK/j vUv	<i>Channa punctatus</i>
19	t`kvj	<i>Channa striatus</i>
20	MRvi	<i>Channa marulius</i>
21	tevqj	<i>Wallago attu</i>
22	WvbKvbr	<i>Esomus danricus</i>
23	gj v	<i>Amblypharyngodon mola</i>
24	Pmcj v	<i>Gudusia chapra</i>
25	t`f` v	<i>Nandus nandus</i>
26	eD gvQ	<i>Botia dario</i>
27	evBg	<i>Mastacembelus armatus</i>

Kul. I cji Dbq b ĩž

28	Ziv evBg	<i>Macragnathus aculeatus</i>
29	teĵj	<i>Glossogobius giuris</i>
30	Kvĵkĵ v	<i>Xenentodon cancila</i>
31	ĵkĵ s	<i>Silonia silondia</i>
32	evPv	<i>Eutropiichthys vacha</i>
33	civMvm	<i>Pangasius pangasius</i>
34	vi Uv	<i>Rita rita</i>
35	P'vKv	<i>Chaca chaca</i>
36	Pv`v	<i>Ambasis nama</i>
37	Lĵj kv	<i>Colisa fasciatus</i>

tj vbr c vbi gvQ i Z vj Kv

<u>µĵgK bs</u>	<u>eivj v big</u>	<u>ĵeĀvĵK big</u>
38	Bĵj k	<i>Tenualosa ilisha</i>
39	Pv`bv Bĵj k	<i>Tenualosa toli</i>
40	m'v gb	<i>Salmo irideus</i>
41	ifcPĵv	<i>Stromateus cinereus</i>
42	tfUKx	<i>Lates calcarifer</i>
43	gvBU`v	<i>Cybium guttatum</i>
44	j BU`v	<i>Harpadon nehereus</i>
45	Qĵj gvQ	<i>Trichiurus haumela</i>
46	nv½i	<i>Scoliodon sorrakowah</i>
47	Bĵj KvĵK ti	<i>Astrape dipterygii</i>
48	nvZĵi nv½i	<i>Sphyrna zygaena</i>
49	cUKv	<i>Tetraodon patoka</i>
50	`vZbv	<i>Acanthopagrus datina</i>
51	Mvs gv, i	<i>Plotosus canius</i>
52	Uĵv	<i>Euthynus affinis</i>



**Abĵj b (Activity)** t Avcbri emoi Avĵkĵĵk ĵeĀvĵeRj vĵĵq th mKj gvQ AvĵQ Ziv`i %ĵeĀvĵK bigmn GKĵU Z vj Kv `Zvi Ki ĵj|

**mvi gg** mnRfĵte tPbv I Dc `vcĵbi Rb` ĵeĵkI Pvi ĵĵK `eĵkĵó'i Dci ĵfĵĒ Kĵi cĵvĵĵK AmsL` ĵĵž ĵĵž tMvĵĵZ fĵM Kiv nĵĵQ| gvQ kvZj i<sup>3</sup> ĵeĵkó RjR tĵiĵŪx cĵvĵ hvi v dĵKvi mĵvĵĵh` kĵmKĵhPĵj vq Ges tRvo ĵeĵRvo cvLbvi mĵvĵĵh` Pj vPj Kĵi | eZĵvĵb ĵek nvRvi cĵRvĵi gvQ AvĵQ| gvQ Kvĵv (chordata) cĵeP fĵvĵĵv (vertebrata) Dc-cĵeP A`vMbv\_v, KbvĵKĵ\_m I AmĵKĵ\_m tkYxi Aš-fĵ | iĵ, KvZjv, gĵMj, micĵ, gv, i BZ`v` ĵgvĵi c vbi gvQ| Bĵj k, ifcPĵ`v, tfUKx, gvBU`v BZ`v` tj vbr c vbi gvQ|



## cuVvEi gj`iqb 1.2

mWk DEti i cuK UK iPy (✓) i b

1/ gvQ ej tZ UK eSvq?

K) Dò i<sup>3</sup> nekó cŶx

L) kxZj i<sup>3</sup> nekó cŶx hvi v dædæmi mivth` klmKvhPij vq

M) Dò i<sup>3</sup> nekó cŶx hvi v dZKvi mivth` klmKvhPij vq

N) kxZj i<sup>3</sup> nekó Rj R tgi yŪx cŶx hvi v dZKvi mivth` klmKvhPij vq

2/ nvzi tKvb tkYxi AšfŶ?

K) mBtKmtUvgvUv

L) KbWkK\_m

M) AmUK\_m

N) A`vgudieqv

3/ iP gvtQi `eÁnbK big UK?

K) Labeo rohita

L) Labeo calbasu

M) Labeo bata

N) Labeo gonius

4/ gv, i gvQ tKvb cwi evti i AšfŶ?

K) mBtCŶW

L) eWvi W

M) K`vi W

N) mJ y`W







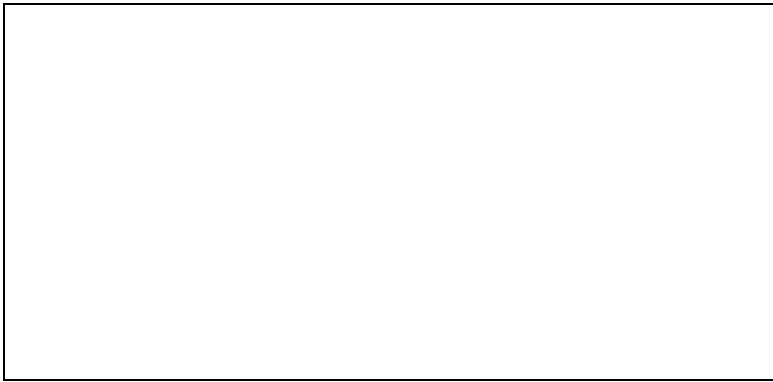
**Ablyj b (Activity) t** Aivbri Dc`Rjvi A\_`%wZK , iazm`ubegvtQi (e`AvibK bvgmn) GKiu Zinj Kv`Zwi Kily Ges Gt`i A\_`%wZK , iazjeyv`r Kily|

**Pv`Ivc`thl`lx t` kx I vet` kx gvtQi cni`vPvZ**

**1| KvZjv (Catla catla)**

fvi Z, ersj vt`k I ngqvbgvti GB gvQ cvl qv hvq| Gii wKtkvi I cY`eq`r Dfq t`q`T`B c`wYR c`w`Ub Lvq Zte wKQymKQyA`ij wR tL`Z c`ti | Bw`Uqvb tgRi Kv`tcP gta` KvZjvi e`w`xi nvi met`P`q teik Ges Gii met`P`q eo ntq`\_vtK| `B t`\_tK wZb eQ`ti i gta` Giv th`Sb cwi`c`Zv jvf Kti | KvZjv `rfimeKfite b`xtZ tg`Sng`x e`w`cv`Zi mgq Gic`J t`\_tK AvM`÷i gta` c`Rbb Kti \_vtK| c`Rbb mg`q b`x t`\_tK A`ev c`Yw`Z c`Rb`b`bi (Induced breeding) gva`tg n`vPwi t`\_tK Drcw`Z KvZjvi tcvb msl`M`h Kiv hvq| Mto c`Z M`g `w`nK I R`b`i Rb` KvZjv 150wU wWg t` qvi `q`gZv i`v`L (wP`T` 1)

Bw`Uqvb tgRi Kv`tcP gta` KvZjvi e`w`xi nvi met`P`q teik Ges Gii met`P`q eo ntq`\_vtK|



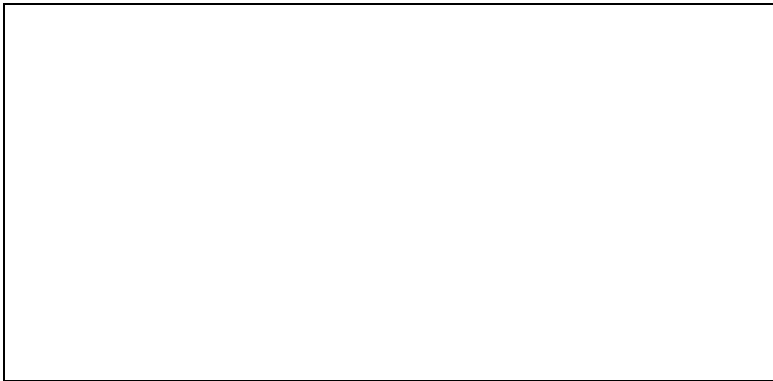
wP`T` 1 t KvZjv

**2| iB (Labeo rohita)**

fvi Z I ersj vt`tki b`-b`xtZ iB gvQ w`P`iY Kti \_vtK| Giv eo Ae`lq c`w`Ub I c`Bbkj `Re c`v`\_`Ges wKtkvi Ae`lq `i`ayc`wYR c`w`Ub tL`q`\_vtK| w`Zxq eQ`ti i tk`l`i w`tk Giv th`Sb cwi`c`Zv jvf Kti Ges t`tni c`Z M`g I R`b`i Rb` 200wU wWg t` qvi `q`gZv i`v`L| iB gvQ `rfimeKfite b`xtZ gvP`\_t`\_tK RjvB gvm c`h`S`l wWg w`tq`\_vtK| GQvov c`Yw`Z c`Rb`b`bi gva`tg Ly mnt`RB iB gvtQi tcvb Drcv`b Kiv hvq (wP`T` 2)|

wP`T` 2 t iB

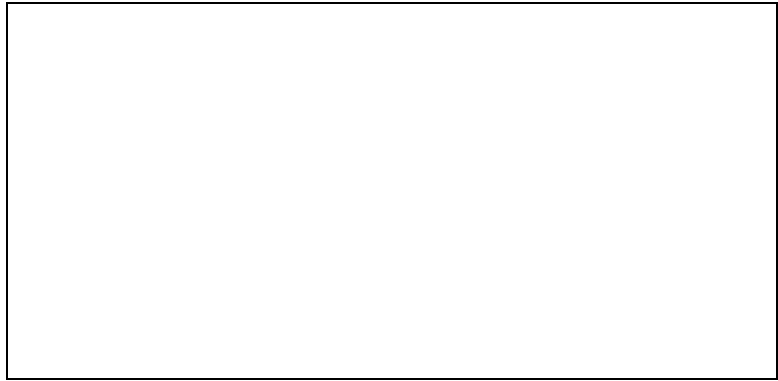
iB gvQ b`xtZ gvP`\_t`\_tK RjvB gvm c`h`S`l wWg w`tq`\_vtK| GQvov c`Yw`Z c`Rb`b`bi gva`tg Ly mnt`RB iB gvtQi tcvb Drcv`b Kiv hvq|



**3/ gḥMj (Cirrhinus mrigala)**

gḥMj mḥaviYZ  
Zj ḥ ḥki ḥRe c ḥḥ  
ḥLḥq ḥḥK|

gḥMj gvQ fvi Z I evsj ḥ ḥki b ḥḥZ cvl qv ḥvq| GB gvḥQi emḥK Aege AtbKuv i ḥ Gi  
mḥ ḥ ḥgtj ḥvq| eq ḥ gḥMj mḥaviYZ Zj ḥ ḥki ḥRe c ḥḥ ḥLḥq ḥḥK| Giv cḥḥUbl ḥLḥq  
ḥḥK| GK eQi eqḥmB Giv ḥḥSb cḥi c ḥZv jvf Kḥi| cḥZ Mḥg ḥ ḥnK I Rḥbi Rb ḥ Giv 50-  
100ḥU ḥḥḥg ḥ ḥZ cvḥi| Giv ḥ ḥḥeKfḥḥe b ḥḥZ ḥḥḥg ḥ ḥq| cḥYḥḥ Z cḥRḥbi gḥa ḥḥḥg|  
mḥḥRB ḥcvb Drcḥ ḥ Kiv ḥḥZ cvḥi (ḥPḥ 3)|

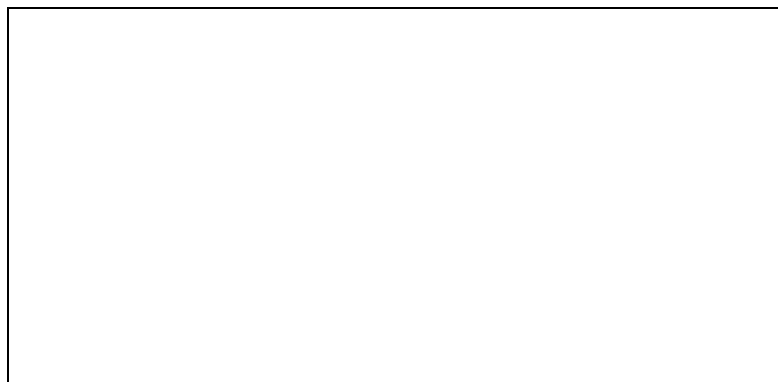


ḥPḥ 3 t gḥMj

**4/ ḥmj fvi Kivḥ (Hypophthalmichthys molitrix)**

ḥmj fvi Kivḥcḥbi  
Dcḥi ḥ ḥ Ges ga ḥ  
ḥḥi Lvei Lḥq| dvBḥUv  
cḥḥUḥ ḥḥi cḥḥb  
cḥKḥZK Lḥḥ|

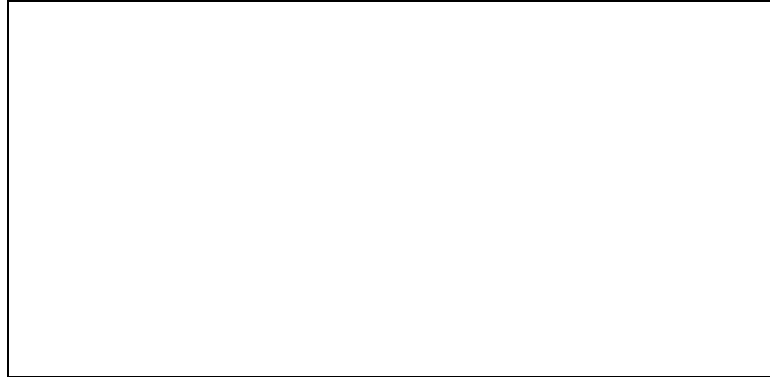
ḥmj fvi Kivḥcḥ Drcḥḥ Pḥb ḥ ḥk ḥḥj I eZḥḥḥ GB gvQḥU ḥḥḥḥḥḥ ḥk Pḥl Kiv ḥḥḥQ| ḥi Yy  
ḥcvb Ae ḥḥḥ ḥmj fvi Kivḥḥi ḥḥUdvi bḥḥK Rḥ cḥḥUḥ Lḥq| Giv cḥbi Dcḥi ḥ ḥ Ges ga ḥ  
ḥḥi Lvei ḥLḥq ḥḥK| dvBḥUv cḥḥUḥ ḥḥi cḥḥb cḥKḥZK Lḥḥ| ḥ ḥ ev ḥZb eQi eqḥm  
ḥmj fvi KivḥḥḥSb cḥi c ḥZv jvf Kḥi| ḥḥḥḥ ḥ Ges RjḥB gvḥmi ḥḥa ḥ b ḥḥZ Giv cḥRḥb  
Kḥi| Pḥl Kivi Rb ḥ cḥYḥḥ Z cḥRḥbi gḥa ḥḥḥg ḥḥi ḥcvb DrcḥḥKiv AveḥḥK| cḥZ Mḥg  
ḥ ḥnK I Rḥbi Rb ḥ Giv 150-200ḥU ḥḥḥg ḥ ḥZ cvḥi (ḥPḥ 4)|



ḥPḥ 4 t ḥmj fvi Kivḥ

5/ weMtnW Kvc®(Aristichthys nobilis)

weMtnW KvtcP DrcwEi Pxb t`tk| wKtkvi I eq` Dfq Ae`vq Dw`c cW4Ub I c0YrR  
cW4Ub Lvq| Giv t`Ltz AfbKUvB wnj fvi KvtcP gZ i aygv\_v Zjbrvj-Kfite eo| weMtnW  
Kvc®KvZjvi mstM Prl Kiv DwPZ bq hw` br tcvbr Qvovi nvi mgSg Kiv nq| weMtnW Kvc®  
wZb t`tk cW4Ub eQtii gta` thsb cwic°Zv jvf Kti| cKzi Prli Rb` c0Yw` Z cRbtbi  
gva`tg Gt`i tcvbr Drcv`b Kitz nte (wP1 5)

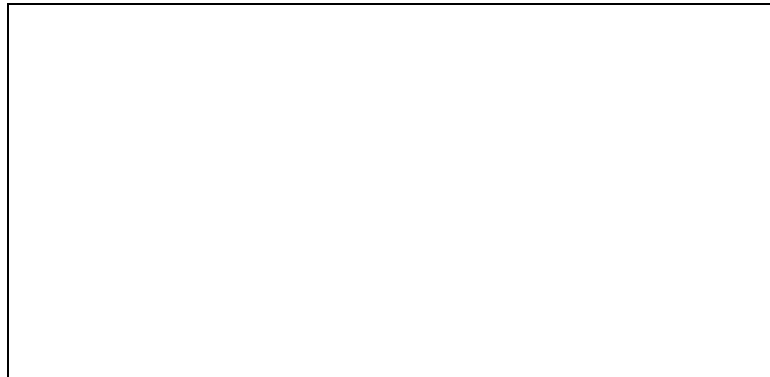


wP1 5 t weMtnW Kvc®

6/ Mm Kvc®(Ctenopharyngodon idellus)

3 tm.wg. j w`nl qvi ce`  
chsfGiv cPz c0YrR  
cW4Ub Lvq wKs`Gi ci  
ciB Giv Rj R eo  
AvMvQv Ges cKzi tKtU  
t`qv Wwzvi AvMvQv tLtz  
i iyKti|

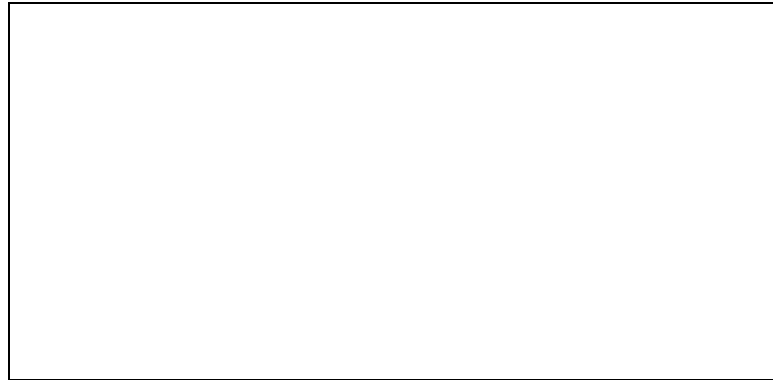
Mm Kvc®Pxtbi wKQyAsk Ges fZc e`tmwftqZ BDwbqzbi wKQyAsk evm Kti| 3 tm.wg.  
j w`nl qvi ce`chsfGiv cPz c0YrR cW4Ub Lvq wKs`Zvi ciciB Giv Rj R eo AvMvQv  
Ges cKzi tKtU t`qv Wwzvi AvMvQv tLtz i iyKti| Mm Kvc®B t`tk wZb eQtii gta`  
thsb cwic°Zv jvf Kti| cKzi Prl Kivi Rb` Gt`i tK c0Yw` Z cRbb Kti tcvbr Drcbæ  
Kiv Avek`K| c0Z Mlg` wnk I Rbtbi Rb` Gt`i wltgi msL`v 75 ntq`vK (wP1 6)|



wP1 6 t Mm Kvc®



uKtkvi Ae`iq Giv meFK, dvBtUrcwUub, Ry cwUub I cBbkij `Re c`v`tLiq tetP  
\_vtK/ cY`eq` Ae`iq Giv dvBtUrcwUub, Ry cwUub c`vb Lv` intmte tLiq \_vtK  
(uP 8)



uP 8 t tZj mcqv

9/ AwdKvb gv<sub>2</sub> i (Clarias gariepinus)

GB gvQ AwdKvi newfbAAtj `rfmeKfite civl qv hvq/ 1989 mtb ersj vt`tk cUg GB gvQ  
Avg`mb Kiv nq/ uKtkvi gv<sub>2</sub> i Ryc- vUub I KxUcZtzi jvfPLv` intmte MhY Kti / cUg  
eq` gvQ meFK/ newfbacUyx I Dw`c RvZxq Lv` e`Giv tLiq \_vtK/ AwdKvb gv<sub>2</sub> i t`o  
t`tk` eQti i gta` cRbbqg nq/ gvQi IRtbi I ci wbfP Kti wltgi msLv 160000  
Gi gZ nq/ cktzi Pvl i Rb` G gvQi cYw`Z cRbb Avek`K (uP 9)

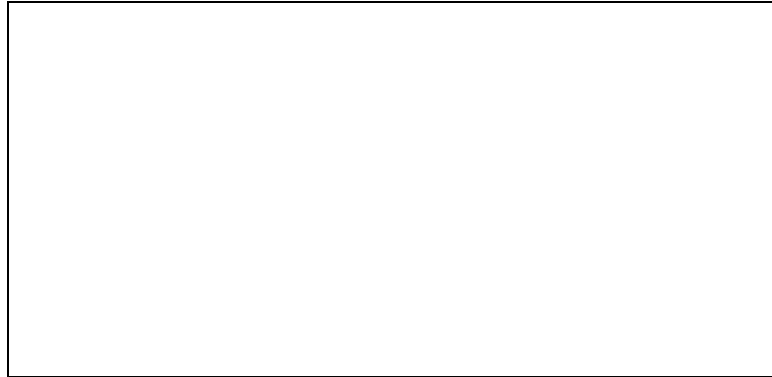
cUg eq` AwdKvb gv<sub>2</sub> i  
meFK/ newfbacUyx I  
Dw`c RvZxq Lv` e`Giv  
tLiq \_vtK/



uP 9 t AwdKvb gv<sub>2</sub> i

10| gv, i (t`kx) (Clarias batrachus)

gv, i gvQ wRIj gvQmg tni gta" Ab`Zg| Giv cKZ, tWiev, wej, Rjvfiug meP Ae`vb Kti| gv, i gvQ djzKvi mnvith" cmbtZ `exfZ Aw tRb MhY Kti klmKvhPvj vq Averi AwZwi<sup>3</sup> kpmZtšj mnvith" evZim t\_tK Aw tRb MhY KiTZ cvti | ZvB Giv cmbi evBti AfbKTY tetP\_vKtZ cvti | gv, i gvQ cKzi i Zjt`tki AvarcPr`Re c`v\_© KxUcZ½ BZ`w` Lvq| G gvQ GK eQti cRbb DcthwMx nq| elKvtj wej, avb tTtZ Gt`i rfmek cRbb nq| Zte cKzi Pvl Kivi Rb" cYw`Z cRbb Avek`K| t`g gvQti I Rb wntmte wWtgi msL`v 1000-10000 Gi gZ (wPĪ 10)|



wPĪ 10 t`kx gv, i



**Ablyj b (Activity) :** Acwi YZ I cYeq`c Ae`vq tKvb gvQ Kx Kx Lv` Lvq, KZ eQi eqtm thšb cwi c°Zv jvf Kti Ges wWg t`qvi msL`v DttLceR PttlvcthwMx t`kx I wet`kx 8wU (4+4) gvQti eAmbK bygmn GKwU Zwiij Kv`Zwi Kity|



**mvi gg<sup>q</sup>** evsj vt`tk cĉq 260wU wgvv cmbi, 475wU tjvbr cmbi Ges 12wU wet`kx cRwZi gvQ itqtQ| iB, KvZjv, gMj, cvsMm, gv, i BZ`w` A`wZK , iZm`ubegvQ| Bwij k gvQ AwfcĉvbKvix (Migratory) gvQ| KvZjv gvQ 2-3 eQti i gta" thšb cwi c°Zv jvf Kti | gv, i gvQ wRIj gvQti gta" Ab`Zg| tZjwcvq, wnj fvi Kvc, Mhm Kvc, KvcP, AwdKvb gv, i BZ`w` PvlthwM" gvQ wet`k t\_tK Avg`mb Kiv ntqtQ| cĉB eq`c AwdKvb gv, i mePK|



### cvVvEi gj`iqb 1.3

mWk DEti i cvk Wk (✓) wPy w b|

1/ tKvbW mvgv`K gvQ?

- K) iB
- L) wPZj
- M) ifcPuv
- N) AvBi

2/ tKvbW `r`ycmbi gvQ?

- K) tKvij
- L) evUv
- M) tFUKx
- N) jBU`v

3/ KvZj v gvQ cKwZtZ mvari YZ Kx Lvq?

- K) dvBtUv cvWUb
- L) Ry cvWUb
- M) cPbkxj `Re c`v`L`
- N) KxUcZ½

4/ cWZ Mg `nK IRtbi Rb` iB gvQ Kx cwi gvY wWg w`tZ cvti?

- K) 200wU
- L) 300wU
- M) 400wU
- N) 100wU

5/ KZ eqtm wmj fivi Kvc`cRbb`lg nq?

- K) 1 - 1.5 eQi
- L) 1.5 - 2 eQi
- M) 2 - 3 eQi
- N) 3 - 4 eQi

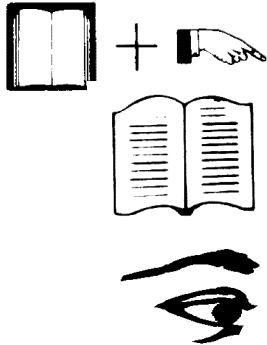
### e'enwiK

#### cW 1.4 iB RvZiq gvQ Ges uPsnwi t`tni weifbæAsk kbr³KiY I uPwYZKiY

##### G cW tkI AvciB

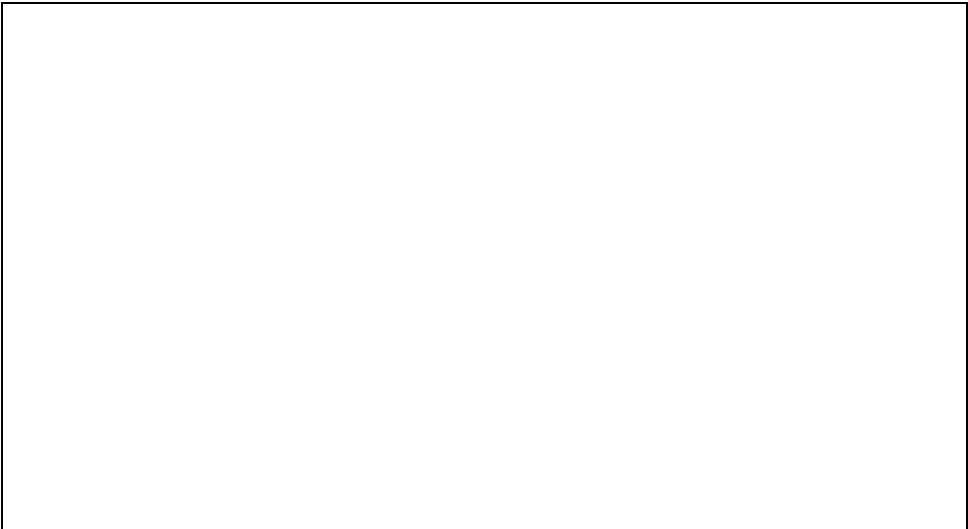
- iB gvQwi t`tni weifbæAsk uPwYZ I kbr³ KiZ cviæb|
- uPsnwi t`tni weifbæAsk uPwYZ I kbr³ KiZ cviæb|

**cÜvjxt** ubtPi uPÎu fij fite t`Lb Ges tm tgvZvteK iB RvZiq gvQwi Qwe GtK t`tni weifbæAsk uPwYZ I kbr³ KiB|



##### uPÎ 11 t iB

**cÜvjxt** ubtPi uPÎu fij fite t`Lb Ges tm tgvZvteK GKÎu uPsnwi t`tni Qwe GtK weifbæAsk uPwYZ I kbr³ KiB|



##### uPÎ 12 t Mj`v uPsnwi





### Povšgji`iqb

#### msuŋB I iPbvji-K ckae

- 1| gvQ PritI i Biznm eYŋv Ki ly|
- 2| ersj vt`tk gvQ PritI i iŋ; Avtj vPbv Ki ly|
- 3| gvŋQi tkYweb`im ij Lly|
- 4| ersj vt`tki ugVv cmb I tjvbn cmbi gvŋQi Zvij Kv w`b|
- 5| ersj vt`tki A\_ŋwZK iŋ; m=ubogvtQi Zvij Kv w`b|
- 6| ersj vt`tk PritIvcŋhMx t`kx I weŋ`kx gvŋQi cmi vPwZ eYŋv Ki ly|



### DĚigjv

#### cW 1.1

- 1| K                      2| L                      3| M                      4| L

#### cW 1.2

- 1| N                      2| L                      3| K                      4| M

#### cW 1.3

- 1| M                      2| L                      3| L                      4| K                      5| M



8) hw` mæ nq Zvntj gwj tKi emoi KvQvKwQ cKz Lbb Kiv DvPZ| hw` emo t\_tK  
AtbK`ti nq Zvntj gvQ Pwi nl qvi ht\_ó SxK\_vtK|

9) cKzi i cmbtZ Qvqv cotZ cvti Ggb RvqMvq cKzi i`vb ubePb Kiv DvPZ bq|

AvqZvKvi cKz DEi  
`wjtY j æ ntj gvQ  
Pvtli Rb` fij |

mvavi Yfvte AvqZvKvi cKz DEi `wjtY j æ ntZ nte hvi dtj cKzi mhjtjvK tenk cwi gvY  
cote|

**gvQti cKz Lbb cwi Kí bv Kvtj vbtPi avcmg n AbgyiY KivevAbvq**

K) cÚtg H AÁtj i fvg Rixc KitZ nte| GRb` H`vtb 2 wgvUvi MZ©Kti wevfbe`ti i  
gvUvi bgbv mSMh Kti Zv wekKtY KitZ nte|

L) ewYvR`K DtítK` cKz Lbb Kitj fij iv`li cvtk Ges evRtíi KvQ`vb ubePb  
Kivi AtbK mjevav itqtQ|

**gvUvi MVb wekKtY**

Kv`v ev GtUj I t`vAvk  
gvUvi wgvYB cKz  
Lbtbi Rb` Av`k@gvU|

Kv`v ev GtUj I t`vAvk gvUvi wgvYB cKz Lbtbi Rb` Av`k@gvU| G gvUvi cmb aviY  
¶lgZv tenk, cmb Pqvbtv tiva Kti Ges cvUub I tebt\_vm Drcv`tbi Rb` cwp mgx cwi tek  
mjo Kti | ewj gvUvi w`hv nq Ges cmb aviY ¶lgZv LvB Kg Ges iayGtUj gvUvi AbvP nq  
Ges tNvj vZimjo Kti |

AvtMB ejv ntqtQ th gvUvi cÚZvU`ti i gvQ Pvtli DcthvMZv cix¶lv vbx¶lv KitZ nte|  
wevfbefvte GvU Kiv thtZ cvti | thgb wevfbe`li t\_tK gvUvi bgbv mSMh Kti ej`Zwi Kti  
t`Lv thtZ cvti | hw` ejvU Lv fij fite RgvU evta Zvntj eStZ nte gvUvtZ chvB Kv`v  
AvtQ Ges Dvvi cmb aviY ¶lgZv fij nte| ejvU hw` tdtU hvq A`ev tft½ hvq Zvntj  
eStZ nte th Dvvi`Yv`Y Kg fij ev fij bq| G cix¶lv hv`wvxvstbqv bv hvq Zvntj  
bZbfvte GKgtv gvUvi vbtq Dvvi cmbtZ wRvtZ nte hvZ Dvvi wKQv Avvtjv nq| Gevi k³  
Kti nvZ w`tq DvvtK mstKvPb KitZ nte Ges Zvici Pvc Aegv KitZ nte| hw` gvU  
nvZi AvKvi ati ivLZ cvti Zvntj eStZ nte th DvvtZ chvB Kv`v AvtQ| hw` Zv bv nq  
Zvntj eStZ nte DvvtZ ewj i cwi gvY tenk AvtQ|

gvUvi wekKt MVb fij fite Rvvi Rb` GKgtv gvUvi vbtq Dvvi cmb w`tq tRvtZ nte Ges 15  
tm.wg. j æ AvKvti i tMj vKvi`tÚi gZ`Zwi KitZ nte| hw` AvKvi ati ivLZ bv cvti  
Zvntj eStZ nte Bvvi tenk ewj hv gvQ Pvtli Rb` AbgtvMx| hw` AvKvi ati  
ivLZ cvti Zvntj GtK evKv Kti AaeE`Zwi KitZ nte| hw` Avcwb GvUvi KitZ mg`bv  
nb Zvntj Dvvi t`vAvk gvUvi | hw` AaeE`Zwi nq Zte cyeE`Zwi Kivi tPov KitZ nte|  
hw` cyeE`Zwi bv nq eStZ nte Dvvi fvix t`vAvk, hw` Dvvi tdtU hvq Zvntj nvj Kv`K`g,  
(light clay) hw` tdtU bv hvq Zvntj K`g| Kv`v gvUvi cmbi aviY ¶lgZv metPtq tenk wKs`  
t`vAvk gvUvi tenk DeP|

MZ©Zwi Kivi ci gvUvi`Yv`Y cix¶lv vbx¶lv ntq tMj mKvtj cmb`jiv cyeKtZ nte|  
mviw`tb th cwi gvY cmb Pqvbtv Ges ev`uxfetbi Rb` Ktg tMtQ Zv mU`vKvtj bZb cmb  
w`tq cyeKtZ nte| Gevi XvKv ev cvZvhv MvtQi Wj w`tq MtZP glv tXtK w`b| hw`  
tenki fivM cmb ciw`b mKvj chšMvtZ`vtK Zvntj H gvUvi cKz Lbtbi KvR e`envi Kiv  
hvte|



**Ablyj b (Activity)** : aily, Avcub Avcbvi emoi migtb gvQ Prtli Rb GKwU ckyz Lbb Kivi K\_v fvetQb/ H v˘tbi gmlU gvQ Prtli DcthvMx wK bv Zv Kxfvte hvPvB Ki˘eb e˘vL˘v Kily/

**gmlU i vniqubK ˘enkó˘ vetk˘lY**

p<sup>H</sup> - gmlU p<sup>H</sup> μg vetk˘lY Kti gmlU mvariYZ Agwq, ˘lvi˘q ev ckgZv Rvbr hvq/ gmlU p<sup>H</sup> 4 Gi Kg Ges 11 Gi tewk ntj Dnv gvQ Prtli ckyz ubg˘Yi Rb˘ AthvM˘ weteWPZ nte/ gmlU p<sup>H</sup> 6.5-8.5 ntj metPtq fij/ ckyzi Zjvi gmlU p<sup>H</sup> gvb Rvbrvi ci ckyzi P˘b c˘qvtMi gv˘v vby˘ Kiv hvq/ GKfvM gmlUz ˘y fivM cwiZZ cwb wgnkZ Kti wj Ugym KivMR ev p<sup>H</sup> wglvi w˘tq Dnvi p<sup>H</sup> vby˘ Kiv hvq/

gmlU p<sup>H</sup> 6.5-8.5 ntj gvQ Prtli ckyz Lbtbi Rb˘ metPtq fij /

**dmtdU**

ckyzi i gmlUz mvgv˘ gv˘vq dmtdU\_vKtj fij nq/ gmlUz dmtdU Ave˘ Ae˘vq br t˘tK e˘envi thvM˘ Ae˘vq\_vKtZ nte/ gmlU cix˘lvi Rb˘ gwEKv cix˘lY wKU (Soil testing kit) e˘envi Kti dmtdtUi cwi gvY vby˘ Kiv hvq/

**bvBtUtRb**

ckyzi cwi wgz cwi gvY bvBtUtRb\_vKtj gvQti Drcv˘b fij nq/ ckyzi i gmlUz th ˘Re c˘v\_˘vK, e˘vKtUvi qv G ˘Re c˘v\_˘vKt ˘v˘tq A˘v˘gmbqv bvBtUtRb ˘Zwi Kti / A˘v˘gmbqv t˘tK e˘vKtUvi qvi wqvqi dtj bvBUtBU Ges cti bvBtUU bvBtUtRb Drcb˘enq/ bvBtUU bvBtUtRb dvBtUvcwUv Drcv˘tbi Rb˘ ˘iKvi nq/ e˘envi thvM˘ bvBtUtRb (bvBtUU bvBtUtRb) tewk\_vKtj gvQti Drcv˘b fij nte/ Soil testing kit w˘tq bvBtUtRtbi cwi gvY vby˘ Kiv hvq/

ckyzi i gmlUz cwi wgz bvBtUtRb\_vKtj gvQti Drcv˘b fij nq/

**cUwkvq**

dvBtUvcwUvUvbi Drcv˘tbi Rb˘ gmlUz c˘qvRbgZ cUwkvq\_vKtZ nte/ gmlUz wK cwi gvY cUwkvq AvtQ Zv Soil testing kit e˘envi Kti vby˘ Kiv hvq/



**mvi gg˘** th gmlU cwb aviY ˘lgZv tewk tm gmlUzB ckyz Lbb Kiv DvPZ/ gvQ Prtli ckyz eb˘v g˘ ˘t˘b ntZ nte/ tetj gmlU wQ˘h˘ nq Ges Gi cwb aviY ˘lgZv Kg/ GKfvM gmlUz ˘fvM cwiZZ cwb wgnkZ Kti wj Ugym KivMR ev p<sup>H</sup> wglvi w˘tq H gmlU p<sup>H</sup> vby˘ Kiv hvq/ Soil testing kit w˘tq gmlUz w˘v˘ dmtdU, bvBtUtRb Ges cUwkvq˘gi cwi gvY vby˘ Kiv hvq/

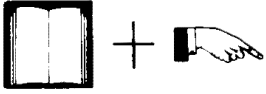


### cuVvEi gj`iqb 2.1

mWVK DEti i cuvk WVK wPy (✓) w b|

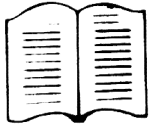
- 1/ tKvb&`rb cKz wbg#Yi Rb` Dc#hWk?
  - K  thLvfb gWU Kvki h#
  - L  thLvfb Mfxi gj-h# MvQcuj v AvtQ
  - M  thLvfb wcaovi wKwe AvtQ
  - N  thLvfb ch#B Avtj v evZvm AvtQ Ges gWU t`wAvk I Kv`vi wgkY
  
- 2/ gWU cmbtZ wfwRtq tMij vKvi `tUi gZ Kti DnvfK evkv Kti eEivKvi Kiv tMtj Dnv tKvb&ai tbi gWU wbt`R Kti?
  - K  Kv`vgWU
  - L  t`wAvk gWU
  - M  tetj gWU
  - N  nij Kv t`wAvk gWU
  
- 3/ gWU p<sup>H</sup> wYq Kivi Rb` th `eY `Zwi Kiv nq DnvfZ gWU I cmbi AbgvZ KZ?
  - K  1:1
  - L  1:2
  - M  1:3
  - N  1:4
  
- 4/ cKzi gWUtZ th `Re c`v`\_`vK Zv t`K tKvbW Avtgvbqv bivtUtRb `Zwi Kti?
  - K  cuWUb
  - L  fvBivm
  - M  e`vKtUwi qv
  - N  Gj wR

### cW 2.2 cubi Drm wPnyZKiY, mieivn I w@vkb cQvqv



#### G cW tkfI Avciw –

- cKzi cmb mieivtni Drmmgr eYv KiZ cvi teb|
- Kxfite cKzi cmb mieivn Kiv nq Zv eYv KiZ cvi teb|
- cKzi i cmb Kxfite w@vkb Kiv nq Zv RivtZ cvi teb|



mdj fite cKz cFZ Kivi Rb` chvB cmb mieivn wvDZ Kiv AZ`š , iZcyf bZb LbbKZ.cKz cmbtZ fuzKiv Qvovl Pqvfbv I ev`uxFebRwbZ cmb NvUwZ cY Kivi Rb` cmb mieivn wvDZ KiZ nq| ev`uxFebi gva`tg cmb metPtq tenk Ktg hvq MfSkvtj | KvRB cKzi i`vb wbePftbi mgq cubi wbfPthvM` Drm AvtQ wK bv Zv wvDZ KiZ nte|

MfSkvtj cKz hvZ cmb kY` bv nq tm Rb` chvB cubi e`e`v vKv Avek`K| mvari Yfite mviv eQiB cKz cmbtZ cY`vKtZ nte| GKBfite AvZwi`3 cmb hvZ cKzi i`vZ KiZ bv cvti tm w`tkI bRi w`tZ nte A`f cmb w@vkb i`e`v ivLtZ nte|

#### cubi Drm

mvariYZ SYf,`vqx b`x, Dcb`x, f,`t i i Dci w`tq cEwvZ epoi cubi Drm t`tK cKzi cmb mieivn Kiv nq`vK|

tKvb SYf g`Li wKtU cKz Lbb Kitj Dnv SYf cmb Oviv cY`nq| Drm wntmte SYf mjev GB th Dnv t`tK GZ tenk cmb cKzi Avtm bv hvZ cKz c- weZ nI qvi fq`vK| KvRB cmb mieivtni Drm wntmte SYfLgB wbfPthvM`| mZi vS cKz Lbtbi`vb wbePftbi mgq cQ`tg SYfAvjUvb Kiv DvPZ|

b`x I Dcb`x cmb mieivtni DchY` Drm wntmte e`eüZ ntZ cvti |

b`x I Dcb`x cmb mieivtni DchY` Drm wntmte e`eüZ ntZ cvti | A`bK b`xtZ mviv eQi cmb`vK Ges tmLvfb cmb mieivtni tKvb weNemvó nq bv| Avevi A`bK b`x MfSkvtj bve`Zv nwi`tg tdtj ev`i wKtq hvq| tm t`v`t i`Ktbr tgSm`g, hLb cKz i`wKtq hvevi fq`vK ZLb cmb cvl qv hvq bv| ZvB b`xK cKzi cmb mieivtni Drm wntmte wPnyZ KiZ b`xi bve`Zvi w`Kw Aek`B wefePbvq AvtZ nte|

cubi tKvb KihRi Drtmi Dcw`wZ Qvovl fij cKz`Zwi Kiv thtZ cvti | G mg`lcKz`tK A`bK mgq AvKvK cKz`0l ejv nq| Kvi Y Gme cKz` epoi cmb Oviv cY`nq ev Gme cKzi cmb mieivn AvKvki Dci wbfPkj | eisjv`tki tenki fVM cKz`B Gi AvLZvq cto| i`agv` epoi cmb thLvfb cubi Drm wntmte e`eüZ nte tmLvfb cmb mieivn I LibKvi Ocubi tktWi`0 I ci wbfP`Kti | cKzi i`Pvi w`tK th gY`v`Aj ev mgZj fvg t`tK epoi cmb Mvotq cKzi cto tm A`Aj`tK cubi tkW ejv nq| cubi tkW tenk eo ntj fviX epocvZi mgq cKz` cweZ nI qvi m`v`ebv`vK|

eisjv`tk GK GKi RjvqZb wekó cKzi cwi`gZ cwi`gvY cmb mieivtni Rb` 5 t`tK 10 GKi AvqZtbi cubi tkW ivLtZ nte| cubi tkW hv` e`vgg nq Zvntj tktWi AvqZb tenk nte| cubi cwi`gvY Kg ev tenk ntj AvBj teta cubi w`K cwi`eZB Kti cKzi i`cubi cwi`gvY wqšY` Kiv hvq|

emYUR`K grm` Lvgf`i  
eZgvtb Mfxi ev AMfxi  
bj Kc e`envi Kti cKzi  
fMF` cmb mieivn Kiv  
nq|



Dtj mLZ cŠv Qvovl b`x ev n` nZ cvt`uí mivn`th` cmb DtEij b Kti cKz cY`Kiv hvq|  
emYUR`K grm` Lvgf`i eZgvtb Mfxi ev AMfxi bj Kc e`envi Kti cKzi fMF` cmb  
mieivn Kiv nq| fMF` cmb DtEij tbi Zjz`bvq eo tKub Rj vkq t`\_tK cvt`uí mivn`th` cmb  
m`lq mSMh Kiv hvq| thLv`tb me`j`r mieivn AvtQ tmLv`tb mWtRj Bw`Atbi cwi etZ` me`j`r  
Pvj Z cvt`uí e`envi Kiv mje`arRbK|

**Ablyj b (Activity) t aly,** Avcbvi GKU cKz AvtQ| cKzU`Z cmbi cwi gvY mWk gv`vi  
Zjz`bvq AtbK Ktg mWtq`Q| GgZve`lq H cKzi cmbi cwi gvY Kx Kx Dcv`tq Ablyj gv`lq  
DbwZ Ki`teb Zv`ij Lj (Ably`100 kã)|

**cmb mieivni cwi gvY**

ev`úFeb I Pqv`bvi Rb` th cwi gvY cmb Ktg hvq Zv Ges Avs`wK ev cY`Lw`j Kivi ci  
ci`Y Kivi Rb` th cwi gvY cmbi c`qvrB nq DnuB nt`Q me`b`e`cwi gvYi cmb mieivn|  
cmb mi`ivni gva`tg cKzi Av` tRb msthvRb Kiv nq| c`KwZK Dm t`\_tK cmb mieivn  
Ki`j cmbi mvt`\_ mKQymKQygv`Qi Lvevi I cKzi Avtm| Avevi AtbK mgq ubweo Pvl c`xwZ  
c`qvm Ki`j cKzi i cmb `wZ nlqvi m`e`bv`\_vtK Ges gv`S gv`S cmb cwi eZ` Kivi  
`i Kiv nq|

**cmb mieivn I ub`vkb c`uqv**

cKzi cmb mieivn I ub`vktbi Rb` 2w c`xwZ AbyiY Kiv ntq`\_vtK- úBm I gsk  
(Monk) |

úBP cKzi i cvtoi GKU Awet`Q` Ask wntmte` Zwi Kiv nq| GuU `w cikvcnk mgvš`ij  
c`Pxi wbtq` MwZ|

gsk cKzi i cvtoi mvgtb`\_vcb Kiv nq| GuU `w cikvcnk I mgvš`ij c`Pxi I GKU  
tcQ`ti c`Pxi w`tq` MwZ| cKZ.c`f`j `w wntóg` c`q` GKB i Kg|

cKzi cmb mieivni  
Rb` AštMgx` biv`vi  
(Inlet) e`e`v`\_vKv  
c`qvrB|

cKzi cmb mieivn Kivi Rb` AštMgx` biv`vi (Inlet) e`e`v`\_vKtZ nte| cKzi AštMgx`  
biv`v`\_vcbi c`e`b`w`w mLZ w`lq mgr` Aek`B wetePbvq` AvbtZ nte t

- 1) ubq`wZ I ubq`wšZ`fite cmb mieivn ubw`DZ Kiv
- 2) cKz t`\_tK gv`Qi cj`vqb` tiva Kiv
- 3) Aew`AZ c`RwZi gv`Qi cKzi c`ek` i`wZKiY

**cmb mieivn biv`v (Water inlet)**

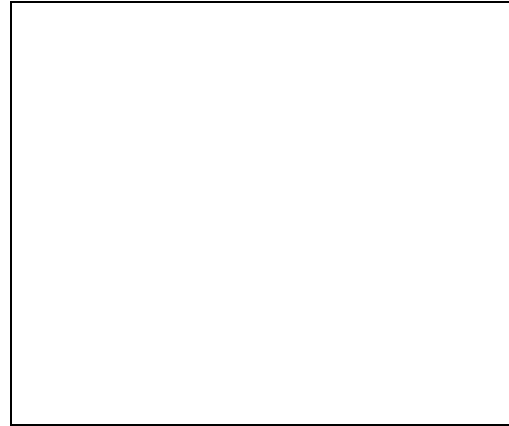
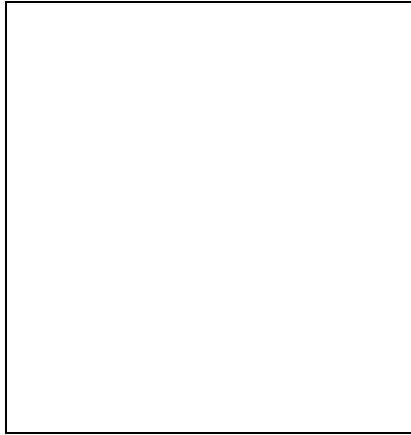
c`ZwU cKzi i Rb` Avj`v` Avj`v` cmb mieivnKiv` ev Ašt`emx` biv`v`\_vKtZ cvti A`\_ev  
Avš`msthvM AvtQ Gi Kg KtqKwU cKzi i Rb` GKU mvariY biv`v`\_vKtZ cvti |

cKzi ubq`wZ I ubq`wšZ`fite cmb mieivn ubw`DZ Kivi Rb` GKU Dj`^úBm` Zwi Kiv nq  
ev emv`bv nq| Gi GKU avZe`nvZj`\_vtK hvi D`PZv` ubq`šY Kiv hvq (wP` 13)| Lv`R  
emv`bv hvte Ges c`qvrB` DVbv`gv Ki`Z cvti Gi Kg w`rfb`e`ai`tYi teW`e`envi Kiv thtZ  
cvti | Lvov` úB`mi wbtP` A`\_ev wbtPi` teW`P` Zj`vq GKU tLv`j`vgy` ivL`Z nte hvi w`fZi w`tq`  
cmb c`qvrB`vq` MwZ`Z Ges c`qvrB`vq` cwi gvY cKzi c`ek` Ki`Z cvti | cKz t`\_tK gv`Qi  
cj`vqb Ges cKzi Aew`AZ gv`Q c`ek` eU Kivi Rb` GKU Wzš`Avb`v`w`K k<sup>3</sup> Pj`w emv`bv



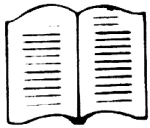


ckzi cwb mieivnKvix Ges w@vkbKvix byjv Ges gštKi MVb GKB| i'aycv`R` GB th  
mi ivnKvix cvtoi Dctii w`tK Ges w@vkbKvix gsK cvtoi Zj t`tk `vcb Kiv nq|



wPĪ 15 t gsK

wPĪ 16 t cŋ| m`k ZxhR cŋPxi



**mvi gg** MŋSkvtj er`úxfetbi gva`tg ckzi i cwb metPtq tenk Ktg hvq| MŋSkvtj ckz  
hvZ cwb kb` bv nq tm Rb` chŋB cwb i e`e`v`v`Kv Avek`K| maviYZ SYŋ, `iqx b`x,  
Dcb`x, f,`t`ii Dci w`tq cĕwnZ epoi cwb i Drm t`tK ckzi cwb mieivn Kiv nq|  
ckzi cwb mieivn I w@vktbi Rb` 2wU c×wZ AbyiY Kiv nq`\_vK- úŋm I gsK|  
cŋZ`KwU ckzi i Rb` Avj v`v Avj v`v cwb mieivnKvix byjv`\_vKtZ cvti |



### civvĒi gj'iqb 2.2

mĪK DĒti i civk ĪK ĪPý (✓) ĩ b|

- 1/ cĵzi civbi mieivnKvix ĩntmte tKvb&DrmiU tek ĩb fPthvM?
  - K  b`x
  - L  SYP
  - M  Dc-b`x
  - N  eĵi civb
  
- 2/ tgvUvgv fĳte evsj v`tk GKĪU GK GKĪ cĵzi civb mieivni Rb` civbi tkĳWi AvqZb KZ nte?
  - K  5-10 GKĪ
  - L  10-15 GKĪ
  - M  15-20 GKĪ
  - N  2-5 GKĪ
  
- 3/ cĳvb ĪK KvĳY civb mieivnKvix I ĩb@vkbKvix bĳv vq Pĳj ĩb e`envi Kiv nq?
  - K  cĵzi hvZ gqj v/AveRĳv XĳZ bĳ civi
  - L  cĵzi hvZ KPĳi civb cĳek KĳZ bĳ civi
  - M  cĵzi hvZ AevĀZ gvQ cĳek KĳZ bĳ civi Ges cĳz t\_ĳK hvZ gvQ bĳ civi
  - N  cĳz t\_ĳK gvQĳi Lv` hvZ temoĳq bĳ thZ civi |
  
- 4/ gsK KZUKZPI ov nI qv DĳPZ?
  - K  10 ĳm.ĳg.
  - L  15 ĳm.ĳg.
  - M  20 ĳm.ĳg.
  - N  30 ĳm.ĳg.



Kul. I cji Dbqb ĩđ

**A<sup>~</sup>QZv t** GKul fij cĳzi i cmb cŭUłbi Dcw<sup>~</sup>łZ ev cŭPbzvi Rb<sup>~</sup> A<sup>~</sup>Q nte űKŠ<sup>~</sup> Kiv vi Rb<sup>~</sup> A<sup>~</sup>Q ev tNvj v nte bv|

cĳzi chw mhđj vK  
cotj gŭŭi Drcv<sup>~</sup> b  
fij nq|

**Autjv t** cĳzi Ae<sup>~</sup>vb Ggb RvqMvq nI qv DłPZ thLvłb chw mhđj vK cto| ZvQiov cĳzi i cmb KPwi cŭbv ev Ab<sup>~</sup> tKvb Dł<sup>~</sup>ŭc Ővıv AveZ<sup>~</sup> vKte bv hıZ chw mhđj vK cmbi wFZi cŭetk mgm<sup>~</sup>vi mŭo KiłZ cvti |

**ĕxfZ Aw łRb t** cĳzi i cmbłZ ĕxfZ Aw łRłbi cwi gvY 5-10 űc.űc.Gg. Gi gta<sup>~</sup> vKte|

**ĕxfZ KveŭwB A<sup>~</sup> vBW t** cmbłZ 6 űc.űc.Gg. Gi teűk KveŭwB A<sup>~</sup> vBW<sup>~</sup> vKte bv|

**tgŭ A<sup>~</sup>vj K<sup>~</sup>vj ıbuł t** cĳzi i A<sup>~</sup>vj K<sup>~</sup>vj ıbuł 100-250 űc.űc.Gg. Gi gZ nte|

**pH t** cĳzi i cmbi pH 6.5 ł<sup>~</sup>łK 9.0 Gi gta<sup>~</sup> vKte|

GQiov cĳzi i cmbłZ wewfba<sup>~</sup> ĕxfZ Kłwb c<sup>~</sup>v<sup>~</sup>łthgb- dmdıvm, cŭűkqvq, űmıj Kb, K<sup>~</sup>vj űmqvq, g<sup>~</sup>łłbımqvq, Avqı b, mıj dvi BZ<sup>~</sup>űı<sup>~</sup> cwi űgZ cwi gvY<sup>~</sup> vKte|

**cĳzi eqymieıv**

Avıv Rmb, gŭŭi Drcv<sup>~</sup>łbi Rb<sup>~</sup> cmbłZ ĕxfZ Aw łRb<sup>~</sup> i<sup>~</sup>đcY<sup>~</sup>űgKv cvj b Kti<sup>~</sup> vłK| tıRb<sup>~</sup>B tKvb KviłY hı<sup>~</sup> cĳzi ĕxfZ Aw łRłbi cwi gvY Kłg hvq Ges gvQ Ggb tKvb j<sup>~</sup>űY cŭkŭ Kti th Dıvıv Aw łRb<sup>~</sup> łZvq fłłQ Zvıłj Riıx űfıłłZ cĳzi Aw łRb<sup>~</sup> mieıv Kiv cŭqvRb|

tKejgvł e<sup>~</sup>vcb cŭıqvı gvałg cĳzi i cmbłZ ĕxfZ Aw łRb<sup>~</sup> mieıv nıq<sup>~</sup> vłK| e<sup>~</sup>vcbı nı mıvıv YZ űZbuł űelłqi Dci űbłłKıj t

1) cmbłZ Aw łRłbi gvłv, 2) cmbi Dcwı<sup>~</sup> łıi AvqZb hv evqı ms<sup>~</sup>łtk<sup>~</sup> vłK, 3) cmb Avł<sup>~</sup>vj łbi gvłv

cmbi łıłK Avł<sup>~</sup>vj Z  
Kti cmbłZ Aw łRłbi  
cwi gvY evıłłbv hvq|

evqymieıvKıx hłšj gvałg evqı cmbi młłłłł łłłłł cmbi Avł<sup>~</sup>vj łbi gvłv evx Kiv nq hıv dtj cmbłZ Aw łRłbi cwi gvY evx cvq| űZbıfıte cmbi łıłK Avł<sup>~</sup>vj Z Kiv hvqt 1) c<sup>~</sup>űłłj űBj A<sup>~</sup>vıłłııi gvałg cmb űQvłłbv łłłZ cvti | 2) cvł<sup>~</sup>ııı mıvıłłł cmb ł<sup>~</sup>ıı Kiv łłłZ cvti | 3) Ab<sup>~</sup> tKvb fıte cmbłK bıvıłłbv łłłZ cvti |

GQiov cmbi wFZi eıeıy mŭııi gvałg cmbłZ Aw łRb<sup>~</sup> mieıv Kiv hvq| eıeıy cmbi łıı DłV Głj eıeıy Ges cmbi młłłłł łłłb Aw łRb<sup>~</sup> ĕxfZ nq|



**Abłıj b (Activity) t** Avcbıv cĳzi i cmbłZ Aw łRb Kłg łłłj Avcbıv Zı Kıfıte eŠteb Ges Aw łRb evıvıvı Rb<sup>~</sup> Kx Kılłeb Zı űj Lıj|

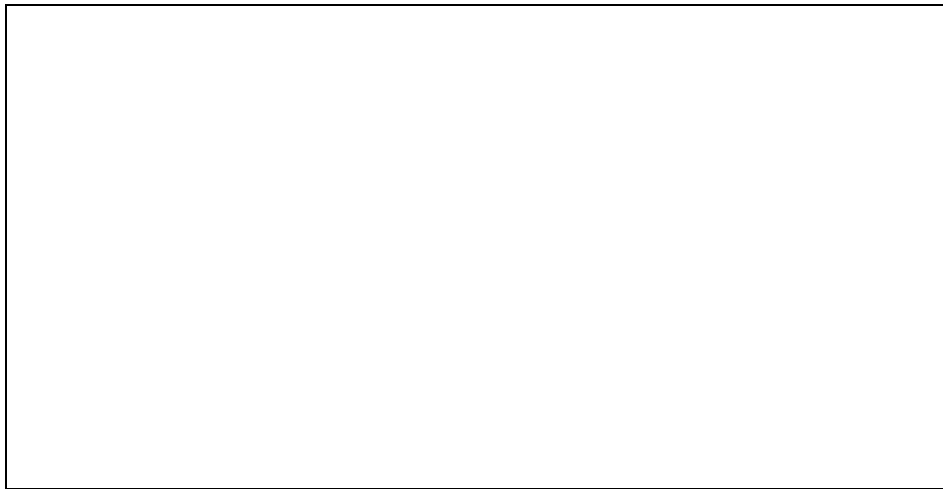
**evqynieivnKvixhš;evtKškj Pvi aitbi ntZ cwti**

**gva`iKIŦ kw³tK KvR j wltq evqynieivn**

gva`iKIŦ kw³i cŦvte th tKvb e`tK Dcti Qšjo w`tj wbtP cto hvq| hw` Dci t`tK cmb  
wbtP cwZZ nq Zvntj evqycmbi msthvM tŦŦ ewx cvte GB gj-bwzi Dci wŦwE Kti GB  
c×wZ KvR Kti | thgb Rj cŦvZtK cŦKwZK A`vitiUi ev evqynieivnKvix ejv nq| hLb  
Dci t`tK cmb wbtP cwZZ nq ZLb cmb ŦžªŦžªKYiq wef³ nq Ges Dnvt`i ms`útk®evqy  
Gtj B cmbtZ `bxfZ nq|

**c`vWj úBj A`vitiUi**

c`vWj úBj A`vitiUi cmbtK evZvfm wQwUtg t`q Ges Dcwi`li tK Avf`wvZ Kti |  
(wŦŦ 17 K I L)



wŦŦ 17 (K) t c`vWj úBj A`vitiUi



wŦŦ 17 (L) t Kvixhš;evtKškj c`vWj úBj A`vitiUi



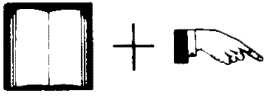


### civvEi gj`iqb 2.3

mivK DEti i civk iUK iPy (✓) i b|

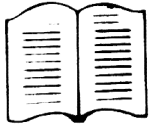
- 1/ cKz tKb ms`vi Ki teb?
  - K  cKz tK gvQ Pvlvc thvMx Kivi Rb`
  - L  cKzi i Mfxi Zv ep`x Kivi Rb`
  - M  cKzi i AvMvQv `gtbi Rb`
  - N  cKzi i Drcv`b evovtbvi Rb`
  
- 2/ GKiu Av`k cKzi i cmbi `exfZ Av` tRtbi gvIv KZ nte?
  - K  3-5 iic. iic. Gg.
  - L  5-10 iic. iic. Gg.
  - M  10-15 iic. iic. Gg.
  - N  1-3 iic. iic. Gg.
  
- 3/ tKvb&hšJi minvth` cKzi i cmbtZ evgyni ei vn Kiv thtZ civi?
  - K  AvKtgbtWR
  - L  tmvP iW`c
  - M  civtWj úBj A`vfi Ui
  - N  imf
  
- 4/ mivdDRvi A`vfi Ui Kxfvte KvR Kti?
  - K  cmbtK qIz`qIz`KYvq ief`3 Kti
  - L  cmbtK evZvfm iQuUtq t`q
  - M  cmbtZ NYØ mivó Kti
  - N  evZvfm ev Av` tRtbi eyej cmbtZ BbtRKkb t`q|

### cW 2.4 MvibK wfiEtZ cKzi tkYweb`im I MVtbi wbgvej x



#### G cW tkI Avciw –

- MvibK wfiEtZ cKz KZ ai tbi Zv RvbtZ cvi teb |
- wwfbaeKvi cKz Kxfite `Zwi Zv eYDv KitZ cvi teb |
- AvZz cKz, Piv cKz I gRz cKz m=utK Avtj vPbv KitZ cvi teb |



wwfbaeAvKvtii gvQ cUzcvj tbi Rb` wwfbaeaitbi cKzi cUqvRb nq | thgb ti bytciwv cij tbi Rb` cKzi AvKvi tQvU Ges Mfxi Zv Kg ntZ nte | Ab`w tK eo tciwv wKsev cRbb`lg gvQ gRz Kivi Rb` eo I Mfxi cKzi cUqvRb nq | e`e`vcwv m`yavt` Ges Awak Drcv` tbi Rb` ZvB wwfbaeAvKvtii cKzi cUqvRbxqZv itqtQ |

AvKvtii Dci wfiE Kti cKztK cUvZ wZbuU fvtM fVM Kiv ntqtQ |

- 1) AvZw cKz
- 2) Piv cKz
- 3) gRz cKz

#### AvZw cKz `Zwi

AvqZb t tKvb AMfxi tWvev ev AMfxi tQvU cKztK AvZw cKz wntmte e`envi Kiv hrv | AvZw cKzi AvqZb KZ nte tm welta tKvb aiv evav wbgg cUvj Z tbB | Zte mvari Yfite 10 t`tK 17 kZisk AvqZtbi AvqZKvi Rj vkq AvZz cKz wntmte fij | bvmfx ev AvZz cKzi Mfxi Zv 1-1.2 wgvUv ntZ cvti |

mvari Yfite 10 t`tK 17 kZisk AvqZtbi AvqZKvi Rj vkq AvZz cKz wntmte fij |

tciwv Drcv`b ev msMni AvtMB bvmfx ev AvZw cKz cUz KitZ nte | cKz cUzKiY ej tZ cKzi iv`lzm gvQ (hw`\_vtK), KxUcZ½, AewAZ gvQ `gb Ges cKz i Kvtbv, mri cUqM I Zj t`k Pvl Kiv BZ`w` Kvh`itgi mgwotK eSvq |

tciwv Drcv`b ev msMni AvtMB bvmfx ev AvZw cKz cUz KitZ nte |

cKz hw` Avcbv Avciw i`wktq bv hrv Zvntj cvt=ui mrvith` cwv tmtp cKz i Kvtbv thtZ cvti | cKz i Kvtj tciwv gvKo, AvMvQv I iv`lzm gvQ GgvbtZB `gb ntq hvte | hw` cKz i Kvtbv bv hrv Zvntj Rij tUtB Ges welta cUqM Kti AewAZ gvQ I KxUcZ½ `gb Kiv thtZ cvti |

**Pz cUqM t** cKz i Kvtbri ci GtUj gvUv Rb` cUz kZvstK 1-2 tKwR Ges ewj gvUv Rb` 0.5 t`tK 1 tKwR Pzv cv\_i ev Kwl.Pz (CaCO<sub>3</sub>) cKzi Zj t`tk cUqM KitZ nte |

**`Re mri cUqM t** AvZw cKzi RycwUv Rb` tbi Rb` `Re mri t`qv Avek`K | Kiv ev GtUj gvUv cKzi i Rb` cUz kZvstK 60 t`tK 80 tKwR Ges ewj gvUv cKzi i Rb` 100 t`tK 120 tKwR tMvev t`qv thtZ cvti |

**cwv mieivn I imvqubK mri cUqM t** `Re mri t`qvi ci cU`wKfite 15 tm.wg. t`tK 23 tm.wg. cwv mieivn KitZ nte | GK mBvn ci cwv Mfxi Zv 1-1.2 tm.wg. KitZ nte Ges cUvU`tbi cwi gvY evovtbi Rb` 1 tKwR BDwv qv, 1 tKwR wUGmnc Ges 0.5 tKwR cUv w` tZ nte |



nelv<sup>3</sup> M'im`ihKiY I tcvKv gvKo`gb t cKzi i cmbtZ eyey t`Lv w`tj noivi mivrth`  
(`no Uvbi) Zjt`ktK Avt`vuj Z Kti tcvbr Ovovi GKir b cte<sup>o</sup>nelv<sup>3</sup> M'immgr`i Ki tZ  
nte| cKzi i cmbtZ AtbK mgq nuntcvKv Rbtq| cZ 10 kZvsk cKzi i Rb` 1 wj Uvi  
wvRj t`uKti tcvKv gvKo aism Kiv hvq|



**Ablyj b (Activity) t aly,** Avcbri cZtekr Rbre nviy mntei 15 kZvski GKiu cKz  
AvtQ| H cKzuK Avcub tKvbaitbi cKz ej teb Zv hv<sup>3</sup> mnKvti wj Lly Ges H cKzi i  
cZKiy maútK<sup>e</sup>Y<sup>o</sup> Kib (Aba<sup>o</sup>150 ka)|

**Priv cKz`Zwi**

Priv cKzi miv eQi cwb\_vKtZ cvti| Priv cKzi AvqZb 0.2 t`tK 0.6 tn+i Ges  
Mfxi Zv 1.5 ug. t`tK 2.5 ug. ntZ cvti| cKzi Rvj tUt b gvQ aivi mveari Rb` Priv cKz  
miyl j<sup>o</sup> ntj fvj nq| Priv cKzi 2 t`tK 3 gym tcvbr cvj b Kiv hvq| tcvbri AvKvi  
Gmgq 10 tm.ug. t`tK 15 tm.ug. ntq\_vtK|

Priv cKz Avz<sup>o</sup> cKzi i gZ KtiB`Zwi KitZ nte| A\_<sup>o</sup> Pz, Remvi I ivmivqubK mvi  
cQvM KitZ nte| Ges tcvKv gvKo, iv<sup>o</sup>zm I AemAZ gvQ`gb KitZ nte|

**mvi cQvM t** Priv gvtQi cKzi hvfZ chvB Lv` Rbtq tmRb` Re I ivmivqubK mvi cQvM  
KitZ nte| Remvi wntmte tMvei tn+i cZ 9900 tKwR Ges ivmivqubK mvi wntmte tn+i  
cZ 24 tKwR BDwi qv, 24 tKwR uUGmic I 12 tKwR cUvk mvi t`qv thtZ cvti|

**gRz cKz`Zwi**

gRz cKzi miv eQi cwb\_vtK| Gi AvqZb 0.4 tn+i ev teuk ntZ cvti| teuk eo ntj  
Aek` e`vcbr Kiv AmveariRbK| Avevi cKz tQvU ntj eo gvQ cvj b Kiv hvq bv| GKiu  
gRz cKzi i AvqZb Kgct<sup>o</sup> 0.13 tn+i ev 33 kZvsk nI qv DvPZ| cKzi i Mfxi Zv 2.5-3  
ug. nI qv DvPZ Zte cKz hLb cmbtZ cY<sup>o</sup>vtK ZLb wKbri vi w`tK cwb i Mfxi Zv nte 1-  
1.5 ugUvi|

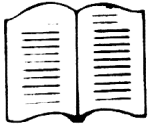
Priv cKz t`tK Priv cwiBi cteB gRz cKz`Zwi Kiv DvPZ| i`tgsmtg hv` mae nq cKz  
i`ktq Zjt`tki Kv`vi cwi givY KgvtZ nte| cKzi i cwb A<sup>o</sup>q ntj cQvRbgZ Pz cQvM  
KitZ nte| iKtbr Ae`vq Zjt`tk Ges cwb cY<sup>o</sup>Ae`vq cmbtZ Pz wQvUq t`qv thtZ  
cvti| GRb` tn+i cZ 740 t`tK 1200 tKwR Pz w`tZ nte|

**mvi cQvM t** cKzi i Drcv`bkij Zv ep<sup>x</sup> Kivi Rb` tn+i cZ 7400 tKwR tMvei, 500-  
1000 tKwR nun gjvMi weov Ges 4400 tKwR Kt<sup>o</sup>uv<sup>o</sup> mvi t`qv thtZ cvti| GQvov  
ivmivqubK mvi wntmte tn+i cZ 120 tKwR BDwi qv, 75 tKwR uUGmic Ges 36 tKwR cUvk  
w`tZ nte|

Dctiv<sup>3</sup> cKz, t<sup>o</sup> vovl cRbb<sup>o</sup>lg gvQ gRtZi Rb` cKz`Zwi KitZ nq| G e`vcvti  
cvV 9.2 G wek`fite Avtj vPvri Kiv ntqtQ|

cKzi Rvj tUt b gvQ  
aivi mveari Rb` Priv  
cKz miyl j<sup>o</sup> ntj  
fvj nq|

GKiu gRz cKzi i  
AvqZb Kgct<sup>o</sup> 0.13  
tn+i ev 33 kZvsk nI qv  
DvPZ| cKzi i Mfxi Zv  
2.5-3 ug. nI qv DvPZ|



**mvi gg**® weifbaAvKvfi i gvQ cZcvj tbi Rb" weifbaei tbi cKz cQvRb/ AvKvfi i Dci  
wfiE Kti cKz tK cAbZ wZb fivM fivM Kiv ntqt0 thgb- AvZ0 cKz, Pvi v cKz I gRZ  
cKz/ mavi YZ 10 t\_tK 17 kZisk AvqZ tbi AvqZvKvi Rjvkq AvZ0 cKz wntmte fivj |  
Pvi v cKz i AvqZb 0.2 tn±i t\_tK 0.6 tn±i GK i Ges Mfvi Zv 1.5-2.5 ug. nZ ci ti |  
gRZ cKz i AvqZb Kgc t¶ 0.13 tn±i ev 33 kZisk nI qv DvPZ Ges Mfvi Zv 2.5 t\_tK  
3 ugUvi nI qv DvPZ |



### cuVvEi gj`iqb 2.4

mWk DEti i cuK Wk Py (✓) w b|

- 1/ MvubK wfwEtZ cktK Kq fvtM fW Kiv ntqtQ?  
K  3  
L  4  
M  2  
N  5
  
- 2/ AvZØ ev bvmfx ckt i Mfxi Zv KZ nI qv DwPZ?  
K  0.5 - 1 ugUvi  
L  1 - 1.2 ugUvi  
M  0.3 - 0.5 ugUvi  
N  0.4 - 0.7 ugUvi
  
- 3/ 1 GKi AvqZtbi Priv ckt Kx cwi gvY tMvei mvi w`tZ nte?  
K  2000 tKwR  
L  3000 tKwR  
M  4000 tKwR  
N  6000 tKwR
  
- 4/ gRZ ckt i AvKvi Kgct¶ KZ nI qv DwPZ?  
K  0.40 tn±i  
L  0.13 tn±i  
M  1 tn±i  
N  0.80 tn±i



### Povšgjiqb

#### mswB I iPbvj-K ckae

- 1/ cki i vb ubeP#bi mgq Kx Kx nelq we#ePbv Kiv D#PZ?
- 2/ cki i g#Ji , Yv, Y Kxf#e hvPvB Ki#eb Av#j vPbv Kily|
- 3/ cki c#b mieiv#ni Drmmg#ni eY#v # b|
- 4/ cki c#b mieivn I #b#vkb c#Zi eY#v # b |
- 5/ cki i ms#vi c#Z eY#v Kily|
- 6/ GK#U Av k#cki i Kx Kx #enk# \_vKv D#PZ Zv #j Lly?
- 7/ cki Kxf#e evq#mieivn Ki#eb Av#j vPbv Kily|
- 8/ Av#Z cky ev b#m#x c#Z Kxf#e c#Z Ki#eb Av#j vPbv Kily|
- 9/ P#v c#Z ev gR# cki i c#Z c#vj x eY#v Kily|



### D#igjv

#### cW 2.1

- 1/ N                      2/ K                      3/ L                      4/ M

#### cW 2.2

- 1/ L                      2/ K                      3/ M                      4/ N

#### cW 2.3

- 1/ K                      2/ L                      3/ M                      4/ N

#### cW 2.4

- 1/ K                      2/ L                      3/ M                      4/ L

### BDubU 3 cwi , Yv, Y

gufQi Rieb avitbi GKvI gva'g ntjv cKZ ev Rjvktqi cwb| Avi GRb" cwi tFSZ I imvqubK Ges RieK , Yv, Y gufQi RiebhvIvtK cfmeZ Kti | cKzi Zjt`k I Kr`vi , Yv, Y cwi tFSZ I imvqubK , Yv, YtK ubqSY Kti | gufQi Lv` MhY, `wnK ewx, cRbb, tetP \_vKv Ges , iZcyecvKiq Kvhm` moZite cwi Pij vri Rb" cwi tFSZ I imvqubK , Yv, Y AbKj gvIvq \_vKv cQvRb|

G BDubU Rjvktqi cwi eY©MÜ I cwi cwi gvY wBY@, cKzi Zjt`k I Kr`vi , Yv, Y cwi gvc, cwi tFSZ I imvqubK , Yv, Y Ges cÜugK Drcv`tki Dci cfve, cÜugK Drcv`tki tkYmeb`im I , iZ; `exfZ KwB c`v`©I Zvi cKvif`, cwi gvYMZ I , YMZ cfve BZ`w` nel`q we`lwi Z Avtj vPbv Kiv ntqQ|

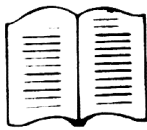
### cW 3.1 Rjvktqi cwi cÜugK eY©MÜ, I cwi cwi gvY wBY@, cKzi Zjt`k I Kr`vi , Yv, Y cwi gvc



#### G cW tkI Avcb –

- Rjvktqi cwi cÜugK eY© MÜ m`fÜ Avtj vPbv KitZ cvi`teb|
- cKzi cwi cwi gvY Kxfvte wBY@ Kiv hvq Zv RvbtZ cvi`teb|
- cKzi Zjt`k I Kr`vi , Yv, Y Kxfvte cwi gvc Kiv nq Zv eY©v KitZ cvi`teb|

#### cwi eY©



cwi eY©ej`tZ tmme eY©K eSvq hv wewfbetKvj tqW I `exfZ `te`i Rb" cwb jvf Kti \_vtK| cwi cKZ.eY©ej`tZ Gme Kvi`Y m` eY©KB eSvq| KvtrB tkvb RmeZ ev gZ Sz`š I wewfbew`e`i cfve thgb AvKviki eY©A`ev AMfii Rjvktqi Zjt`tki eY©vivi m` eY©K cKZ.eY©ntmte aiv nq bv| Aek" cwi AvcvZ eY©m`i Gme cfveK AtbK mgq cwi eY©m`fÜ fj` eSvqSi m` Kti |

cÜKwZK cwb wewfbetY© ntq \_vtK| tkvb tkvb Rjvktqi cwb eY©xb Avevi tkvb tkvb Rjvktqi cwi eY©LgB Mip ntq \_vtK|

wbaj ulZ e`cÜKwZK cwbZ eY©m`i Rb" `vqx t

- 1) Avqib t tdim mvj tdu ev tdim K A` vBW wntmte Avqib nj`y eY©m`i Kti |
- 2) wDgvm e`t bxj , meR, nj`y, ev`vqx, Mip ev`vqx BZ`w` wewfbaeY©m`i Kti \_vtK|
- 3) K`vj wmqv KvefBU t cPZ cwi gufY K`vj wmqv KvefBU meR eY©m`i Kti etj `vex Kiv nq|

cwb eY©xb nl qvi GKwU fij w`K nt`Q th cwbZ teuk teuk mhaj vK cÜek KitZ cvi`te|

FZzcwieZfbi mvt\_ mvt\_ cwi eY©`j nl qvtK `Zwmx etj wetePbv Kiv nq| eQtii tkvb wv`@ mgq cwi eY©LgB nvj Kv ntq thZ cuti | mivmwi mhaj vtK cwb eY©xb nl qv cfmeZ Kti etj Rvbr hvq| cwb eY©xb nl qvi GKwU fij w`K nt`Q th cwbZ teuk teuk mhaj vK cÜek KitZ cvi`te| dtj H Rjvktqi dvBtUvcwU`vbi mvtjvK mstkY Kvhfvg ewx cvi`te| Kj wv ugUvi bigK hS`e`enri Kti cwi eY©cwi gvc Kiv nq|

Kul.1 cj-x Dbqb -ž

**cubi MÜ**

wei x cubi tKib MÜ bv vKtj l newfbaKvižY cKzi i cubi MÜ žwi nž cti | AZwaK cwi gvtY cPbkj Re c`v`© vKtj B cKzi i cubtZ Lvi v MÜ cwi j wZ nq | ubieo Pti li Avl Zvq th mg`l cKzi cPž cwi gvtY m`u`K Lv` t`qv nq tm me cKzi i cub MÜhž nq | GQvov`rfweK Ae`vq cKzi i cubtZ tKibi c MÜ v`K bv |

AZwaK cwi gvtY  
cPbkj Re c`v`©  
vKtj B cKzi i cubtZ  
Lvi v MÜ cwi j wZ  
nq |

**cKzi i cubi cwi gvtY wYq**

bvbiea cQvRtb cKzi newfbaivmivubK c`v`©cQvM Kivi cQvRbxqZv t`Lv t`q | thgb KUlCZ½ ev AewAZ gvQ wbg® Kivi Rb` cKzi w el cQvM Kiž nq | GB w el cQvMi GKw ubir`g gvT AvtQ | Dni Kg ntj KvRi nte bv Ges tenk ntj cub AtbK w b gvQ Pti li AthwM`vKte | KvRB ubir`g gvT wntme Kivi Rb` cKzi Kx cwi gvtY cub AvtQ Zv cwi gvtY Kivi cQvRb cto | mviYZ cKzi weli NbgvT v. v. Gg. (ppm-parts per million) GKtK MYbv Kiv nq | Dni l Rb wfvEžZ wbaŕ Y Kiv DvPZ | AvqZb wfvEžZ Kiž AtbK mgq žm MYbv wbfž nq bv |

KUlCZ½ ev AewAZ gvQ  
wbg® Kivi Rb` cKzi  
w el cQvM Kiž nq |  
GB w el cQvMi GKw  
ubir`g gvT AvtQ |

**cwi gvtY i newfbaGKK**

Avgiv AwKiskB cvDÜ, tKwR, M`vj b, GK i BZ`w` newfbaGKK Ges kZKiv nvti i mt`cwi wPZ |

thgb- Avgiv Rwb 16 AvdžY 1 cvDÜ Ges 2.2 cvdžÜ 1 tKwR ev 1000 Mž nq |

AvqZti tžtAv Avgiv wj Uvi, M`vj b BZ`w` e`envi Kw | 1 M`vj b mgvb 4.55 wj Uvi (1 wj Uvi 1000 w. w)

GK Nbdly cubi AvqZb 7.5 M`vj b Ges l Rb 62.4 cvDÜ | tKvb cKzi i cubi AvqZb KZ Nbdly Zv Avgiv mnžRB gvtZ cwi | cQž Avgt` i H cKzi i`N` cÜ` l Mfxi Zv KZ dš Zv RivžZ nte | Zvici wZwU msL`vi , Y Kiž B cKzi i AvqZb KZ Nbdly Zv Rivv hvte |



**Abžj b (Activity) t aiž, Avcbri GKw cKž AvtQ hvi`N`150 dš cÜ`90 dš Ges Mfxi Zv 7 dš | H cKžwU cubi AvqZb KZ M`vj b Zv tei Kiž |**

GKi-dš ntj v AvqZti  
GKK hv GK GKi  
cKzi i 1 dš Mfxi Zv  
chš cwi AvqZb wbt`R  
Kti |

GKi-dš ntj v AvqZti GKK hv GK GKi cKzi i 1 dš Mfxi Zv chš cwi AvqZb wbt`R Kti | 1 GKi-dš 43,560 Nbdly ev 3,26,000 M`vj b ev 27,18,000 cvDÜ cub v`K | cKzi i AvqZb GKti tžc Mo Mfxi Zv (dš) w`ž , Y Kti GKi-dš wntme Kiv hvq | wntme Kti t`Lv tMžQ th

1 v. v. Gg. Nžžj Rb` i Kvi nte - 2.7 crt / GKi-dš  
0.0038 Mž / M`vj b  
0.0283 Mž / wKDieK dš

**Kv`vi , Yv`Y**

cKzi i Kv`v Drcv`bkj Zv ew` Kti | cKZ.Kv`vi c`v`b Dcv`vb nž`Q gvU KYv wKš`GvUž tek cwi gvtY Re c`v`P v`K | Re c`v`© mgŕ ōmDgvM AvKviti v`K hv GKw D`P

AvYneK IRb meikó`Re thštMi b`vq AvPiY Kti | e`vKtUmiqv Oviv DvM` I cōNYR `ē`  
fvštbi ci ōtKvj tqWō unmtē Kv`v RgtZ`\_vtK | unDgvm unDvgK GmštWi Rb` `gP GmW  
unmtē Ges bvBtUtRb RvZxq c`vt`P Rb` `gP qvi unmtē e`eüZ ntZ cvti | A`P Kv`vi  
evdvi qgZv AvtQ hvi dtj pH cwi eZB` mKQvY ubqšY Kitz cvti |

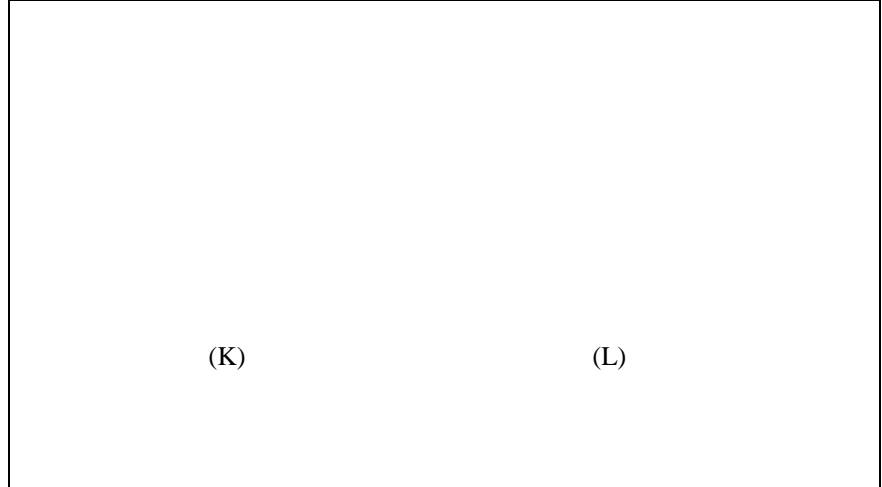
cKzi Zjt`tk 1 dži  
teuk Kv`v\_vKv DvPZ  
bq | cKzi Ly teuk  
cwi gvtY Kv`v\_vKtj  
cmbtZ melv<sup>3</sup> M'vftmi  
mjo nte |

cKzi i Kv`vq thtnZzRe c`v`Rgv`\_vtK ZvB AtbK AtpjYÜx cōYx thgb Gtbij Wv cteP  
AšfP Ges AtbK KxUcZtzi jvfpZ`\_vq evm Kti | Kv`vi `Yv`Y ej tZ MvVbK Dcv`vb  
Qvovl tm mg`IRxtei cōPbzv ešvq | tm Rb` th tKvb cKzi Aek`B Kv`v\_vKv DvPZ | Zte  
cKzi i Zjt`tk 30 tm.ug. Gi teuk Kv`v\_vKv DvPZ bq | G cwi gvtY Kv`v\_vKtj vbtPi  
`fti (KwvP, gštMj) gvQ`\_tjv fvj evote Ges cKzi cmb teuk w`b\_vKte | cKzi Ly teuk  
cwi gvtY Kv`v\_vKtj cmbtZ melv<sup>3</sup> M'vftmi mjo nte | Gi dtj cKzi i cwi tek bó nte Ges  
Av` tRtbi NvUvZ t`Lv w`te | cKzi hw` GK`g Kv`v bv`\_vtK Zvntj thme gvQ vbtPi `fti i  
Lvevi Lvq thgb gštMj, KwvP Giv teuk evote bv | Kvi Y Kv`vi gta`B Gt` i Lvevi`\_vtK |

cKzi hw` GK`g Kv`v bv  
\_vtK Zvntj thme gvQ  
vbtPi `fti i Lvevi Lvq  
thgb gštMj, KwvP Giv  
teuk evote bv |

cKzi i Kv`vq th mg`I cōYx evm Kti Zvt`i tK tebt`vm (Benthos) etj | cKzi i Kv`v  
DvWtq tebt`vftmi cwi gvYMZ I `YMZ mektđ`tYi gva`tg Kv`vi `Yv`Y cwi gvc Kiv thtZ  
cvti |

Kv`vi bglv mslMni Rb` th hš;e`eniv Kiv nq Gi bvg BKtgbtWR (Ekmandredge) |  
Giu LyB mavi Y GKiu hš; BKtgbtWR hš;Ui gly tLvj v ti tL DvntZ mshP` iuk atı cKzi  
vbtPc Kiv nq | hš;Ui IRb teuk weavq mstM mstM Dvri Kv`vq tcštō hte Ges mKQvKv`v  
Dvri gta` Xkte Ges Avcbv Avcvb gly eÜ ntq hvq (wP 19 K I L) | GLb iuk tUtē  
hš;UtK Dcti ZjtZ nte | Dvri gly Ltj Kv`v tei Kti GKiu Pjv vbtZ mKQycvb w`tg



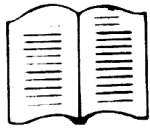
(K) (L)

wP 19 t BKtgbtWR (K) tLvj v Ae`vq (L) eÜ Ae`vq

bvovtj GK mgq Atc`qvKZ.eo cōYx ev`Re c`v`Pvj vbtZ`\_vKte Ges Kv`v ašq hte |  
GLb tebt`vm`\_tjv Pjv vbt t`\_tK mslM Kti Gt` i cwi gvtY vbaftY Ges tkYweb`vm Kitz nte |  
BKtgbtWRi AvqZb Rvbr AvtQ | ZvB GKiu cKzi i KtqK RvqMv t`\_tK bglv mslM Kti  
Dvnt` i Mo Kti cKzi i tgU AvqZtb Kx cwi gvtY tebt`vm AvtQ Zv mntRB vbyQ Kiv hvq |

Kul. I cj x Dbqb 7

GQvor cwb ev gvuLi c0wgK Drcv`tbi Rb` th mg`l tgs`tji `i Kvi nq tm,tjv wewfbae  
AYR`xtei Ask Mh`tY GKwU P`mi gra`tg m`ub`raenq| c`kzi Kiv`v br`\_vKtj G P`m WKgZ  
m`ub`raenqZ cvi te br|



**mvi gg** c0KwZK cwb wewfbae`tY nq`\_vK| tKvb tKvb Rj vktqi cwb eY`xib Avevi tKvb  
tKvb Rj vktqi cwbi eY`L`B Mip nq`\_vK| wbeo P`tli Avl Zvq th mg`l c`kzi c0z  
cwi gr`tY m`u`i-K Lv` t`qv nq tm c`kzi i cwb MÜhy` nq| c`kzi Ly tenk cwi gr`tY Kiv`v  
\_vKtj cwbtZ wlv`3 Miv`mi m`p nte| mvaivYZ c`kzi i KxUcZ½ ev Aem`AZ grQ `gtbi  
Rb` uc.uc.Gg. wntmte wlv` c0qvm Kiv nq| Kiv`vi bgby msM`ni Rb` th hš`e`enri Kiv nq  
Zvi bvg BK`tgtWR|





### cuVvEi gj`iqb 3.1

mWk DEti i ctk Wk Py (✓) w b|

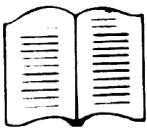
- 1/ cki i cmb tKb meR nq?
  - K) meR A`ij wR ev dvBtUvcwUtb i Rb`
  - L) tek Avqj b\_vKvi Rb`
  - M) tek RycwUv\_vKvi Rb`
  - N) tek tek Rj R AvMvQv\_vKvi Rb`
  
- 2/ GK i-dh ej tZ Kx tevSvq?
  - K) GK GK i mgvb KZ eMdh
  - L) GK GK i AvqZb Ges GK dh Mfvi Zv
  - M) GK GK i mgvb KZ Nbdh
  - N) GK GK i mgvb KZ eMgUvi
  
- 3/ 1 M`ij b cmbtZ 1 uc.uc.Gg. NbZji `eY `Zwi i Rb` Kx cwi gvY `e` w tZ nte?
  - K) 2.7 cvDU
  - L) 0.7 cvDU
  - M) 0.0038 Mg
  - N) 0.0283 Mg
  
- 4/ cki cwi gZ cwi gvY Kv`v\_vKtj tKvbgtQi epv fvi nq?
  - K) KB
  - L) KvZj v
  - M) Mm Kvc®
  - N) KvcP
  
- 5/ Kv`vq th mg`IRxe em Kti Zvt`i tK GK K\_vq Kx etj?
  - K) dvBtUv cwUv
  - L) teb\_tvm
  - M) Ry cwUv
  - N) A`ij wR

### cW 3.2 cwbi tfSZ I imvqubK , Yv, Y Ges c0\_ugK Drcv`tki Dci Gi cfve



#### G cW tkI Avicb -

- cKzi i cwbi tfSZ , Yv, Y Kx Kx Zv ej tZ I wj LtZ cvi teb|
- cKzi i cwbi imvqubK , Yv, Y Kx Kx Zv ej tZ I wj LtZ cvi teb|
- cKzi i cwbi tfSZ , Yv, Y Kxfite c0\_ugK Drcv`btK cfmeZ Kti Zv eYDv KitZ cvi teb|
- cKzi i cwbi imvqubK , Yv, Y Kxfite c0\_ugK Drcv`btK cfmeZ Kti Zv eVLv KitZ cvi teb|



grm` Pvlxt` i Rb` cwbi , Yv, Y e`e`vcbr GKK , iZcY`cfveK| cwbi , Yv, Y e`e`vcbr GKIU Pj gvb c0\_ugK hv tkvb w`b tkI nq bv Ges Gi Rb` GKRb gvQ PvlxtK A`bK kg w`tZ nq|

cwbi , Yv, Y ej tZ Kx eSvq? cwbi , Yv, Y ej tZ tfSZ, imvqubK I `RueK Drcv`vtbi mgwó eSvq hv Rj R cwitek MVb Kti Ges gvQI Drcv`btK cfmeZ Kti | cKZ.ct` Gt` i GKIUi cwieZD Ab`u`tk/Ab`vb` , tjt`K cfmeZ Kti |

#### cKzi cwbi tfSZ , Yv, Y

cKzi i cwbi newfbetfSZ , Yv, Y gvQI Drcv`tbi Dci cfve tdtj | tfSZ , Yv, Y m`tU mst`itc w`taAvtj Pbv Kiv ntj vt

#### cKzi Mfxi Zv

cKzi i Mfxi Zv cwbi tfSZ, imvqubK I `RueK , Yv, Y wKQv wqsy Kti | cKz hiv` tenk AMfxi nq Zvntj mh`KiY cKzi i Zjt`k ch`stcSv`Z cvi dtj cKzi tenk tenk Dv`c Rb`te| Avevi AMfxi cKzi i cwbi Mfxi Zv Mig ntq hvq, dtj gvQI `IwZ nI qvi m`tebv `vtK| Ab`w`tk cKzi i Mfxi Zv hiv` Lg tenk nq Zvntj cKzi i w`at`tk mh`jvK c`ek Kite bv dtj H AA`tj tkvb c0\_ugK Drcv`b m`e nte bv| dj m`fc Dv tgvU Drcv`tb tZgb tkvb fvgKv ivLte bv|

AMfxi cKzi i cwbi Mfxi Zv Lg ZvovZwio Mig ntq hvq, dtj gvQI `IwZ nI qvi m`tebv `vtK|

#### ZvcgvIv

Mfxi Zv w`tb mh`Zvtci dtj cKzi i cwbi wZb DòZv `ti wef<sup>3</sup> ntq hvq- tenk Dò, (Dcti i `li), Kg Dò (ga` `li) I WÜv (w`tpi `li)| th`nZzmh`KiY thLvtb tenk tkwI Z nte tmLvtb dvB`Uvc- v`U`bi mvtjvK mstK- IY tenk nte Ges dj k`ZtZ Av` tR`bi cwigvY tefo hvte| w`tpi `ti th`nZzmvtjvK mstK- IY nte bv ZvB H `ti Av` tR`b `f gvIvq `vKte ev Gt`Ker`i B Av` tR`b kY` nte|

mÜ`tejv hLb mh`jvK `vKte bv Ges ZvcgvIv Ktg hvte ZLb newfbet`ti i cwbi w`kY NUte| G fite cwbi newfbet`ti i w`kY gvQI Rb` LgB `IwZKi KviY GtZ w`tpi `ti i `f Av` tR`bhv` cwbi m`úY`Rj vktq w`tk w`tq Av` tR`bi `f Zv NUvtZ cvi |

cKzi i cwbi ZvcgvIv Ktg tM`j gvQI e`x Ktg hvq|

cKzi i ZvcgvIv Ktg tM`j gvQ Lvl qv`vl qv Kvgtq t`q dtj gvQI e`x Ktg hvq Ges gvQI Drcv`b nwm cvq| Avevi ZvcgvIv Av`K ntj I gvQI `IwZ nq|

**cubi A`QZv**

cmbtZ e`KYv ugnkZ Ae`vq \_vKtj A`QZvi mjo nq| cw4Ub I cubi A`QZvi Rb` `vqx nZ cvti Zte tewki fVM t`qT Kiv`vKYv Rb` cubi A`QZv mjo nq| Kiv`vKYv Ovi v mjo A`QZv cubi wfZti mhaj vK cletk weNemjo Kti dtj dvBtUv cw4Utb mvtj vK mstk- IY e`nZ nq Ges Drcr` b Ktg hvq| Kiv`vKYv AtbK mgq w\_Ztq cKzi i Zj t`tk tcSOtZ cvti Ges Zj t`tk Aew`Z teb`K RxeTK tXtK tdj tZ cvti | Kiv`vKYv cubi tPtq tewk Zvc tkvY Ki tZ cvti dtj Kiv`vKYv Ovi v mjo A`Q cubi `Q cubi Atc`qv tewk Mig nq| ZvB Mj`Kvtj A`Q cubi gvQI Rb` Avi I tewk `qvZi Kiv`v nq| cw4Ub Ovi v mjo A`QZvi Aek` gvQI Drcr` b ewx`tZ mnvqZv Kti \_vtK|

**Avtjv**

th cKzi i cmbtZ mhaj vK tewk cto tmLvtb mvtj vK mstk- IY fvj nq Ges gvQI Drcr` b ewx` cvq| tmRb` cKzi Ggb RvqMvq nI qv DvPZ thLvtb chvB mhaj vK \_vtK| AtbK mgq KPni cvbv Ovi v cKzi i cubi Dcwi`li AveZ t`tk Avtjv cletk eU Kti t`q| Gifc cKzi gvQI Drcr` b AtbK Ktg hvq|

cKzi Ggb RvqMvq nI qv DvPZ thLvtb chvB mhaj vK \_vtK|

**cKzi i cubi imvqubK , Yv, Y**

**`exfZ Aw tRb**

cKzi i cmbtZ chvB `exfZ Aw tRb i `qvYte`qvY Kiv` mjo`nvZxZfvte GKRB gvQ Pvlxi Ab`Zg , iZc`KvR| cmbtZ `qvYte Aw tRb `exfZ nZ cvti- cubi Dcwi fvtM mi vmi evqgUj t`tk Ges cKzi i RjR Dv`K i mvtj vK mstk- IYi gva`tg| dvBtUv cw4Utb mvtj vK mstk- IYi gva`tgB wmsnfvM Aw tRb cmbtZ `exfZ nq|

gvQ `exfZ Aw tRb dj`Kvi mnvth` MhY Kti wecvKxq Kvh`m`ubaeKti | ZvB `exfZ Aw tRb i cwi gvY Ktg tMj gvQ kjm Kto gviv hvq| AwZwi`3 dvBtUv cw4Ub AvtQ Gifc cKzi tgNjv v`tb Ges i vT Aw tRb `fZv t`Lv v`tZ cvti | dvBtUv cw4Ub ev cU`ugK Drcr` tKi kmb Kvh`m`ubaeKivi Rb`I `exfZ Aw tRb i cU`qvRb itqtQ| cKzi cubi Aw tRb i NbZj5 uc.uc.Gg. ev Gi tewk \_vKv fvj |

cKzi i cubi Aw tRb i NbZj5 uc.uc.Gg. ev Gi tewk \_vKv fvj |

**`exfZ KveB WvB A· vBW**

cKzi i cmbtZ KveB WvB A· vBW `exfZ Ae`vq \_vtK| GQvov gvQ, cw4Ub I Ab`vb` Ritei kmb KvthP dtj I KveB WvB A· vBW Drcb`enq| mvtj vK mstk- IY cU`qvRb Rb` dvBtUv cw4Ub Dcvi`vb wntmte KveB WvB A· vBW MhY Kti | tmRb`B dvBtUvc- v4Utb i `fvmeK ewx`i Rb` chvB cwi gvY `exfZ KveB WvB A· vBW cKzi i cmbtZ \_vKv Avek`K| Zte AZ`waK gvT`vq `exfZ KveB WvB A· vBW I dvBtUvc- v4Ub gvQI I ci `qvZKi c`vve tdj | KveB WvB A· vBtWi gvT`v 6 uc.uc.Gg. Gi tewk nZ cubi A`QZv ewx` cvq|

KveB WvB A· vBtWi gvT`v 6 uc.uc.Gg Gi tewk nZ cubi A`QZv ewx` cvq|

**A`vj K`vuj ubvU**

cKzi i cmbtZ `exfZ `qvixq LubR mg`tni tgvU NbZB nT`Q A`vj K`vuj ubvU| mvavi Yfvte A`vj K`vuj vBb cubi (40 ug.Mh/vj Uvi Gi tewk) ckg ev A`vixq cubi tPtq Avak Drcr` bkj | tgvU A`vj K`vuj ubvU I GKvU eo Ask dmdivtmi Dcwi`vZi Rb` nq| dmdivm dvBtUv cw4Ub ewx`i Rb` , iZc`KvDcvi`vb|

Kul.1 cǝ-x Dbq̄b ǝ

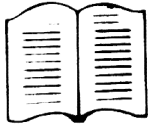
**cmbi pH**

cmbi pH gvĪv Rv̄bvi gvaṯg GKūU cǝǝi i gvQ PvlṯhvlṯZv ɯbifcY Kiv hɯq| gvQ Pvlṯ cǝǝi i cmbi pH 6.5-8.5 Gi gṯaṯ nṯj fij | pH Gi gvĪv Abṯvbṯ DcvṯbṯK cǝṯmeZ Kṯi ǝṯK|

gvQ Pvlṯ cǝǝi i cmbi  
pH 6.5-8.5 Gi gṯaṯ  
nṯj fij |



**Ablyj b (Activity)** t Avcbri gvṯQi cǝǝi i cmbi pH KZ Zv ɯbYq̄ Kily Ges H gvĪv ṯKvbṯṯKvbṯgvQ Pvlṯi Rbṯ mṯevḂg| pH Gi cwi gvY Kg nṯj Krfvṯe evovṯeb th mṯṯṯKṯ ɯj Lly (Abalṯ100 kṯ)|



**mvi ggṯ** cmbi ṯYv, Y ejṯZ ṯṯṯ, i v̄mvq̄ubK I ṯR̄ieK Dcvṯṯbi mgwṯ eṯvq hv Rj R cwi ṯek Mvb Kṯi Ges gvṯQi DrcvṯbṯK cǝṯmeZ Kṯi | cǝǝi i Mfxi Zv, ZvcgvĪv, cmbi AṯṯṯZv I Avṯj v BZṯṯ cǝǝi i cmbi ṯṯṯ ṯYv, Y | G ṯṯṯ ṯYv, Y, ṯj v ɯevf̄b̄vṯe gvṯQi Drcvṯṯbi Dci cǝṯve ṯṯj | ṯṯṯṯ Avṯ ṯRb, ṯṯṯṯ KveṯWvB Aṯ vBW, Aṯj Kṯṯj ɯb̄U Ges cmbi pH BZṯṯ cǝǝi i cmbi i v̄mvq̄ubK ṯYv, Y | gvQ Pvlṯi cǝǝi ṯṯṯṯ Avṯ ṯRb, ṯṯṯṯ Kveṯ WvB Aṯ vBW, Aṯj Kṯṯj ɯb̄U I cmbi pH m̄vK gvĪvq ǝvKv ṯi Kvi |



### cvfVvEi gj`iqb 3.2

mWk DEti i cvfk Wk iPy (✓) w b|

1/ tKvbW cwb i fFZ Ae`vi Avl Zvq cto br?

K) Mfxi Zv

L) `^QZv

M) ZvcgvIv

N) `exfZ KwWb c`v\_©

2/ tgNj v w`tb ev i vT Av tRb NvUwZ t`Lv w`tj Dnv KwWb`R Kti?

K) cKzi cPz gvQ AvtQ

L) cKzi cPz Ry cv%Ub AvtQ

M) cKzi cPz dvBtUv cv%Ub AvtQ

N) cKzi cPz Kv`v AvtQ

3/ cKti i Drcv`b evotZ dmdi v m Kxfvte KvR Kti?

K) gvQ mi v m i dmdi v m MhY Kti

L) dmdi v m dvBtUv cv%Utbi Drcv`b evotZ mnvqZv Kti

M) dmdi v m Ry cv%Ub evotZ mnvqZv Kti

N) dmdi v m pH cwi eZfb FYvZK figKv i vtl

4/ gvQ Prtli cKzi i cwb i pH KZ ntj fij?

K) 6.5-8.5

L) 5.5-7.5

M) 4-6

N) 7-10





Kul.1 cj-x Dbqb -x

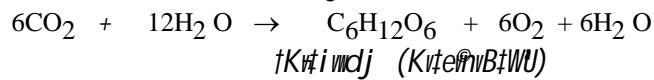
eM<sup>®</sup> tcwi wWibGBj m&  
D`vni Y - tnigwWibqvg (Hemidinium)

eM<sup>®</sup> WvBtbvK`vc`tmBj m&  
D`vni Y - BDfi vKKKvm (Urococcus)

**c0\_ugK Drcv`tki , iZi**

th tKvb Rxei ep x Ges weKvtki Rb` th kw<sup>3</sup> i c0qvRb nq Zvi Avmj Drm nt`Q tmSi kw<sup>3</sup> (solar radiation) | tKej meR Dw<sup>™</sup> mtjvK mstk- IY c0qvri gva`tg tmSi kw<sup>3</sup> tK Rxei Mb`Yvc`thvMx kw<sup>3</sup> tZ (KvtefvBtWU) ifcivSi Z Ki tZ cvti |

Avtj v



th mg` Rxe mi vmi  
tmSi kw<sup>3</sup> e`envi Kti  
wb`Rt` i Rb` Ges  
Ab`vb` m`u0vtqi Rb`  
kw<sup>3</sup> DrcbGes Rgv  
Ki tZ cvti Dnv` i tK  
c0\_ugK Drcv`K etj |

th mg` Rxe mi vmi tmSi kw<sup>3</sup> e`envi Kti wb`Rt` i Rb` Ges Ab`vb` m`u0vtqi Rb` kw<sup>3</sup> DrcbGes Rgv Ki tZ cvti Dnv` i c0\_ugK Drcv`K etj | meR Dw<sup>™</sup> i mtjvK mstk- IYB nt`Q mKj `RweK KvR e`eüZ kw<sup>3</sup> Ges `Re c`vt` P Drm | mZi vs tKvb Rj vktqi Drcv`b Dnvi c0\_ugK Drcv`tbi Dci wbf`Kxj | emni t`\_tK mi vmi Lv` mieivn bv Kti tKvb Rj vktqi gv`Qi Drcv`b ep x Kivi K\_v i P`S`i Ki tZ c0\_tgB Dnvi c0\_ugK Drcv`b ep x Ki tZ nte | meR Dw<sup>™</sup> i (cK`zi c0`Uub) mtjvK mstk- I tYi Rb` KveB WvB A` vBW I c0vb Qvovl weifbæ aitbi A`Re c`v`\_` thgbN` bvBtUt`Rb, dmdivm, mij dri, cUmkqvg, K`ij umqvg, Avqi b, g`v`vibR, wRsK, Kcvi BZ`w` i c0qvRb nq |

`Re c`vt` P Rb` Dw<sup>™</sup> B nt`Q c0Yt` i GKgvI kw<sup>3</sup> i Drm | gvQ wb`Ri Lv` wb`R `Zwi Ki tZ cvti bv | KvtefvBtWU wntmte Dw<sup>™</sup> th Lv` `Zwi Ges Rgv Kti DnvB c0Yt` i ep x Ges weKvtki Rb` e`eüZ nq | KvRb mtjvK mstk- IY tK gvQ ev Ab`vb` c0Yx Drcv`tbi mt`\_ m`u<sup>3</sup> Kiv nq |

tKvb Rj vktqi tgvU  
Drcv`b ep x Dnvi  
c0\_ugK Drcv`K ev  
dvBtUvc- vsU`bi  
Drcv`b ep x i Dci  
mi vmi wbf`Kxj |

wfue` Qvov thgb tKvb weiv s Kí bv Kiv hvq bv tZgub c0\_ugK Drcv`K Qvov `RweK Drcv`b (Biological production) Kí bv Kiv hvq bv | tKvb Rj vktqi tgvU Drcv`b ep x Dnvi c0\_ugK Drcv`K ev dvBtUvcusU`bi Drcv`b ep x i Dci mi vmi wbf`Kxj |

c0\_ugK Drcv`K mtjvK mstk`Y weivqv NUvtbvi mgq th Av` tRb DrcbæKti DnvB mtjvK mstk- I tY `Zwi th`M tK Rvii Z Kti KveB I kw<sup>3</sup> Drcv`tbi Rb` e`eüZ nq | Ab` cvtVl ejv ntqtQ th cwb`Z `exfZ Av` tRtbi Rb` c0\_ugK Drcv`tki mtjvK mstk- IY c0qv GKvU Ab`Zg , iZi cY`Drm | c0\_ugK Drcv`K th Av` tRb `Zwi Kti Zv `iayDnv` i wb`Rt` i bq eis mKj Rxei kmb Kvth`e`eüZ ntq \_vtK | cwb`Z `exfZ gY` KveB WvB A` vBW mtjvK mstk- I tYi Rb` e`envi Kti dvBtUv c0`Uub KveB WvB A` vBtWi NbZ; wqsy` Kti \_vtK | mZi vs, t`Lv hv`Q th tKvb Rj R cwi t`tki BtKvmt` ÷ tg c0\_ugK Drcv`K c0vb fvgKv cij b Kti \_vtK |

tKvb Rj R cwi t`tki  
BtKvmt` ÷ tg c0\_ugK  
Drcv`K c0vb fvgKv  
cij b Kti \_vtK |





**mvi gg** thme Rxe tmši kw<sup>3</sup>tk ifcvš mi Z Kti Dnt`i ubtRt`i Ges Ab`vb` Rtei Rb` Lv` kw<sup>3</sup> Drcv`b KitZ cti Zi`iK cū<sub>ig</sub>K Drcv`K etj | meR Dm<sup>c</sup>tk cū<sub>ig</sub>K Drcv`K ejv nq | dvBtUv cū<sub>4</sub>UbtkB tKvb c<sub>ž</sub> ev Rjvktqi Drcv`bkjy Zvi mPK intmte wePbv Kiv nq | KveBtWU intmte Dm<sup>c</sup> th Lv` `Zwi Ges Rgv Kti DntB cū<sub>Y</sub>kt`i e<sub>x</sub> I weKviki Rb` e`eüZ nq | Rj R cmi tetk cū<sub>ig</sub>K Drcv`tki i Zi Acwi m<sub>g</sub> |



### **cvtVvEi gj`iqb 3.3**

**mWK DEti i cvtk UK Pý (✓) w b |**

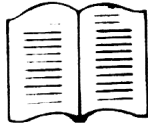
- 1/ cū<sub>ig</sub>K Drcv`K ej tZ mK ešvq?  
 K• cū<sub>ig</sub>K chv<sub>q</sub>i Drcv`bKvix  
 L• mi vmi tmši kw<sup>3</sup>tk Lv` kw<sup>3</sup>tZ ifcvšli Kvix  
 M• Lv` kw<sup>3</sup>tk tft<sub>1/2</sub> kw<sup>3</sup> Drcv`bKvix  
 N• Rxeb avi tYi Rb` i ayv<sub>1</sub> KveB WvB A• vBw e`envi Kvix
  
- 2/ `úvBti vMvBiv tKvb&etM<sup>P</sup> Ašif<sup>9</sup>?  
 K• tUUt`úv<sub>i</sub> Bj m  
 L• tKv<sub>i</sub>vKk<sub>1</sub>KBj m&  
 M• vRMvbgv<sub>t</sub>UBj m&  
 N• BDt<sub>j</sub> vUvBt<sub>K</sub>Bj m&
  
- 3/ tKvbU mWK bq?  
 K• cū<sub>ig</sub>K Drcv`K intmte dvBtUv cū<sub>4</sub>Ubtk tKvb Rjvktqi Drcv`bkjy Zvi mPK ejv nq  
 L• m<sub>t</sub>j vK mst<sub>k</sub>- I tYi gva`tg Dm<sup>c</sup> Lv`-kw<sup>3</sup> intmte KveBtWU `Zwi Kti  
 M• dvBtUv cū<sub>4</sub>Ub Rjvktqi c<sub>mbi</sub> `exfZ Av tRtbi cwi gvY e<sub>x</sub>tZ m<sub>rvh</sub> Kti  
 N• dvBtUv cū<sub>4</sub>Ub c<sub>ž</sub>i i c<sub>mbt</sub>Z `exfZ KveB WvB A• vBtWi cwi gvY e<sub>x</sub> Kti
  
- 4/ BDvMv tKvb&cte<sup>P</sup> Ašif<sup>9</sup>?  
 K• tKv<sub>i</sub>vdvBUv  
 L• BDvM- t<sub>br</sub>dvBUv  
 M• v<sub>v</sub>Bt<sub>m</sub>dvBUv  
 N• cvBt<sub>i</sub> vdvBUv

**cW 3.4 `ëxfZ Kwb c`v\_©I Zvi cKviþf`, cwi gvYMZ I , YMZ cFve**



**G cW tkþI Avicb –**

- `ëxfZ Kwb c`v\_©Kx Ges Zvi cKviþf` Avtj vPbv KiþZ cviþeb|
- `ëxfZ Kwb c`v\_©P cwi gvYMZ I , YMZ cFve eYðv KiþZ cviþeb|



**`ëxfZ Kwb c`v\_©**

cKwZK me aiþbi cmbþZ `ëxfZ Kwb c`v\_©we`gub| cmbþK meRbxb `ëK ejv nq Kvi Y Gw Ab` AþbK Zitj i Zþbvq tewk iKþgi `ë`ëxfZ KiþZ citi|

Zjþþki mþ\_ wbioe mþúK, ffvþMi Dcwi þþi cmb cèvn, fMf` cmb Pzþbv, Rj R Rþei cPb BZ`w` weifbæfvte cKþi i cmbþZ `ëxfZ Kwb c`v\_©msthvRZ nq| Guv LgB `fweK th weifbæRj vkþqi cmbþZ `ëxfZ Kwb c`v\_©P cwi gvY Ges , Yv, Y wfbæfvbæte Ges GgbwK GKB Rj vkþq FZztþf` `ëxfZ Kwb c`v\_©P cwi gvYMZ I , YMZ cv`R` cwi jwþZ nþZ citi | wdèvi KZ.cmbþK Kg Zvcgvþvq er`zxfetþi ci th i`c`v\_©Aenkó \_vþK Dnv A%Re c`v\_©P msngkY|

`ëxfZ Kwb c`v\_©K mrvai Yfvte `þfvþM fwm Kiv hvq| h\_v- `ëxfZ A%Re Kwb c`v\_©I `ëxfZ `Re Kwb c`v\_©P

**`ëxfZ A`Re Kwb c`v\_©**

cKwZK cmbþZ `ëxfZ AwKvsk A%Re c`v\_©Rj R Rþei Dci cZ`þ ev cþivþfvte cFve tdþj | Gþ`i þKvb þKvbw AwK KvhRix fvgKv i vþL| Gþ`i gþa` metþþq tewk Dþj - LþvM` KþqKwU wþP Avtj vPbv Kiv ntj v|

**A%Re bvþUþRb thþM**

**bvþUþ bvþUþRb**

weifbæRj vkþq bvþUþ bvþUþRþbi cwi gvY weifbævþq \_vþK Ges GKB Rj vkþq bvþUþUi NbZ; weifbævþq wfbæfvbævþZ citi | bvþUþ e`vKþUwi qv Ges bvþUþ MþvYKvix Rþei mþ\_ bvþUþUi thþnZymþúK`þqþQ ZvB GuU cwi gvY me mgq cwi ZþKvj | dvþUþvþUþbi eþ`i Rb` bvþUþ bvþUþRþbþK GKwU Ab`Zg , iþcY`þbqþYKvix Dcv`vb (Limiting factor) wþmþe weþPbv Kiv nq| þKvþi wþdj Drcv`þbi Rb` GuU GKwU cþvþvþK e` wþmþe cþqvRb nq| bvþUþ Kg cotj þKvþi wþdj Drcv`b eU nþq hvq|

dvþUþvþUþbi eþ`i Rb` bvþUþ bvþUþRb GKwU Ab`Zg , iþcY`þbqþYKvix Dcv`vb|

**bvþUþ bvþUþRb**

cKwZK cmbþZ bvþUþRb bvþUþ wþmþeI we`gub| weþKl aiþbi e`vKþUwi qv bvþUþþK weRwi Z Kþi bvþUþ iþcþš wi Z Kþi | bvþUþ bvþUþRb AþbK mgq cþ`vþK Drcv`þKi Dci þwZKi cFve tdþj |

**A`itgmbqvg j eY**

A`itgmbqvg j eYi NbZi  
teuk ntj gvtQi I ci  
¶iZKi cfi'e cto|

c0kuZK cmbtZ ¶KQycwi givY A`itgmbqvg j eY `exfZ Ae`iq \_vtK| Gt`i gta` A`itgmbqvg  
KvefbU AwaK cwi givY cvl qv hvq| A`itgmbqvg j eYi NbZi teuk ntj gvtQi I ci ¶iZKi  
cfi'e cto|

**umij Kb**

umij Kb c0kuZtZ gY Ae`iq cvl qv hvq bv| c0kuZK cmbtZ `exfZ umij tKU intmteI  
umij Kb tKij tqW intmte \_vtK| Rj vktqi wefbaZv, FZzcwi eZB, Rjvkq Awfglx c0vvnZ  
cmbi c0kuZ, WvqUgti Drcv`bkxj Zv Ges Mfxi Zv BZ`w` bvbwea Kvi tY umij Ktbi cwi givY  
wfbawfbentZ cvti| WvqUg bvgK GK ai tYi dvBtUvcwUti tLij m`Zwi i Rb` umij Kb  
c0qvRb nq| WvqUgti Drcv`b umij Ktbi c0c`Zvi I ci mivmwi wbfPkij |

**dmdim**

c0kuZK cmbtZ dmdim dmtDU intmte c0z cwi givY \_vktZ cvti| K`ij umqvg dmtDU  
intmte teuki fVM dmdim we`gub \_vtK| gwUtZ, AvKwi tK Ges Rxe t`n dmtDU  
e`vcKfite we`Z| Rj vktq c0B dmdim tK `gvtM fVM Kiv thtZ cvti |  
K) `exfZ dmdim dmtDU intmte \_vtK Ges  
L) `Re dmdim hv Rxe t`n Ges `Re c`v`e`gub|  
dvBtUvcwUti Drcv`b I ewx i Rb` chvB cwi givY dmdim `i Kvi nq|

**Ab`vb` Dcr`vb**

¶KQy¶KQyDcr`vb thgb -  
K`ij umqvg, g`vMtbimqvg,  
g`vZwbR, Avqib,  
tmvWqvg, cUmkqvg,  
mij dvi, Kcvi BZ`w`  
cmbtZ `exfZ i vmqubK  
thstMi Dcr`vb intmte  
e`euZ nq Ges th fiteB  
trvK bv tKb Rj R  
cwi t`tki I ci , iZcY`  
cfi'e tdtj |

Zv Qvor Avi I AtbK A`Re c`v`cmbtZ `exfZ \_vtK| Gt`i cwi givY Lg Kg Avevi Lg  
teukI ntZ cvti | ¶KQy¶KQyDcr`vb thgb - K`ij umqvg, g`vMtbimqvg, g`vZwbR, Avqib,  
tmvWqvg, cUmkqvg, mij dvi, Kcvi BZ`w` cmbtZ `exfZ i vmqubK thstMi Dcr`vb intmte  
e`euZ nq Ges th fiteB trvK bv tKb Rj R cwi t`tki I ci , i`ZcY`cfi'e tdtj | Gt`i  
tKvb tKvbu Drcv`bkxj Zvi c0ZxK intmte wefepZ ntq \_vtK|

c0ZwU meR Dv`i Rb` K`ij umqvtgi c0qvRbxZv itqtQ| K`ij umqvg Dv`i tKvli GKwU  
Avek`Kxq Ask| GwU Ab`vb` Avqitbi c0c`Zvq mrvqZv Kti | g`vMtbimqvg tKv`i vdtj i  
GKwU Ask Ges tKv`i vdtj Drcv`tbi Rb` GwU Aek`B cmbtZ we`gub \_vktZ nte| Dv`i  
ewx I weKv`tki Rb` Avqitbi c0qvRb itqtQ| GwU tKv`i vdtj Drcv`tbi AbvUK intmte  
KvR Kti \_vtK| tmvWqvg Dv`i ewx I weKv`tki Rb` mivmwi `i Kvi bv ntj I GwU GKwU  
AZ`š Kvr LZ Dcr`vb| tmvWqvg cUmkqvtgi msi ¶K intmte KvR Kti | GwU gwUtZ  
wekwl Z cUmkqvtK Dv`i Rb` mnR c0c` Kti |

**`exfZ `Re Kivb c`v`**

RweZ c0Yxi Dv`Qo Ges  
gZt`n cmbtZ `Re c`v`  
thvMvbi c0vb Dm|

Rj vktqi Af`šfi Ges ¶Kbri vq wefbaRitei Dcv`wZ Rj vktqi cmbtZ Aweivg `Re Kivb  
c`v`mieivn Kti \_vtK| Gt`i ¶KQyAsk cmbtZ `exfZ nq| Kv`RB c0kuZK me cmbtZB  
¶KQycwi givY `Re c`v`we`gub| RweZ c0Yxi Dv`Qo Ges gZt`n cmbtZ `Re c`v`  
thvMvbi c0vb Dm| Rj vktqi cmbtZ thfnZz cvwUv I Ab`vb` c`v`qgkZ Ae`iq \_vtK  
ZvB `exfZ `Re c`v`e`tk- IY Kivi Rb` cmbtK c0tg tmvUvclDR Kitz nte A`ev tKvb  
KihRix wdevi e`enri Kti G mg`I `Re c`v`e`wZ Kitz nte|

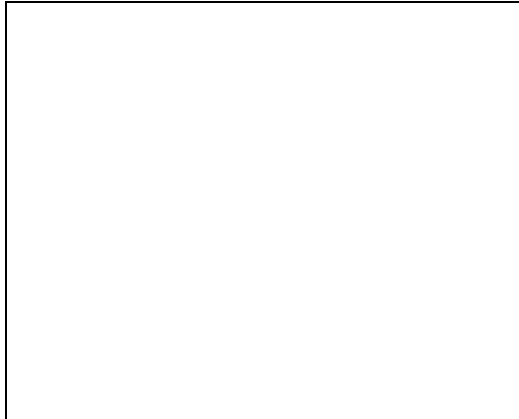






**Btj KUibK p<sup>H</sup> ugUvi**

tKvb `etY ubgW%Z `jtlv Btj KtUttWi mvt\_ Btj KtUingUvi msthvM Kti p<sup>H</sup> cwi gvc Kiv m=et| evRvti Btj KtUibK p<sup>H</sup> ugUvi ukbtZ cvl qv hvq| G hšj e`envi Kti Lg mntRB mivKfrte p<sup>H</sup> cwi gvc Kiv m=et (wPÎ 20)|



wPÎ 20 t Btj KUibK p<sup>H</sup> ugUvi

**Kih@Vj x**

- 1| p<sup>H</sup> ugUvti i Btj KtUW cwiZZ cwb w`tq cwi@vi Kily
- 2| Btj KtUW Rvbr p<sup>H</sup> Gi `etY c@ek Kivb|
- 3| K`vij tekb tgW (Mode) Gi tevZvtg Pvc w`tq uba@vi Z ÷ vUWw<sup>H</sup>-G hšjU K`vij tetU Kily|
- 4| th cwb ev `etYi p<sup>H</sup> ubY@ Kiteb Dnv tKvb cwi@vi meKvi ev dvf`c ubb|
- 5| Gevi p<sup>H</sup> ugUvti i Btj KtUWwU H meKvti ev dvf`c cwbZ ev `etY c@ek Kivb Ges GKUzbrvPror Kily| H `etYi p<sup>H</sup> hšjUi tQvU gubUti t`Lv hvte|
- 6| p<sup>H</sup> Rvbr ntq tMjt Btj KtUW meKvi t`tK tei Kily Ges cwiZZ cwbZ cwi@vi Kti Btj KtUttWi Rb` uba@vi Z meKvti p<sup>H</sup> 7 evdvti tittL w`b|
- 7| Kih@Vj x avi vevnKfrte Avcbri e`enmi K LvZvq wj nce x Kily Ges wDUi tK mgqgZ t`wL`tq `vji ubb|

**gšé`**

tKvb Rjvktqi cmbi p<sup>H</sup> hwi 7 Gi wbtP nq Zvntj Rvbtb H Rjvktqi cwb A=0Ges hwi 7 Gi tewk nq Zvntj Rvbtb Dnvi cwb vjixq Avi hwi 7 nq Zvntj eštéb cwb wDUij ev ckg|





- 7) dvBtUv c04Ub I Ry c04Ub kbr<sup>3</sup> Kivi Rb" WKQyÔliterature' AvtQ tm,tjvi mstM  
wgij tq c04Ub kbr<sup>3</sup> Ki ly|
- 8) wPÎ 22 Ges 23 G KtqKwU iZcy®I mivari Yfvte c0B dvBtUv c04Ub I Ry c04Ub  
t`Lvfbv ntjv| GB wPÎ mgfni mvf\_ wgij tqI c04Ub kbr<sup>3</sup> KiZ cri teb|
- 9) Kiv@Vvj x Abjvqx c04Ub kbr<sup>3</sup> Ki ly Ges e`enwvi K LvZvq Qwe GtK h\_vmgdq wUDUi tK  
t`wLdq ~vji wbb|



wPÎ 22 t KtqKwU wbe®PZ dvBtUv c04Ub

Kul. I c j x Dbqb 7z



PT 23 t KtqKu ubenPZ Ry cU/Ub



Povšgij`vqb

msvB I i Pbigj-K ckae

- 1| Rj vktqi cmbi eYq MÜ m=Ü Avtj vPbv Kily|
- 2| cktzi i cmbi cwi gvY wbyq c×wzi eYbv Kily|
- 3| cktzi i cwi tek I Kr`vi , Yv, Y ej tZ Kx eSvq Zv wj Lly|
- 4| cktzi i cmbi tfSZ Ae`vmgn Avtj vPbv Kily|
- 5| cktzi i cmbi i vmiqubK , Yv, Y mgtni eYbv Kily| cmbi tfSZ I i vmiqubK `enkó`mgn Kxfvte cÜ\_wgK Drcv` btk cfwmeZ Kti Avtj vPbv Kily|
- 6| cÜ\_wgK Drcv` K dvBtUv cW4Utb i tkYweb`vm wj Lly|
- 7| cÜ\_wgK Drcv` tKi , i zj Avtj vPbv Kily|
- 8| cmbtZ `exfZ KwWb c`v`ej tZ Kx eSvq? weifbæaitbi `exfZ KwWb c`v`m=Ü Avtj vPbv Kily|
- 9| cktzi i Drcv` bkxj Zvq `exfZ KwWb c`v`mgtni cfw eYbv Kily|



DËigjv

cW 3.1

- 1| K                      2| L                      3| M                      4| N                      5| L

cW 3.2

- 1| N                      2| M                      3| L                      4| K

cW 3.3

- 1| L                      2| M                      3| N                      4| L

cW 3.4

- 1| M                      2| L                      3| K                      4| N

## BDubU 4 gvQ Pvl

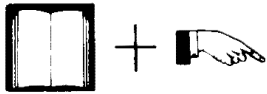
~fweKfrte tKvb Rj vktq th cwi gvY gvQ Drcv`b nq Zvi tPtq teuk cwi gvY Drcv`b KivB gvQ Pvl i Df`k`| t`tki µgeaGvb tC`Uub Pm`v ci-Y, KgmS`vb eµx, `e`nkK gyi ARB, Av`fvgmRK Dbqb, t`tki wekij Rj i nk`k KvtR j vM`tbr Ges gvQ i Drcv`b evovei Rb` gvQ Pvl bvbv ai`bi e`e`rcbv MpxZ nq| cRmZ ubePb, gvQ Qvovi AvbgmZK nvi, GKK I ugkPvl BZ`w` i I ci mWK e`e`v MhY Kitj Rj vktq gvQ i Drcv`b eµx cvq|

LvBq gvQ i Pvl, tPsev`Pvq gvQ i Pvl Ges mguSZ gvQ i Pvl AvabK grm` Pvl chny`i tek KZ`\_tjv bZb`w`K| avb t`f`Z gvQ i Pvl A`bK cjuZb ntj I Avgv`i t`tki Rb` bZb| evsjv`tki gY Rj vktq`\_tjvi e`e`rcbv AZ`S`l`\_i`z`c`Y` KviY Avgv`i t`tki grm` Drcv`tbi msnf`MB Avtm gY Rj vktq t`\_tk| Av`Kvi qvfg gvQ Pvl tmsl`b e`rcvi ntj I eZGv`b Gi eW`R`K`\_i`z`i`i`q`q`| MZ GK`\_k`k` Av`Kvi qvfg e`emv tek fij frte we`l`z` jvf K`i`i`q`|

G BDubU cKzi gvQ Pvl i c`U`ugK ubYqK, cRmZ ubePb, gvQ Qvovi AvbgmZK nvi, gvQ Qvovi ubqvej`x, GKK Ges ugkPvl, LvBq, tPsev`Pvq Ges avb t`f`Z gvQ Pvl, mguSZ gvQ Pvl, gY Rj vktq e`e`rcbv, Av`Kvi qvfg gvQ cvj b c`x`Z, Pvl vct`h`Mx t`kx I wef`kx gvQ kbr`K`i`Y`m`u`k`e`w`i`Z`Avtj`v`Pv`K`i`v`nt`q`q`|

### cW 4.1 cKzi gvQ Pvl i c`U`ugK ubYqK, cRmZ ubePb Ges gvQ Qvovi AvbgmZK nvi

G cW tk`I Av`c`b` -



- cKzi gvQ Pvl i c`U`ugK ubYqK eY`v`K`i`Z`cvi`teb|
- gvQ Pvl i Rb` cRmZ ubePb`i` c`U`q`R`b`q`\_euk`o`mg`Avtj`v`Pv`K`i`Z`cvi`teb|
- Av`K`Drcv`tbi`Rb` gvQ Qvovi AvbgmZK nvi ubYq`K`i`Z`cvi`teb|

### cKzi gvQ Pvl i c`U`ugK ubYqK



cKzi i gml I cmbi ub`m`j`u`L`Z`f`S`Z` I`i`m`v`q`ub`K`Dcv`v`b`mg`I`m`h`v`j`v`K`gvQ`Pvl`i`Rb`\_i`z`c`Y`ubYqK|

- 1| gml - c`a`v`b`Z`g`u`K`vi`Mv`b`I`u`c`GBP|
- 2| cmb - M`f`xi`Zv, `Q`Zv, Z`v`c`g`v`I`v, `e`x`f`Z`Av`\_t`Rb, `e`x`f`Z`K`v`e`b`-W`v`b`A`\_v`B`W, u`c`GBP, d`m`t`d`U, b`v`B`t`U`U, L`i`Z`v`B`Z`w`|

### gml

GtUj I t`v`-Auk gml i cKz gvQ Pvl i Rb` mtef`Eg| cKzi i gml ubi`c`q` ev`f`vi`agr`ntj`gvQ`i`Drcv`b`teuk`nq| GtUj I t`v`Avk gml`Z`\_R`u`e`K`c`v`\_e`teuk`\_v`t`K`etj`Gme`gml`teuk`DeP`nq| GtUj I t`v`Avk gml i cmb avi`Y`f`g`Z`v`teuk`| ubi`c`q` gml i u`c`GBP. \_v`t`K`7| ubi`c`q` I`f`vi`agr`gml`gvQ`Pvl`i`Rb` teuk`Dc`h`Mx|

GtUj I t`v`-Auk gml i cKz gvQ Pvl i Rb` mtef`Eg|

**cwb**

cKzi i cwbB gvtQi evm`vb ev cwi tek | cKzi i cwb i Yv, tYi I ci gvtQi epX Z\_v gvtQi Drcv`b wekl fite wbfPkj | cKzi gvtQi Prtli Rb` cwb GKIU, iZcYc0\_ugK ubYqK | cwb i tFz I i vmiqbK Dcv`vbmgr`wbtaewYZ ntj v t

cKzi i cwb Mfxi Zv 2  
ugvti i KvQvKwQ ntj  
gvtQi Prtli Rb` fvj |

**Mfxi Zv t** cKzi i cwb Mfxi Zv 2 ugvti i KvQvKwQ ntj fvj nq | Gi tPtq tewk Mfxi ntj cKzi i Zj vq `RweK c`v`Rtg cPtZ i iYKti Ges Gi dtj KveBvBA` vBW, Gtgnbqv, ug`\_b, nvBtWtRb BZ`w` weLv<sup>3</sup> M`vm `Zwi nq | Gme M`vm gvtQi Rb` qWZKi |

**^QZv t** ^Q cwbZ mntR AtpK Mfxi Zv chS`mhqj vK tcStQ | Gi dtj cwbZ cPz Dw`c cWUb (phytoplankton) Drcbenq hv gvtQi Lv` | cwb i ^QZv 25-30 tm. ug. nI qv evAbxq |

Avgt`i t`tki gvtQi  
epxi Rb` mekaK AbKj  
ZvcgvIv ntj v 28-32<sup>o</sup>  
tmj wqum |

**ZvcgvIv t** gvtQi Prtli Rb` cwb i ZvcgvIv AZ`sl, iZcYc0 ZvcgvIvi mt`\_ gvtQi t`tni epxi nvi cZ`qfite m`uKqj | cwb i ZvcgvIv evotj gvtQi epxi nvi evto | Avevi cwb i ZvcgvIv Kgtj gvtQi epxi nvi Ktg | Avgt`i t`tki gvtQi epxi Rb` mekaK AbKj ZvcgvIv ntj v 28-32<sup>o</sup> tmj wqum | ZvcgvIvi KvItYB eIqKtj Avgt`i t`tk gvtQi Drcv`b tewk nq Ges kvZKtj Kg nq | Avgt`i t`tk tg gvm t`tk Atpvei gvm ntj v gvtQi Prtli mtefEg mgq |

Aw tRtbi Afve ntj gvtQi  
Lwe Lrq | A`f fimtZ  
\_vtK I evZvm MhY Ki tZ  
\_vtK | Aw tRtbi Afite  
gvtQi gvi v tMtj gZ gvtQi nv  
Kti \_vtK |

**`exfZ Aw tRb t** gvtQi Prtli Rb` Aw tRtbi KvLZ NbZi ntj v Kgc`q 5 ug.Mh./uj Uvi | hLb cwbZ Aw tRtbi NbZi 18 ug.Mh./uj Uvi G tcStQ, ZLb gvtQi eyev ev gas embolism tivM nq | th me cKzi AwaK cwi gvtY Wzsl Dw`c \_vtK tmme cKzi AwZwi<sup>3</sup> Aw tRb `exfZ nq | Aw tRtbi Afve ntj gvtQi Lwe Lrq | A`f fimtZ \_vtK I evZvm wMj tZ \_vtK | Aw tRtbi Afite gvtQi gvi v tMtj gZ gvtQi nv Kti \_vtK |

**`exfZ KveB-WB A` vBW t** mtj vK mstk- I tYi Rb` cwbZ `exfZ KveB-WB A` vBtWi cQvRb nq | wKs`hw` Gi NbZi 5 ug.Mh./uj Uvti i I cti Dtv ZLb gvtQi qWZ Mh`nq | G mgq hw` cwbZ Aw tRtbi Afve Ntu Zv ntj gvtQi kjb KvR Amyeav nq Ges gvtQi evck nvti gvi v thtZ cti | cKzi `Re c`v`vKtj tewk KveB-WB A` vBW `Zwi ntZ cti |

gvtQi cKzi cwb i  
w.GBP. Gi cwi mi 6.5-  
9\_vKv DvPZ |

**w.GBP t** gvtQi Prtli Rb` cwb i w.GBP 4-9.5 cQvRb | Zte w.GBP Gi cwi mi 6.5-9 gvtQi Prtli Rb` mtefEg | cwb i w.GBP. hLb 7 G \_vtK ZLb ZvtK wbt`c`q etj | cwb i w.GBP Kg \_vtKtj Pz cQvM Kti Zv evotbv hvq |

**dmtDU t** cwbZ cQvRb gZ dmtDU bv \_vtKtj tklj v ev Dw`c cWUb fvj fite RbWtZ cti bv | hw` cKzi i cwbZ 0.10-0.20 w.w.Gg. NbZi dmtDU i vLv hvq Zvntj gvtQi Drcv`b evto |

**bBtU t** cKzi i cwbZ gvtQi AwaK Drcv`b tctZ ntj cwbZ bvtUti NbZi i vLtz nte 2.0 ug.Mh./uj Uvi |

**LiZv t** tKvj cwb i tPtq Li cwbZ gvtQi Drcv`b tewk nq | cwb Li Zv 25 ug.Mh./uj Uvi ev Zvi tPtq Dcti ntj cKzi gvtQi Drcv`b AwaK nq |







### cuVvEi gj'iqb 4.1

mMK DEti i cuK UK iPy (✓) w b/

- 1/ gvQ Prtli Rb" tKvb&gvUj cKz mteEg?  
K) tej gvU  
L) jvj gvU  
M) GtUj I t`veAvk gvU  
N) jvj I A=gvU
  
- 2/ cmbi ZrcgvIv evotj gvQi epxi nvi Kx nte?  
K) Ktg hvq  
L) w`i \_vK  
M) evto  
N) evto Ges Ktg
  
- 3/ gvQ Prtli Rb" KgcTj `exfZ Av tRtbi NbZ;KZ \_vKv DvPZ?  
K) 2 ug.M0./uj Uvi  
L) 5 ug.M0./uj Uvi  
M) 6 ug.M0./uj Uvi  
N) 6.5 ug.M0./uj Uvi
  
- 4/ gvQ Prtli Rb" cmbi uc.GBtPi mteEg cwi mi KZ?  
K) 4-10  
L) 5.5 - 9.5  
M) 6.5 - 9  
N) 7-9
  
- 5/ c0Z kZvstki cKzi megvU KZuU gvQ Qvov DvPZ?  
K) 30 uU  
L) 25 uU  
M) 32 uU  
N) 22 uU

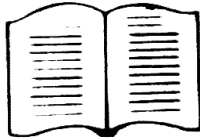


### cw 4.2 gvQ Qivov i bqqvej x, GKK Ges igkPvl



#### G cw tktl Avci b -

- gvQ Qivov i bqqvej x eYDv Ki tZ cvi teb |
- gvQ i GKK Pvl m=utK e`vL`v Ki tZ cvi teb |
- gvQ i igkPvl m=utK Avtj vPbv Ki tZ cvi teb |



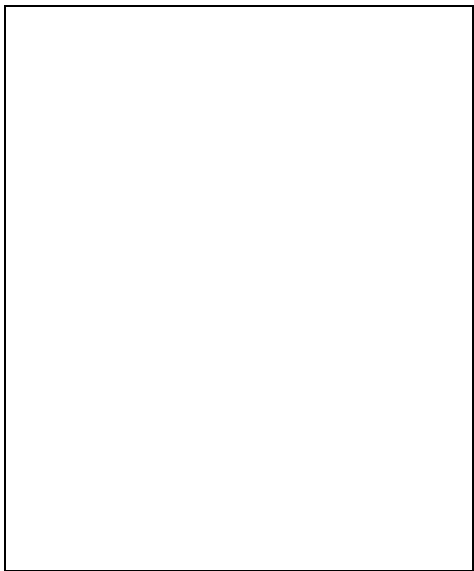
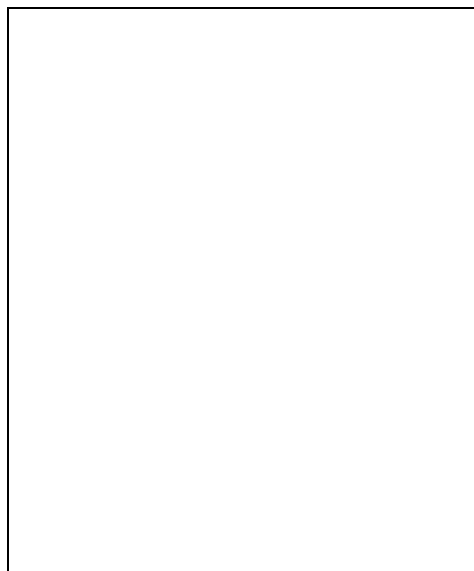
#### tcvov Qivov i bqq

cKzi i cmb hLb meR ntq Dtv ZLb cKzi gvQ i tcvov Qivov DvPZ | eZ@tb ersj vt`tk tcvov enb Kivi Rb` nmo I Av` tRb h3 cij u\_b e`vM e`eniv Kiv nq | Zte Av` tRb h3 cij u\_b e`vM tcvov enb Kiv me tPiq fij `eAvbK cSv | hv` nmo w` t q tcvov enb Kiv nq Zv ntj cLtg nmo iU cKzi i cmb tZ bvgvZ nte Ges nmo i Mj v chS i cmb tZ 30 igvU Kvj Wnetq ivL tZ nte | Gici nmo i A tAR cmb cKzi i cmb w` t q e` j Ki tZ nte Ges GKB Ae`vq Av i 20 igvU mgq ivL tZ nte | Gi ci nmo KvZ Kti nmo i gly cmb tZ ivL tZ nte | G Ae`vq nmo t` tK tcvov cKzi i cmb tZ P t j h r t e | (vP t - 25)

Av` tRb h<sup>3</sup> cij u\_b e`vM tcvov enb Kiv me tPiq fij `eAvbK cSv |

cvt i cmb I cKzi i cmb i Zvcgv i vi gv tS Ly tevk cv`R` \_vK t j tcvov e`vcK nvti gv iv hvq | cKzi tcvov Qivov DEg mgq ntj v mKvj tej v |

hv` tcvov cij u\_b e`vM enb Kiv nq Zv ntj cLtg e`vM iU gly erav Ae`vq cKzi i cmb tZ 30 igvU Kvj Wnetq ivL tZ nte | Gici e`vM i gly cmb i Dcti ti tL Lj tZ nte Ges cKzi i cmb Qivov e`vM i A tAR cmb e` j Ki tZ nte | Gici e`vM i gly Dcti ti tL B e`vM i evKx Ask 20 igvU Kvj cmb tZ Wnetq ivL tZ nte | Gici e`vM i gly cKzi i cmb tZ Wnetq at i ivL tZ nte | tcvov cKzi i cmb tZ P t j h r t e | G c x i Z Avy i Y Kiv nq cvt i cmb i Zvcgv i v cKzi i cmb i Zvcgv i vi mgZvq Avbvi Rb` | cvt i cmb I cKzi i cmb i Zvcgv i vi gv tS Ly tevk cv`R` \_vK t j tcvov e`vcK nvti gv iv hvq | cKzi tcvov Qivov DEg mgq ntj v mKvj tej v | Gmgq cKzi i cmb ViUv \_vtK | (vP t - 26)



vP t 25 t tLj v cv t ntZ tcvov Qivov c x i Z

vP t 26 t cij u\_b e`vM ntZ tcvov Qivov c x i Z

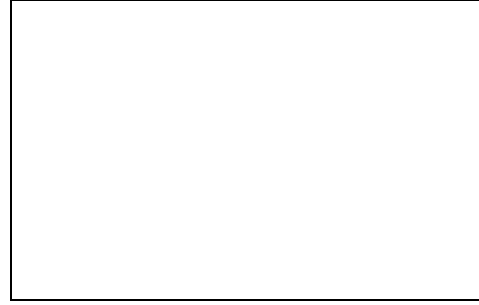
**GKK Pvl**

hLb tKvb Rjvktq i'ay gvi GKU cRmZi gvQ Pvl Kiv nq ZLb ZvtK gvtQi GKK Pvl etj | GKK Pvl wbeo Pvl i tejvq tenk e'envi Kiv nq| Avgvt`i t`tk ivRcyj, gv, i | cvsMvtmi GKK Pvl Kiv nq| Zte G, tjvi gvtS ivRcyj GKK Pvl mnR I jvfrbK|

hLb tKvb Rjvktq i'ay  
gvi GKU cRmZi gvQ  
Pvl Kiv nq ZLb ZvtK  
gvtQi GKK Pvl etj |

**ivRcyj GKK Pvl**

ivRcyj Ab` bvg ntjv \_vB micj| \_vBj`vU ntZ G gvQ Avgvt`i t`tk Avg`wb Kiv ntqtQ| GK kZvsk ntZ i'iyKti GK GKti cKzi I ivRcyj GKK Pvl Kiv hvq| kxZKvtj cKz i'vKtq qmZKi tcvKv-gvKo, gvQ I AvMvQv mwi tq tdj tZ nte| hw` cKz i'Kvtrv mæe bv nq Zv ntj KxUvKk, ti vUbb ev dmUw b e'envi Kti qmZKi Rxe tgti tdj tZ nte| Gi ci cZ kZvstK 1 tKvR Kti Pz cQvM Ki tZ nte| Pz i'Kbv ev cmb fiv` cKzi e'envi Kiv thtZ cvti| Pz t`l qvi ci cmbi Mfxi Zv 1-1.2 ugUvi Zj tZ nte| Pz cQvMi 3-4 w`b ci cZ kZvstK 3-4 tKvR tMvei A\_ ev 2 tKvR gjvMi wov cQvM Ki tZ nte| Gi 6-7 w`b ci cZ kZvstK 100 Mtg BDwi qv Ges 200 Mtg wU.Gm.wc. e'envi Ki tZ nte| BDwi qv I wU.Gm.wc. cUtg tKvb cvtI , tj wbtZ nte Ges Zvi ci wUwtq mviv cKzi cQvM Ki tZ nte (wP t 27, 28, 29)|



wP 27 t cKzi Pz cQvM cxwZ

wP 28 t cKzi `Re mvi cQvM cxwZ



wP 29 t cKzi i'vqvubK mvi cQvM cxwZ

mvi cQvMi 4-5 w`b ci cKzi i' cmb meR ntq hvte| ZLb cZ kZvstK 5-8 tm.wg. `Nq 60 - 65w tcvb QvotZ nte| tcvb Qvovi ci w`b t`tk mvi wY-3 Abvrti m`u-i-K Lv` cQvM Ki tZ nte|



Kul.1 cju Dbqob ֆ

ւղկ՝Քրժի Rb՝ մւււ eՕի  
 Կճի Կմբ իւԼժ Կւիժ  
 Բիյ ռղ| Շէ 8-9 ցմ  
 Կմբ յԿժի I Քժի |

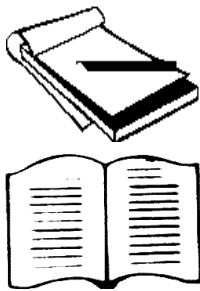
Կւժյւ, իԹ, ցժՄյ, յմյ Բւի ԿւԿ, յցի ի ԿւԿ, յԿԵ ԿւԿ (ԿււԿՔ), Մժմ ԿւԿ յՅ մի Կւժ յղկ՝  
 Քրժի e՛նւի Կիւ ռղ| յղկ՝Քրժի Rb՝ մւււ eՕի Կճի Կմբ իւԼժ Կւիժ Բիյ ռղ| Շէ 8-  
 9 ցմ Կմբ յԿժի I Քժի | ԿժԿ ԿՅիս Եժ ԿժԿ ԿԿի ԱւԿիժի Կճի յղկ՝Քրժի Կիւ յղղ|  
 Կճի ի ՄԲի Շւ 2-2.5 յղղի իւԼժ յե| ԿժԿիժի Եր ցւՕ Օոուի ԿժԿ մԲւն ԱրժՄ յղՅԿի  
 ԻԿւԿիցւԿո, ցւՕ I ԱւՄՕւր Կճի յժ յԵԵՔ Կիժ յե| ԿժԿ ԿՅիսժ 160 Մղ իւԿՅԵ Եր ժ  
 Շւ Կիւ յղղ| Ա\_Եր ԿժԿ ԿՅիսժ 3ւՕ ժմււր Ե ԵւՕ (1-1.5 յղղի Կմբի ՄԲի Շւի Rb՝)  
 e՛նւի Կիժ յե| ԿիւԵրԿԿ յեժ յԿժիժի ԿիժՕ Կ ԵւՕ Կւլ ցւ յղղ| ժմււր իԵ յեժ յԿժի 4-5  
 Եր Ե յԿժի | ԿմԵ Կիժ յԵԵՔ Կճի ի Կմբ e՛նւի Կիւ ԵրՅԵ Եղ|

Քժ I մւի ԿԿԿ Քրժ Կժիցւի ցՅԵ e՛նւի Կիժ յե| ԿՅ 4.1 Կի յԵԵԵ ԱԵրժի Կճի  
 ԻԿւԵր ՕւՕժ յե Կես մւի յԿ-4 ԱԵրժի մ=ւի-Կ Լւ՝՝ ԿժիցւՄ Կիժ յե|

մւի յԿ 4 Ե ԿժԿ Կճի Կժիժ Ե Լւ՝՝ ԿժիցւՄի Կւի ցւԿ|

ցմ	ԿժԿ ԿԿի Կժիժ իԵ Լւ՝՝ (ԻԿԵՐ)
1	2.0
2	2.5
3	3.0
4	4.0
5	5.0
6	6.0
7	7.0
8	8.0
9	9.0
10	10.0
11	11.0
12	12.0

Կ Կժի ԱԵրժի Կիժի ԵՕի ԿժԿ ԿԿի 50-70 ցՅ ցւՕ ԵրԿւր Շ յե| Կժիցւժ ԿԿԿ Քրժի  
 Եր յԵԵԵ ԱԵրժի Կիժ յե|



**ԱԵրժի Ե (Activity) Ե Երժի,** ԱրԵրի ԿԿԵ Կճի ԱրՕ Երի ԱրՅԵ 1 Երժի | Կ Կճի յԵԵԵ  
 ԿԿ ԵՕի ի Rb՝ ցւՕ Քրժի ի Կժիցւժ ԱրԵր Կժիժ Ե Կ Կւի ցւԿԵ մ=ւի-Կ Լւ՝՝ ԿժիցւՄ Կիժ Եր Շւ  
 յԵԵԵ Կիժ Կես Կի ԿԿԵ մւի յԿ Կժի յԵԵԵ Կիժ |

**մւի ցժ** ռււՕ Եր Կիյ յՅ Ե՛Մ Օւրի իԿւԵր Կւի Երժի Կիժ յե| Կժի Կմբի I Կճի ի Կմբի  
 ՇիԿիցւժ մԵԵԵ Կժի Կմբ ՕւՕժ յե| ԿԿ Կժիցւժի ցւԿի Քրժի ԿԿԿ Կես ԿԿԵԿ  
 Կժիցւժի ցւԿի Քրժի յղկ՝Քրժի Եր ռղ| իւԿժի ԿԿԿ Քրժի մնՐ I յրԲԵԿ| ԿժԿ ԿՅիսժի  
 Կճի իւԿժի 60-65 յՕ Կմբ իՕժՕ մւի I մ=ւի-Կ Լւ՝՝ ԿժիցւՄ Կիժ յե| 3-6 ցժի  
 յԲՅի ցւՕ Երժի յԵԵԵ ԱրԿի Երի Կիժ| յղկ՝Քրժի Rb՝ Կւժյւ, իԹ, ցժՄյ, յմյ Բւի  
 ԿւԿ, յցի ի ԿւԿ (ԿււԿՔ), Մժմ ԿւԿ յՅ մի Կւժ յեժ Կիժ յե| ԿժԿ ԿՅիսժ Կմբ  
 Կժիցւժի 32ւՕ Կմբ ՕւՕժ յե| ԿժԿ ԵՕի ԵրԿւր Ե յԵԵԵ ԿԿի 50-70 ցՅ|

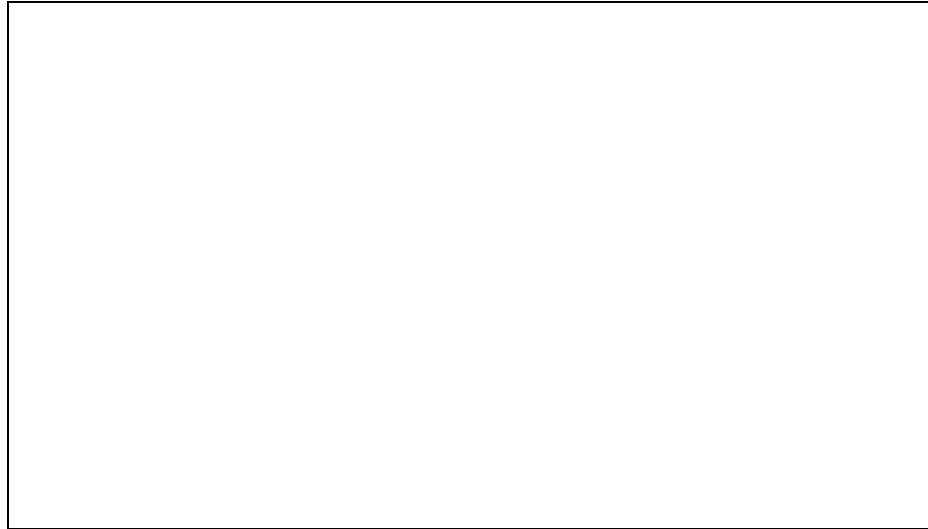


## cuVvEi gj`iqb 4.2

mivK DEti i cuvk iJK iPy (✓) i b|

- 1| tcvbri cwi enYi mePttq e`AvibK cŠi tKivbU?  
K) nivoZ tcvbri cwi enY  
L) Av tRb Qvov cuj u\_b e`vM tcvbri cwi enY  
M) Av tRb hŠ cuj u\_b e`vM tcvbri cwi enY  
N) civoK i evj uZtZ tcvbri cwi enY
  
- 2| tcvbri Qvovi DEg mgq tKivbU?  
K) `gij  
L) mKij  
M) meKij  
N) ivZ
  
- 3| ugk<sup>a</sup> Pvi tKivbU?  
K) GK cRmZi Pvi  
L) GKmaK cRmZi Pvi  
M) ivRcvi Pvi  
N) KivZj v gvtQi Pvi
  
- 4| cŰZ kZvstK KZ tKivR Pz e`envi Kiv DvPZ?  
K) 0.5 tKivR  
L) 1.0 tKivR  
M) 1.5 tKivR  
N) 2.0 tKivR
  
- 5| ivRcvi cKzi i Mfvi Zv KZ ntj fvj?  
K) 2-3 ugUvi  
L) 1-1.2 ugUvi  
M) 3-4 ugUvi  
N) 4-4.5 ugUvi





**WPI 31 t cUdtg<sup>o</sup>mcZ LvBi mwi**

LvBiq gvtQi Pvl ntjv ubneo Pvl | G PvlI Rb` Kwlg myg Lv` AZ`vek`K| Avgvt`i t`tk  
ubneo Pvl | G PvlI Rb`  
Kwlg myg Lv`  
AZ`vek`K| Avgvt`i  
t`tk LvBiq tZj mcqv,  
gv, i I ivRcylI Pvl  
mæ|

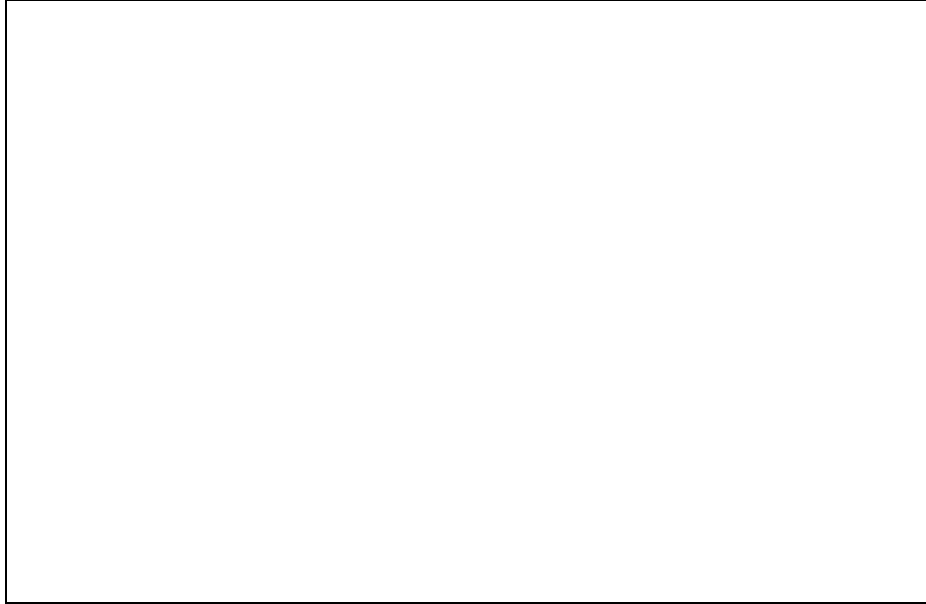
LvBiq gvtQi Pvl ntjv ubneo Pvl | G PvlI Rb` Kwlg myg Lv` AZ`vek`K| Avgvt`i t`tk  
LvBiq tZj mcqv, gv, i I ivRcylI Pvl mæ| Zte Gt`i gvtS tZj mcqvI Pvl jvfRbK|  
tZj mcqv Pvl Ki tZ ntj cõZ 1 eMõUvi LvBiq 200-300W tcvbr QrotZ nte| Mtgi fwl I  
wkwj h\_vptg 85% I 15% niti wkwj gvtK Lv` wntmte w`tZ nte| cõZw`b Lv`i  
cwi giv \_vKte gvtQi t`tni IRtbi 6-7%| LvBi Zjvi meUKzAsk cij\_w`b w`tq gytq  
ZitZ Lv` w`tZ nte| A\_ev iuk w`tq LvBiq UKwi Sij tã ZitZ Lv` mieivn Ki tZ nte|

wKQyb ci ci LvBi Ryj cij I tkljvq fuz`ntq thtZ citi |Ggb ntj etk ev etk  
kji Sivr w`tq Ryj cwi`vi Kti w`tZ nte| cõZ 3 gym Ašli Ašli GKU LvB nãZ 20  
tKwR tZj mcqv Drcv`b Kiv mæ|

**tPševPiq gvQ Pvl**

Avgvt`i t`tk tPševPiq  
AmclKib I µm gv, i,  
tZj mcqv I ivRcylI Pvl  
mæ|

tPševPiq gvQ Pvl GKU ubneo Pvl c×vZ | G t`qãI Kwlg I myg Lv` Acwivh<sup>o</sup> gvQ  
PvlI Rb` tPševPvi Avkvi 50 eMõã nãZ KtãK nãRvi eMõã chšI nãZ citi | Avgvt`i  
t`tk tPševPiq AmclKib I µm gv, i, tZj mcqv I ivRcylI Pvl mæ| Zivov tPševPiq  
gv, i, uks, e`vãoi tcvbr I e`vãoi Pvl mæ (WPI 32)|



ՊՏ 32 t ԻՏԵՐՊՐԳ ԳՎՅՈՒ ՔՐԻ

c՛Z 0.2 eMՅԱՆԻ ԳԿՈՒ ԿՖԻ  $\mu$ m ԳՎՅՈՒԻ ԽԵՐՆ ԽՈՒՄԻ ԲՐՈՒՄԻ, ՍԵՅԿԵՆ ԿՐԿՅԻ ԿԻՎՄԻԿ ԼՐ՝ ՄՆՄՏԵ Ե՛ՆՐԻ ԿԻՅ 2 ԳՎՄ ԳԿՈՒ ԳՎՅՈՒ ԻՐԲ ՎՈՐԳ 200-250 ՄՐԳ/ ԻՏԵՐՊՐԳ ԸՆԲԻ ՄԲՈՒՅՆ ԻՎԼԻՅ ՆԻ 0.6-0.8 ՊԳՎԻ ԳԵՏ Ը՛Զ 15 ՄԵՑ ԸՆԲ Ե՛Յ ԿՖԻ ՄԻՅ ՆԳ |

ԻՏԵՐՊՐԳ ԽՅՄԸՎԻ ԻԿՆ ԸՐՄՆԻ ՔՐԻ ԿԻՅ ՆՅ Ը՛Զ eMՅԱՆ ԳԿՈՒ ԿՖԻ ԽԵՐՆ ԽՈՒՄԻ ՄՅԻ ԲՐԻ Ի ՄԿՐԿՅԻ ՊԿԿ (80%-20%) ԼՐ՝ ՄՆՄՏԵ Ե՛ՆՐԻ ԿԻՅ ՆԳ | ԳՅ 3 ԳՎՄ ԳԿՈՒ ԳՎՅՈՒ ԻՐԲ ՆԳ 60-70 ՄՐԳ | ԻՏԵՐՊՐԳ ԸՆԲԻ ՄԲՈՒՅՆ ԻՎԼԻՅ ՆԻ 0.6-0.8 ՊԳ. ԳԵՏ Ը՛Զ ՄԵՐՆ ԳԿԵՐԻ ԸՆԲ Ե՛Յ ԿՖԻ ՄԻՅ ՆԳ |

ԻՏԵՐՊՐԳ Ը՛ՅԿ ԱԵՎԳ 15 ԽՄ.ՊԳ. ԸՆԲ ԽՈՒՄ ԸՎԻՅ ՄԿՍ Ի ԳՎՅՈՒԻ ԽԵՐՆ ԽՈՒՄԻ ՔՐԻ ՄԵՅ | Ը՛Զ eMՅԱՆ 5ՈՒ ԿՖԻ ԳՎՅՈՒ ԽԵՐՆ ՈՐՈՎ ԽՐԳ | ԱԲ՝ ՄԻԿ ՄԿՍ ԳԻ ԽԵՐՆ ՈՐՈՎ ԽՐԳ 200ՈՒ | 15 ՄԵՑ ԸՆԲ ԸՆԲԻ ՄԲՈՒՅՆ 0.3 ՊԳՎԻ ԵՐՈՎԻՅ ՆԳ | ԼՐ՝ ՄՆՄՏԵ Ը՛ՅԿ ԱԵՎԳ ՄՈՒԸԵՎ՝ (tubifex) ԳԵՏ Ը՛Ի ՍՐԿՎ ԳՎՅՈՒ ԽԸԻԻ Ե՛ՆՐԻ ԿԻՎ ԽՐԳ |

ԻՏԵՐՊՐԳ Ը՛ՅԿ ԱԵՎԳ 6 ԲՈՒՄ ԸՆԲ ԽՈՒՄ ԸՎԻՅ ՄԿՍ Ի ԳՎՅՈՒԻ ԽԵՐՆ ԽՈՒՄԻ ՔՐԻ ՄԵՅ | Ը՛Զ eMՅԱՆ 5ՈՒ ԿՖԻ ԳՎՅՈՒ ԽԵՐՆ ՈՐՈՎ ԽՐԳ |

ՄԿՍ, ԳՎՅՈՒ, ԿԲ, Ը՛ՅԿ, ԽՍԻՎ, ԽՅՄԸՎ՝ ՎԲ ԻՎՐԸ՛Յ, ՊԳԻ ԿՎԸ, ԿՎԸՔ, ՍՄԿ, ԽԲ՝Վ ԲՅ՝Մ՝ ԳՎՅՈՒ ԱՎ ԽՅՄԸՎ ՔՐԻ ԿԻՎ ԽՐԳ |

**ԱՎ ԽՅՄԸՎ ԳՎՅՈՒ ՔՐԻ**  
ԱՎ ԽՅՄԸՎ ԳՎՅՈՒ ՔՐԻ ԸՎՄ Ը՛Յ 100 ԵՈՒԻ ԸՎՄԻՎ | ԱՎ ԽՅՄԸՎ ԳՎՅՈՒ ՔՐԻ ԽՅՄԸՎ ԱՎ ԳԼ՝ ԸՄՅ ԱՎԻ ԳՎՅՈՒ ԽՅՄԸՎ ԸՄՅ | ԽՄԵ ՄԲՔՅՐԿՅԻՅ ԸՆԲ ԱՎՍԿ ՎՅԿ ԽՄԵ ՐՈՅ Գ ԱԻՅԻ ՔՐԻ ԻՐԲ՝ ԸԵՅ | ԱՎ ԽՅՄԸՎ ԳՎՅՈՒ ՔՐԻ Ի ԳՅ ՆՅՎ ԵԻՔԻՅ | ՄԿՍ, ԳՎՅՈՒ, ԿԲ, Ը՛ՅԿ, ԽՍԻՎ, ԽՅՄԸՎ, ՎԲ ՄԻ Ը՛ՅԿ, ՊԳԻ ԿՎԸ, ԿՎԸՔ, ՍՄԿ, ԽԲ՝Վ ԲՅ՝Մ՝ ԳՎՅՈՒ ԱՎ ԽՅՄԸՎ ՔՐԻ ԿԻՎ ԽՐԳ |



c0tg avb t9tzi AvBj Dpzkfi tetā mbtZ nq| Gici t9tzi Pviw`tk 0.3N0.6 ugUvi  
c0`l 0.3N0.5 ug. Mfxi Kti bjev tktU mbtZ nq| A\_ev t9tzi gvtS GKU tQvU MZ©  
Kti Zv t9tzi Pvi c0tšlPmiuU ev Zvi tPtq Awak bjev tktU AvBtj i Kiv chšlAvbtZ nte  
(wP 33)|



wP 33 t avb t9tzi gvtQi Pvl

GKvR\_tjv m`ubekivi ci h\_vimZ t9tzi Pvl w`tq avb jvMtZ nte| hLb avtbi Pviv\_tjv  
gmvU mvt\_ k³ fite tjtm hite ZLb c0Z tn±ti 2500-3000 uU tcvbr QvotZ nte| tcvbr  
GKU ev GKwaK cRwzi ntz cvti | avb t9tzi h\_vm`e tenk Mfxi Zvq cwb ivLtz nte|  
elā iitZ tcvbr QvotZ nte Ges aitZ nte avb KivUvi mgq| GtZ Drcv`b `vante  
200-250 tKwR/tn±i |

gvQ, ci, cvL, km` I  
dj gj- hLb GKtI GKB  
Lvgvi e`e`vcvvi Aaxtb  
Pvl Kiv nq ZLb ZvtK  
mgvSZ gvQ Pvl  
(Integrated Fish  
Culture) ejv nq|

**mgvSZ gvQ Pvl**

gvQ, ci, cvL, km` I dj gj- hLb GKtI GKB Lvgvi e`e`vcvvi Aaxtb Pvl Kiv nq ZLb  
ZvtK mgvSZ gvQ Pvl (Integrated Fish Culture) ejv nq| Lvgvti i etRq m0`envi Kti  
Kg LiP Drcv`b evovtbr G cxwzi c0vb Dti`k`| Zte Gi mvt\_ Rwg, k0gK Ges gj-atbi  
m0`envi I h3 ntz cvti | gvQ I gjvMi Pvl GKU mgvSZ Pvl cxwz| G t9tI gvQ, gjvM  
I dj gj i Pvl GKtIxfZ Kiv nq|

**gvQ I gjvMi mgvSZ Pvl**

gvQ Pvti Rb` h\_vimZ cktz `Zvi Kiv nq| Gici cktzi Dcti ev cto gjvMi Ni `Zvi  
Kiv nq Ges cktzi cvto dj ev kvK-meRxi MvQ jvMtbr nq| gjvMi me0v cktzi mvi  
wntmte e`eüZ nq Ges cktzi DeP gmvU dj gj- I kvK-meRxi MtQi tMvovq e`eüZ nq|  
Averi dj gj i eR©gjvMi Lv` Ges cktzi mvi wntmte e`eüZ ntz cvti |

gvQ I me0v cktzi mvi  
wntmte e`eüZ nq|

Kvl.1 cj# Dbqpb ˆz

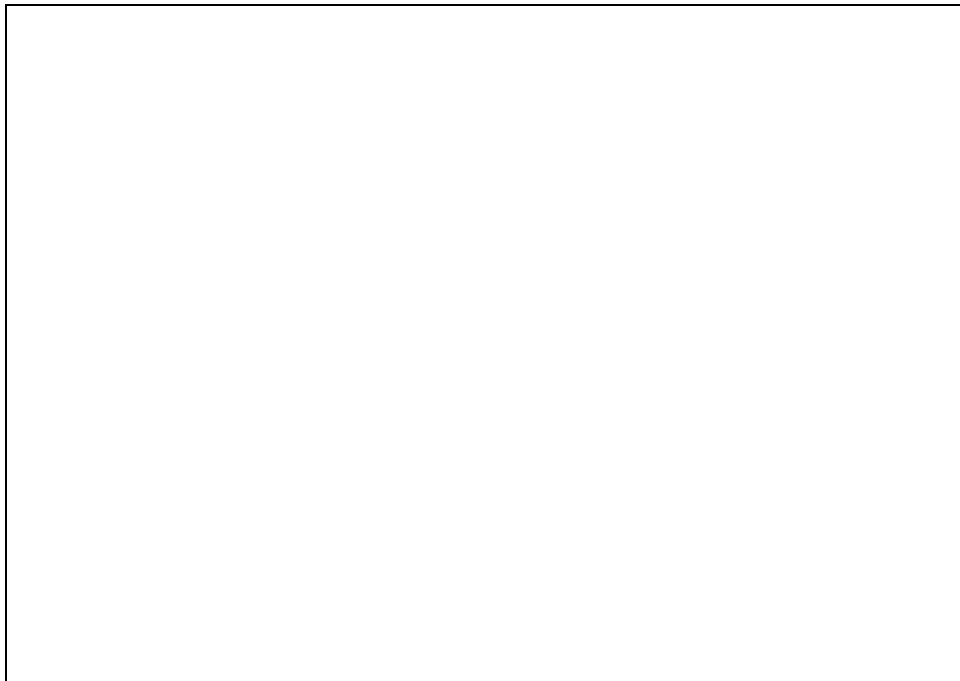
mgk<sup>a</sup> Pvl ev GKK Pvl i Rb<sup>o</sup> thfite cƷz cŰZ Kiv nq, GtƷtŰI tZgbfite cŰZ KitZ nte| Gici cŰZ weNvq mvi wY-5 Abyvti wefbaœRvzi tci bv QvoŰZ nte|

mvi wY 5 t mgwšZ gvQ Pvl i tƷtŰI tn±i cŰZ wefbaœRvzi gvŰQi mSLˆv|

gvŰQi bvg	mSLˆv / tn±i
KvZjv	600
wj fvi Kvc	1800
iB	1500
gŰMj	1200
MŰm Kvc <sup>€</sup>	600
wgi i Kvc <sup>Ÿ</sup> Kvc <sup>Ÿ</sup>	300
tgvU	6000

**gvŰMi Ni ˆZwi Kivi mgq wŰPi wbgg AbyvY KitZ nte**

gvŰMi Ni cƷzi Dci ev cvto ˆZwi Kiv thŰZ cvti | Zte cƷzi Dcti Kitj Ni cwi<sup>®</sup>vi Kiv mnR nq| cŰZwU etjvi gvŰMi Rb<sup>o</sup> 0.09-0.14 e.wg. ˆvŰbi cŰqvRb nq| Abˆw ˆK wWgcvor gvŰMi Rb<sup>o</sup> cŰqvRb nq 0.2-3 e.wg. | evk I KvWˆtq gvŰMi Ni ˆZwi Kiv hvq| evŰki evZv (evLwi) wˆtq gvŰMi NŰii tgŰS ˆZwi Kiv hvq| evZvi gvŰS dŰK ivLŰZ nte 1 tm.wg. Gi gZ| GŰZ KŰi dŰK wˆtq gvŰMi cv XŰK hvŰe bv| tgŰS nŰZ NŰii Pjvi DˆPZv nte 1-1.5 wglvŰti gZ| NŰii Pwi wˆtK teov wˆtq gvŰS dŰK ivLŰZ nte evZvm PjvPŰj i Rb<sup>o</sup>| wƷqvj I ebweotj i Avmgy nŰZ mvearb ˆvKŰZ nte| PŰtj i QvDwb Qb, bvor ev Kvkeb Űvii tˆ I qv thŰZ cvti (wPŰ 34)|



wPŰ 34 t cƷzi Dci gvŰMi Ni

cĀZ tn±i cĀzi 460-500u gjm i vLvi e`e`v Kiv hvq| G msL`vq cĀzi i cmb bó nq br| cij tbi Rb` 1 gym eqtmi ev`Pr ubaŕY KižZ nte| etjvi gjmMi Prl Kitj mviwY-6 Ablyvq Lv` mieivn KižZ nte|

mviwY 6 t etjvi gjmMi Rb` newfbæqtm Lv` mieivtni cwi gvY|

DcKiY	mgq I cwi gvY (tKwR)	
	0-4 mBun	5-8 mBun
Mg fvOv	50	50
wgwn Kgv	14.5	17
wZtj i %j	16.0	15
wkngj	19.0	16
wSbtKi ,av	--	1.5
jeY	0.5	0.5
tgvU	100 tKwR	100 tKwR



**Ablyv b (Activity) t aily,** Avcbvi GKwU cĀz AvtQ hvi AvqZb 0.5 tn±i | H cĀzi Avcwb gvQ I gjmMi mgwSZ Prl Kivi K\_v fvefQb| tmtŕtŕ Avcwb tKvb&tKvb&cŕwzi gvQ KZwU Ovoteb Ges KZwU gjmM cij b Kižeb Zv hvP mnKvti wj Lj|

Ab`w tK wlg t`qv gjmM jvj b Kiž mviwY-7 Ablyvni Lv` mieivn KižZ nte|

mviwY 7 t wlg t`qv gjmM jvj tbi tŕtŕ newfbæqtm Lv` mieivtni cwi gvY|

DcKiY	mgq I cwi gvY (tKwR)		
	0-4 mBun	5-16 mBun	16 mBvtni Dcti
Mg fvOv	46.0	46.0	44.0
wgwn Kgv	20.5	24.5	29.0
wZtj i %j	16.0	14.0	12.0
wkngj	17.0	15.0	10.0
wSbtKi ,av	--	--	4.5
jeY	0.5	0.5	0.5
tgvU	100	100	100

Lvevi cvtŕ Lv` Ges cmbi cvtŕ cmb mieivn KižZ nte (wPŕ-35)|

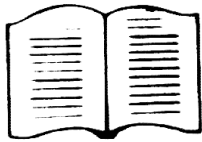


wPŕ 35 t gjmMi Lvevi I cmbi cvtŕ

Kul. I cj. Dbqb ˘z

Lvt`i cvt`i gvc nte : `N°1 ugUvi, cõ' 0.2 ugUvi Ges DŽPZv 0.1 ugUvi | G ai`bi GKU Livi cvt` 24 uL gjmMi Rb` ht\_ó/ mrvuK ev uL`bi \_vjvq gjmMi Rb` cmb mieivn Kiv thtZ cvt`i |

ivYt`Ź, emšf Ktj iv BZ`w` tivtMi Rb` mgq mgq uUKv w`tZ nte | G cxwZtZ tKvb mri e`envi bv Kti eQti meNv cõZ tn±ti 4600-5400 tKwR gvQ Drcv`b Kiv thtZ cvt`i | Ab`w`k etjvi gjmMi Drcv`b `vavte 5400-5800 tKwR | wLg t`qv gjmMi tŹt` eQti 64-78% gjmM wLg w`tq \_vtK |



**mvi gg** Lvbq gvQ i Pvl ubneo Pvl cxwZ | eo eo Rj vktq Lvbq gvQ i Pvl mæ | tjvrv l etk mn wwfbaai`bi DcKiY w`tq Lvbvi KvVtgv `Zwi Kiv hvq | mžv ev Zvt`i Rvj Lvbq e`envi Kiv hvq | tPšer`Pvq gv\_i, tZjwcv, ivRcv`mi ubneo Pvl mæ | tPšer`Pvq wks, gv\_tii tcvb Drcv`b mæ | avb tŹtZ gvQ i Pvl cxwZtZ avb gL` dmj Ges gvQ tMŠY dmj | avb tŹtZ wks, gv\_i, KB, cvd, tUsiv, tZjwcv, \_vB micvd, wgi i Kiv, KmcP BZ`w` gvQ Pvl Kiv mæ | gvQ l gjmMi Pvl mgwšZ gvQ Pvl | gvQ l gjmMi GKt` Pvl gjmMi Ni cvt`i cvto ev cvt`i Dcti `Zwi Kiv DvPZ | gjmMi wov gvQ i mri wntmte e`eüZ nq |

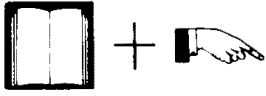


### cuVvEi gj`iqb 4.3

mWk DEti i cuK uK iPy (✓) i b|

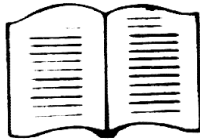
- 1| LvPiq gvtQi Pvl tKvb&aitbi Pvl c×uZ?  
K) Avav ubweo  
L) ubweo  
M) AvZ ubweo  
N) mbvZb
  
- 2| tPŠevPiq tKvb&tKvb&cRmZi gvQ Pvl mæe?  
K) iB, KvZjv, gMj  
L) UvK, tkvj, MRvi  
M) gv, i, tZj wcv, i vRc  
N) cisMm, iPZj, KvcP
  
- 3| avb tPZ cZ tn±ti KZu tcvbv QvotZ nte?  
K) 2000-3000 uU  
L) 2500-3000 uU  
M) 2500-3500 uU  
N) 3000-3500 uU
  
- 4| gjvMi weov gvtQi cKzi Kx intmte e`eüZ nq?  
K) Lv` intmte  
L) mvi intmte  
M) Lv` I mvi intmte  
N) tKvb uKQb bv
  
- 5| mgvšZ gvQ Pvl eQti cZ tn±ti gvtQi Drcv`b KZ ntZ cvti?  
K) 5000-6000 tKvR  
L) 4600-5400 tKvR  
M) 7000-8000 tKvR  
N) 8000-9000 tKvR

### cw 4.4 gŷ Rjvkq e`e`lcbv



**G cw tkłl Avcib –**

- gŷ Rjvkqmgŋni e`e`lcbvi cxiZ, tjv eYbr KiłZ cviłeb|
- gŷ Rjvkłqi cwi gvY I Zvi Drcv`b m`fU Avtj vPbv KiłZ cviłeb|



**gŷ Rjvkq**

eb`vi cwb, b`x, Lij, wej, nvl o, evl o, nı, tgvnvr AAj BZ`w` ntjv gŷ Rjvkq| th me Rjvkłqi cwbı ubqšŷ m`uYfıc cKuzi I ci ubfPkij Ges cwb ubqšŷY gvbył i KiYxq Ly teuk wKQy vřK bv tm, tjvB gŷ Rjvkq| KvBvB nı gvbył i mıo ntj I Gi vekij Zvi Rb` GıU gŷ Rjvkq| evsj vř`tk cłq 40 j 9| tnıi cwi gvY gŷ Rjvkq AvřQ| evsj vř`tki grm` Drcv`łbi cłq 70% Avřm gŷ Rjvkq ntZ| evsj vř`tk gŷ Rjvkłqi RjvqZłbi cwi gvY mvi wY-8 G cłE ntj v|

eb`vi cwb, b`x, Lij, wej, nvl o, evl o, nı, tgvnvr AAj BZ`w` ntjv gŷ Rjvkq|

mvi wY 8 t evsj vř`tk gŷ Rjvkłqi RjvqZłbi cwi gvY|

evsj vř`tki grm` Drcv`łbi cłq 70% Avřm gŷ Rjvkq ntZ|

Rjvkłqi big	RjvqZb (tnıi)
b`x, Lij, Lıwo I tgvnvr AAj	10,31,563
nvl o I wej	114,163
evl o	5,488
KBvB nı	68,800
cveb fıg (ıbgwřZ km` fıgmn)	28,34,008
meřgvU	40,54,022

Dctiv<sup>3</sup> vekij Rjivki grm` Drcv`b gvř 5,60,000-6,00,000 Ub| GZ Kg Drcv`b nı qvi KviY ıb`efc t

- avb Pvl, fıwo era, tmP I iv`ıNvU ıbgřY Kti gŷ Rjvkq bóKiY|
- gvřQi eskeřxi nřıi tPřq teuk nřıi gvQ AvniY|
- ıbıePřı cRbbKvi x gvQ I tcvıv ıbab|
- Kul. I ıgj cłZöřłbi`ıY|
- mi Kviı bıwZgvj v I cwi Kıı bvi Afıe|

avb Pıřı i Rb` AłbK Lıj-ıej, b`x-bıj v, nvl o, evl o BZ`w` Rjvkq, tjv iıKřq tđtj avb Pıřı i DcřıvMx Kiv nř`Q| Avevi AłbK Rjvkq ntZ avb třřřZ tmřPi Rb` cwbı tbaıv nř`Q| Avevi avb třřřZı tcvKv`gb Kivi Rb` KıUbıkk e`enıi Kiv nř`Q| Gme KviřY Rjvkq, tjv gvřQi eıv`řłbi AbıcvřıvMx nřq hıř`Q|

AłbK`řłb fıwo era teta eb`v ıbqšŷ Kiv nř`Q | Gme fıwo eraı KviřY gvQ b`x ntZ PııY fıřřZ cłek KiłZ cviı bı| Zıvov fıwo era AłbK cRbb fıg bó Kti ıř`ř`Q| đtj gvřQi Drcv`b Křg hıř`Q|

Atbk tmP cKí Ges iv`vNvU gvtQi cRbb AÁj Ges PriY fvgi ¶wZ Ki tQ| tmP cKí I iv`v Ggb me`v`tb wbg¶Y Kiv ntqtQ th`\_tjvi Kvi tY GKiv`tK gvtQi`v`vmeK Pj vPj e`v`vZ nt`Q Avevi Ab`ir`tK cRbb fvg, tcvbvi j`vj b fvg Ges PriY fvg a`ism nt`Q |

evsj vt`k RbmsL`v tevk nI qvq gvQ aivi nvi AZ`š'teuk| Gi dtj cÁZ eQi th`\_cwi gvY gvQ Drcv`Z nq Zvi tPtq AtbK tevk aiv nq| GtZ Kti gvtQi cwi gvY GZ`\_Z nvti KgtQ th`\_cRbb Kivi gZ ht`\_ó gvQ Avi GLb`\_vKtQbv| GtZ Kti el`vKvtj Rj vKq`\_tj vtZ eo nI qvi Rb`\_c¶qvRbxq msL`K tcvb Drcv`Z nt`Qbv, dj`\_vvt`Q cvb AvtQ gvQ tB|

el`v`i i tZ cRbb Kivi Rb`\_hLb cRbbKvix gvQ`\_tj v cRbb t¶t`i i w`tK AMhi nq ZLb b`\_xtZ evbvi`tq ev eo eo Riv`\_tdtj wlgmn G`\_tj vtK aiv nt`Q | Zvovov el`v`i Avit`B thme Riv`\_e`envi Kiv nq tm`\_tj vtZ gvtQi tQvU tQvU tcvb e`vcK nvti aiv cto| A\_P KtqK gym cti ai tj B G`\_tj v eo nI qvi m`thvM tcz Ges gvtQi Drcv`b evotZv|

wevfbæaitbi Kul`\_t¶tZ bvbv aitbi KxUvixK I JIa e`envi Kiv nq| G`\_tj v evb ev eb`vi cvbi mvt`\_Rj vKtq tcs`Q Ges gvtQi bvbv aitbi Amjev NUvq | KxUvixK Kivi tY gvQ gviv thtZ citi | gvtQi cRbb wevNz`\_ntZ citi Ges gvtQi eab`\_nvi Ktg thtZ citi | GKB fite w`kí vÁj`\_tj vtZ th`\_ivmvqubK`\_e`\_cotQ ZvtZ KY¶jx I evb M`vi gZ b`\_x`\_c¶q grm`\_kly`\_ntq tM`Q|

evsj vt`k ki grm`\_m`ut`\_i Dbatbi Dcti mi Kvti i tKvb m`y bmvZgvj v tB| thUKz AvtQ Zv KvhRix nt`Q bv| eQt`\_i ci eQi GKB mgm`\_vi K`\_v`\_ej v nt`Q |

wbaj wLZ e`\_e`\_v MhY Kti g¶ Rj vKtq gvtQi Drcv`b evotbv m`e

cZ`\_¶ e`\_e`\_vcbv

- g¶ Rj vKtq tcvb gRz`\_Kiv|
- wej`\_bvm¶tZ tcvb Drcv`b Kiv Ges g¶ KitiYi e`\_e`\_v Kiv|
- cRbbKvix gvQ I tcvb i¶vKiY|
- Pvl`\_thvM`\_Rj vKtq gvQ Pvl`\_i e`\_e`\_vKiY|
- Lv¶q, tctb Ges fimgvb c¶t`\_i gvQ Pvl`\_i e`\_e`\_v Kiv |

ctiv¶ e`\_e`\_vcbv

- h`\_vh`\_fite grm`\_AvBb c¶qM Kiv|
- nvl o Ges b`\_xtZ Afqvktg`\_Zvi Kiv |
- nvl o I b`\_xi`\_RweK e`\_e`\_vcbv KvhRix Kiv |
- m`y`\_grm`\_bmvZgvj v I cwi Kí bv c¶qb Kiv|

g¶ Rj vKtqi e`\_e`\_vcbv i w`\_K`\_tjvi AvakvskB MtelYv`\_ch¶q i tqtQ| g¶ Rj vKtq tek KtqK eQi ntZ tcvb Qvov nt`Q | w`\_K`\_š`\_Gi dj v dj m`\_tU GLbI w`\_vOZ Kti w`\_KQ`\_jev v hv`\_t`\_Q bv| Abj/c fite wej`\_bvm¶tZ tcvb Drcv`\_tbi mel`\_qU I MtelYvaxb| Zte`\_c¶\_exi eU`\_t`\_tK GilU ci w`\_¶Z th`\_cRbtbi Rb`\_ht`\_ó gvQ`\_vKtj Ges tcvb gvQ aitZ bv`\_t`\_l qv`\_ntj gvtQi Drcv`b ev`\_cvq|

Kul.1 cj# Dbqb ˘z

gʒ Rj vktqi Pvl thvM" AĀj , tjtZ weifbæc×wZtZ gvQ Pvl Ktj gvtQi Drcv`b evotbv mæ| KviY hLb gvQ Pvl Kiv nq ZLb Drcv`tbi melq, tjt v bqsšY ivLv nq Ges Drcv`btK wbwðZ Kiv nq|

ctivŋ e`vcvvi AwKvskB RvZiq bmwZgvjvi Ask wtkl | G, tjt v h\_vh\_ fvte cvj b Ktj gvtQi Drcv`b ewx tctZ cvti |

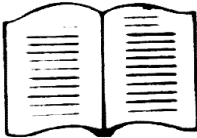
gʒ Rj vktq tcvb Ovovi Rb" ht\_ó cRbbKvix gvQ iŋv Kiv `iKvi | Gi Rb" nvl o l b`x, tjtZ KZ, tjt v Mfvi AĀj tK iŋv KtZ cvitj AtbK cRbbKvix gvQ iŋv tctZ cvti | Gi Rb" wKQynvl otK wj Rgʒ ivLtZ nte| ZvOvor eo eo b`xi wKQyAĀj tK mivv eQi gvQ aiv t\_ tK weiZ ivLtZ nte| mi Kwii chŋq Gaitbi e`v MhtYi tPov Pj tQ|

Ab`w tK me, tjt v nvl to GK mgtq gvQ aivi c×wZ e`j Kti cĀZw nvl to 7-10 eQi Ašfi chŋqµtg gvQ aivi e`v KtZ nte| GtZ Kti cĀZ eQi nvl to wKQycRbbKvix gvQ t\_ tK hvte| Gme gvQ elŋ Avitæcnvl o t\_ tK tei ntq cRbb AĀj wWg w`te|

evsj vt`tki grm" msi ŋY AvBb, tjt v hv` h\_vh\_ fvte cĀqM Kiv nq Zv ntj AtbK tcvb Ges cRbbKvix gvQ iŋv Kiv mæ| wKš` tLi melq nt"Q, grm" Awā Bti i mvt\_ cvj k emvbx i mgšqnbZvi KvitY grm" msi ŋY AvBtbi mšzcĀqM mæ nt"Q bv| Ab`w tK RbMYtK tcvb gvQ l cRbbKvix gvQ aivi Kzj mæ tŪ m tPZb KtZ nte| Gi Rb" ti wWl, tUw wfk b, gvBK, wj dtj U BZ`w` e`envi Kiv thtZ cvti |

th tKub tŋtŋ mšycwii Kí bv l bmwZgvjvi wKí tbB| evsj vt`tki grm" mæ ut`i Dbq tbi Rb" Avil ev`eglx KgmŋP wbtq tm, tjt vi ev`evq tbi c` tŋc MhY KtZ nte| eZŋvb AeKivrtgrv e`envi Kti Lg` z` f tgqv`x KgmŋP MhY KtZ nte| Z` gwi fvte tZi Dbqb KgmŋP mgn tK Gi Rb" 5 miv v ev 10 miv v cwii Kí bv MhY KtZ nte| Gme e`v MhY Ktj gʒ Rj vktq gvtQi Drcv`b evotZ cvti |

mšzcwii Kí bv l bmwZgvj v cĀqb Kti Ges grm" msi ŋY AvBb h\_vh\_ fvte cĀqM Kti gʒ Rj vktq gvtQi Drcv`b evotbv mæ|



**mvi gg**<sup>ot</sup> eb`vi cwib, b`x, Luj, wej, nvl o, evl o, nē, tgvn bv AĀj BZ`w` ntjt v gʒ Rj vktq| KivBvB nē gvbtj i mō ntj l vekij Zvi KvitY GwU gʒ Rj vktq| evsj vt`tki cĀq 40 j ŋ tñ±i gʒ Rj vktq AvtQ| evsj vt`tki grm" Drcv`tbi cĀq 70% Avtm gʒ Rj vktq ntZ| gʒ Rj vktq gvtQi Drcv`tbi cwigvY eQt i 5.6-6.0 j ŋ Ub| avb Pvl, tŋweta, tmP l iv`lNvU wbgŋY Kti, AwZwi<sup>3</sup> gvQ aiti, wbwæRviti cRbbKvix gvQ l tcvb tgti bvbv aiti bi `wZ` ē` w` tq gvtQi Drcv`tbi nwm Kiv nt"Q | tcvb tQto, cRbbKvix gvQ l tcvb iŋv Kti Ges Pvl i e`v Kti gvtQi Drcv`b evotbv mæ| mšzcwii Kí bv l bmwZgvj v cĀqb Kti Ges grm" msi ŋY AvBb h\_vh\_ fvte cĀqM Kti gʒ Rj vktq gvtQi Drcv`b evotbv mæ|



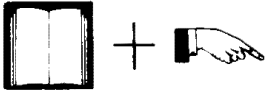


### cuVvEi gj`iqb 4.4

mWk DEti i cuK Wk iPy (✓) i b|

- 1/ gŷ Rj vkq tKvb& tj v?  
K) cKž, iPsiwi Lvgvi  
L) thme Rj vktqi cmbi ubqšŷ m=úYpfc cKwzi Dci ubfPkj  
M) thme Rj vkq kxZKvtj i iKtq hvq  
N) thme Rj vkq Awak Mfixi
  
- 2/ ersj vt`tki grm` Drcv`tbi cŕq KZ fM gŷ Rj vkq ntZ Avtm?  
K) 50%  
L) 60%  
M) 70%  
N) 80%
  
- 3/ KvbvB nt`i AvqZb KZ?  
K) 40,700 tn±i  
L) 56,600 tn±i  
M) 65,500 tn±i  
N) 68,800 tn±i
  
- 4/ gŷ Rj vktq gvtQi Drcv`b Kgvi Kvi Y tKvbW?  
K) Lŷ tenk eb`vi dtj  
L) kxZKvtj cmb Kg\_vtK etj  
M) ubiePti cRbbKvix gvQ I tcvbr ubatbi Kvi tY  
N) divr`v evtai Kvi tY
  
- 5/ ersj vt`tk gŷ Rj vktqi cwi gvY KZ?  
K) cŕq 30 j ¶| tn±i  
L) cŕq 40 j ¶| tn±i  
M) cŕq 55 j ¶| tn±i  
N) cŕq 35.5 j ¶| tn±i

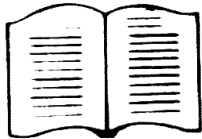
### cW 4.5 A՝vKւի գրգ գւՁ cւյ b c×ւՅ



G cW ֆkֆI Aւcւb –

- A՝vKւի գրգ Kx Zv RvbtZ cւի ֆeb|
- A՝vKւի գրգ գւՁ cւյ b c×ւՅ eYԹv Ki ֆZ cւի ֆeb|

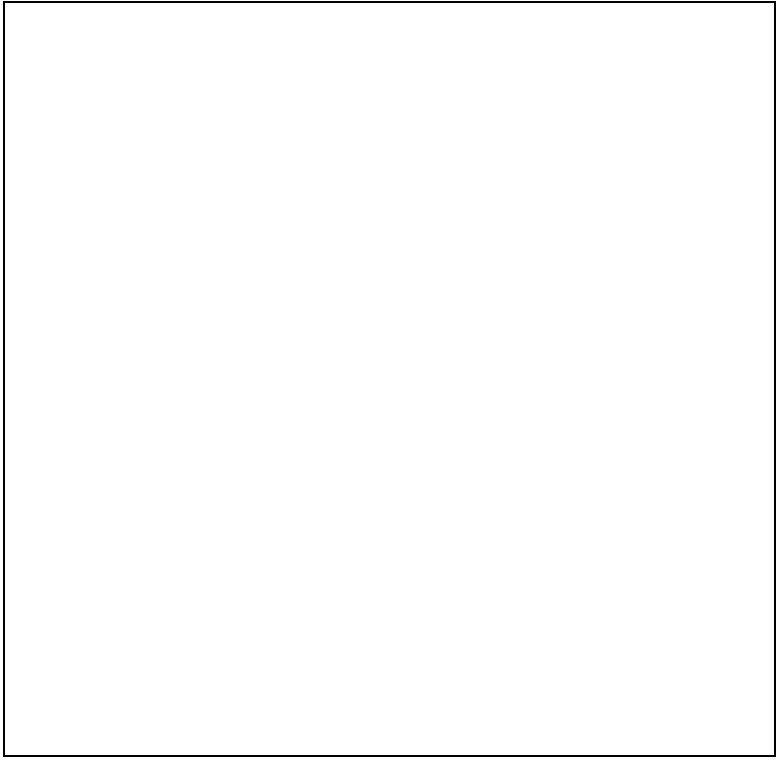
### A՝vKւի գրգ գւՁ cւյ b



Pււււ ֆK KւP Օւււ AveZ cւb aւi Y ԳլգZւ mօւբֆKւb cւI ֆLւֆb DւՄԸ I գւՁ iւLւ mօԷ ZւֆK A՝vKւի գրգ (Aquarium) eււ nգ| B՝Օւ Ki ֆj A՝vKւի գրգի Zj ֆZ I KւP e՛enւi Kւ P ֆj | cւb ֆZ Aew՝Z գւՁ I DւՄԸ ֆK հւֆZ eւււ ֆ ֆK ֆ՝Lւ հւգ ֆmRb՝ A՝vKւի գրգ KւP e՛enւi Kւ nգ| A՝vKւի գրգ գւՁ cւյ b GKււ ֆmՏւLb e՛vci | Zֆ eZԹւֆb Gi ֆij eււYւR՝K , i ֆj AւֆՁ|

Pււււ ֆK KւP Օւււ AveZ Rj aւi Y ԳլգZւ mօւբֆ ֆKւb cւI ֆLւֆb DւՄԸ I գւՁ iւLւ mօԷ ZւֆK A՝vKւի գրգ eււ nգ|

A՝vKւի գրգ bւb AւKւZ i nֆZ cւֆi | Zֆ AւաKւsk ֆԳֆI B AւգZւKւi A՝vKւի գրգ e՛enւi Kւ nգ| A՝vKւի գրգի AւKւi, ֆKւ\_vգ eււֆbւ nֆ Zւi mֆ\_ mvgÄm՝ ֆիֆL ււK Kւ nգ| ֆm Kւi ֆY KֆqK eMԹԹ nֆZ ՝i yKֆi KֆqKkZ eMԹԹU i AւKւֆi i A՝vKւի գրգ nֆZ cւֆi |



ւՄI 36 ֆ A՝vKւի գրգ գւՁ cւյ b

A՝vKւի գրգի KւP հZ ՝Պ nֆ ZZB ֆij | cւb i Pֆci Dci ւււԷ Kֆi KւPi cւյ Zւ ւbֆi Y Ki ֆZ nգ| A՝vKւի գրգ Ggb ՝ւֆb eււֆZ nֆ հւֆZ mֆRB ֆPֆL cto| ֆmRb՝ A՝vKւի գրգ eււeւi ՝ւֆb i mֆ\_ D՝PZւ i , i ֆj cYԳ A՝vKւի գրգ 0.6-1.2 ւգււi D՝PZւգ eււֆbւB DԷg| ZւB A՝vKւի գրգ eււeւi Rb՝ GKււ ÷ ՝vՕ cԹqւRb| A՝vKւի գրգի ÷ ՝vՕ GKււ ֆUeւj nֆZ ՝i y

Kti bivr Kvi kvh`guUZ mKQyntZ cvti | melquU e`w`MZ iypI lci mbfPkij | A`vKni qvg Ggb `vtb emvZ nte thLvtb mi vmi mthP Avtjv coe br | A`vKni qvtg mi vmi mthP Avtjv cotj Lg ZvovZmo tkljv RtbG Ges dtj cwb meR etYP ntq tms`h`nmb NUvq |

A`vKni qvtgi emvevi `vb Ges = `vU mbanfi Z nl qvq ci A`vKni qvg cwi`vi Kti emvZ nte | A`vKni qvtg cwb t`l qvi AvtMB Dm`c j vMvevi Rb` Zjv cO`Z Kti mvtZ nte | Gi Rb` tgvUv ewj , Kp Kp cv\_i l iuOb `e`w` e`envi Kiv thtZ cvti | Zte gtb ivLtZ nte tKvb mtgB Ggb `e` e`envi Kiv hvte br th `tjv ctP | GtZ cwb bo nte Ges gvQ giv hvte |

Zjv cO`Z Kiv tkl ntj ZjvU cO`gZ mrvvtbvi ckeAvtm | GvU e`w`MZ cO`t`i melq | Gici cO`gZ Dm`c emvZ nte | A`vKni qvtgi Rb` bivr cRmZi Dm`c AvtQ tm `tjv cO`gZ e`envi Kiv thtZ cvti | j`q` ivLtZ nte tKvb iKtgB thb AZ`maK Dm`c br jvMvbtv nq | GtZ Kti A`vKni qvtgi tms`h`nmb NUte | tFij mtbvi qv, tmi vtUvcbjvg BZ`w` Dm`c A`vKni qvtg e`envi Kiv hvq |

Gi ci gaj menxb cwi`vi cwb w`tq A`vKni qvg fuz`Kiz nte | GKvtR tUtci ev bj Ktci cwb e`envi Kiv DEg | A`vKni qvtg cwb Ggbvte Xij tZ nte hvZ Zjv Ges Dm`c mKfite `vtK | cwb D`PZv A`vKni qvtgi Dcti i tdtgi tMvov chS`l ivLtZ nte | hvZ Kti cwb Dcvi fVM evni ntZ tPvtL br cto | tPvtL br covi KivRv bivr hvteB Kiv thtZ cvti |

cwb w`tq A`vKni qvg fuz`Kivi ci gvQ QvotZ nte | A`vKni qvtgi AvKvti mvt\_ mvgAm` ti tL gvtQi AvKvi mbanfi Y Kitz nte | A`vKni qvtg Lg teuk msL`vq gvQ Qvotj tms`thP nmb NtU | GvU meAvtbi melq bq mktfi melq | evsj vt`k t`kx vet`kx bivr cRmZi gvQ cvl qv hvq th `tjv A`vKni qvtgi e`envi Kiv nq | thme gvtQi tPvL eo D`aj cvLbv eo l evnmi Ges cwb ga`ti Nymdiv Kti tm me gvQB A`vKni qvtgi Rb` DrKa. | thgb- tMvi wdk, tRei wdk BZ`w` |

A`vKni qvtg Lg teuk msL`vq gvQ Qvotj tms`thP nmb NtU |

**A`vKni qvtgi e`e`tcbr**

A`vKni qvtgi KtP cwi`vi ivLvi w`tK bRi ivLtZ nte | KtP Acwi`vi ntj `uA` ev Kvco w`tq cwi`vi Kiv hvq | cwb Acwi`vi ntj Zv e`j Kti bZb cwb w`tZ nte | A`vKni qvtg wdvvi e`envi Kij cwb l Kiv `w`v`b cwi`vi `vtK | A`vKni qvtg hvZ gajv br XtK tmRb` GKvU XvKv w`tZ nte | XvKv bivr ai tYi ntZ cvti |

A`vKni qvtg wdvvi e`envi Kij cwb l Kiv `w`v`b cwi`vi `vtK |

hw` A`vKni qvtg cKwZK Avtjv br cto Zv ntj `e`yZK Avtjvi e`e`v Kiv thtZ cvti | evtjji lqvU mbanfi Y Rb` cwb mtePP 6 BvA` Dcti evj | emvZ nte Ges w`tb 10 NEv Rjv vtZ nte | Rvbjvi cvtk ev evi v`vq A`vKni qvg emvtj FZjy cwi`eZ`bi Kiv tY Avtjvi ZieZv nrm tctZ cvti | Gi Rb` A`vKni qvtgi Ae`vtbi mKQly cwi`eZ`bi Kivi cO`qvRb ntZ cvti | A`vKni qvtg Lg teuk mgq Avtjvi Dciv`vZ Kvg` bq | Kiv Y GtZ Dm`c Lg teuk niti evto Ges A`vKni qvg Dm`c` fuz`ntq thtZ cvti | Gme ntj gvtS gvtS Dm`c tKtU w`tZ nte | cwb mvtP Dm`c KtUvi Kp cvl qv hvq | GKvtR Kp e`envi Kiv thtZ cvti | ZvQvov Avtjvi Dciv`vZi mgqKvj l Kvgtq t`l qvi e`e`v Kitz nte |

cwb ZvcgvT`v gvtQi cRmZi mvt\_ m`u`Ktj | cwb ZvcgvT`v 28-30` tmj mqv mivL cO`qvRb | kvZKvtj cwb ZvcgvT`v hLb AtbK Ktg hvq ZLb WzS`l mUvi e`envi Kti cwb Kiv`qj ZvcgvT`v eRvq ivLvi m`e | A`vKni qvtg evZv`mi c`v`v t`l qv cO`qvRb | ZvtZ Kti

A`vKni qvtgi gvtQi Rb` wUw`v` (Tubifex) ntjv DEg Lv` |





### cu#VvEi gj`iqb 4.5

mi#K DEti i cu#k #UK #Py (✓) #i b|

- 1/ A`vK#i qvtgi AvKvi tKvb&ai#bi ntj fij?  
K) tMj vKvi  
L) e#tKvbvKvi  
M) AvqZvKvi  
N) #T#KvbvKvi
  
- 2/ A`vK#i qvq KZ D`PZvq em#b#v Di#PZ?  
K) 0.4-3 #qUvi  
L) 0.2-2 #qUvi  
M) 0.1-0.5 #qUvi  
N) 0.6-1.2 #qUvi
  
- 3/ A`vK#i qvtgi Rb` tKvb&c#b met#tq fij?  
K) eb`vi c#b  
L) b`xi c#b  
M) bj K#ci c#b  
N) c#zi i c#b
  
- 4/ A`vK#i qvtgi Zj vq tKvb&ai#bi `e` e`envi Ki#Z n#e?  
K) eo eo cv\_i  
L) #PKb en#j  
M) Kv`v g#vU  
N) tgvUv en#j I K#P K#P cv\_i
  
- 5/ A`vK#i qvtg c#bi Zicgv#v KZ \_vKv Di#PZ?  
K) 20-25<sup>0</sup> #mj #mqvm  
L) 25-30<sup>0</sup> #mj #mqvm  
M) 27-29<sup>0</sup> #mj #mqvm  
N) 28-30<sup>0</sup> #mj #mqvm

### e'enwiK

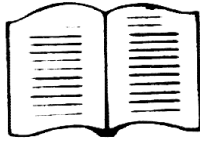
#### cw 4.6 PflvcthvMx t`kx I wet`kx gvQ kbr<sup>3</sup>KiY



G cw tkfI Avicb -

- Pfl i DcthvMx t`kx gvQ, tj vfk `enkó`mn kbr<sup>3</sup> Ki tZ cvi tēb |
- PflvcthvMx wet`kx gvQ, tj vfk `enkó`mn kbr<sup>3</sup> Ki tZ cvi tēb |

#### PflvcthvMx gvQ kbr<sup>3</sup>KiY



eZgvfb evsj vfk wba j wLZ gvQ, tj v cKzi Pvl Kiv nt`Q |

t`kx gvQ - KvZj v, iB, gMj, gv, i, wks |

wet`kx gvQ - wj fvi Kvc, Mm Kvc, Kgb Kvc (KmcP), wgi i Kvc, vB micw, bvBtj wUKv, AvcdKvb gv, i |

wba j wLZ `enkó` vi v Gme gvQ kbr<sup>3</sup> Kiv mē |

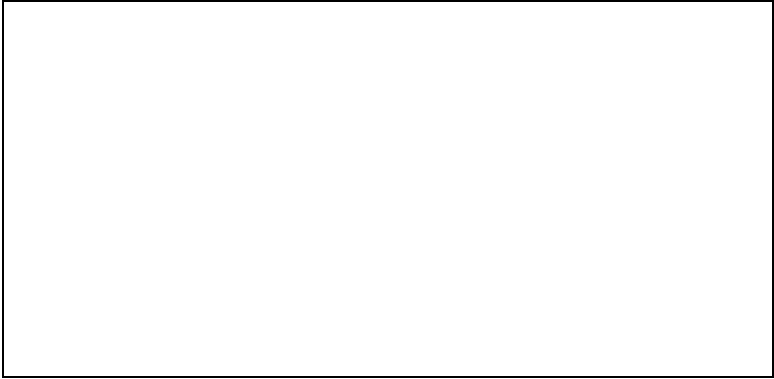
#### KvZj v (Catla catla)

fvi Z Dcgnvfk ntZ gvj tqwqv I vBj vU chS G gvQ i wē hZ | KvZj v gvQ 6 dlt chS j wntZ cvi | KvZj v b`xi gvQ |

#### kbr<sup>3</sup>Kvix `enkó`

gv, v eo nq, gv Dcti i wfk vfk, t`n tPv nq Ges t`ni D`PZv t`ni tgvU `N`P cūq 3 fivMi GK fiv nq | wctVi cvLbvq 17-19 wU wkov Kuv vfk | GKevi gvQw t`Ltj fZ nI qvi mēbr Kg | (wP-37)

KvZj v gvQ i t`ni D`PZv t`ni tgvU `N`P cūq 3 fivMi GK fiv nq |



wP 37 t KvZj v

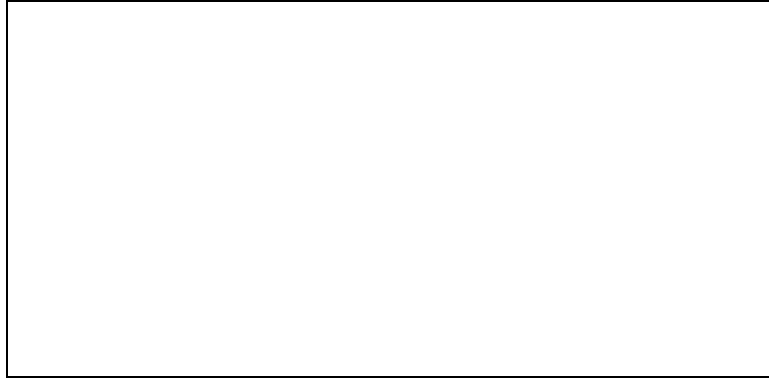
#### iB (Labeo rohita)

fvi Z Dcgnvfk ntZ wgvbgi chS G gvQ i wē hZ | G gvQ b`vZ evm Kti | iB gvQ 3 dlt ev Zvi Avak j wntZ |

**kbv<sup>3</sup>Kvix`eiko`**

iB gv<sup>4</sup>Qi gly wbtPi w`tK  
\_vtK| c<sup>o</sup> cvLbvq wko  
KvUv \_vtK 15-16 wU|

t`n j <sup>o</sup> I tPbv nq| t`tni DZPZv t`tni tgvU ``tN<sup>o</sup> 5 fv<sup>4</sup>Mi GK fvM nq| tVwL<sup>o</sup> uó  
\_vtK Ges tVwL A<sup>o</sup>bK fvR \_vtK| iB gv<sup>4</sup>Qi gly wbtPi w`tK \_vtK| c<sup>o</sup> cvLbvq wko KvUv  
\_vtK 15-16 wU| gvQwUj wbtPi Ask j vj tP nq (wP<sup>o</sup>T-38)|



wP<sup>o</sup>T 38 t iB

**g<sup>4</sup>Mj (Cirrhinus mrigala)**

g<sup>4</sup>Mj b`xi gvQ| fvi Z Dcgnvt`k n<sup>4</sup>Z wgvqvgvi ch<sup>o</sup>S(Gi we`wZ| G gvQ 3 d<sup>o</sup> ev Zvi tP<sup>o</sup>tq  
j <sup>o</sup> n<sup>4</sup>Z cv<sup>o</sup>i |

**kbv<sup>3</sup>Kvix`eiko`**

t`n tPbv I j <sup>o</sup> gv<sup>o</sup>v tQvU, t`tni D<sup>o</sup>PZv t`tni tgvU ``tN<sup>o</sup> c<sup>o</sup>q 6 fv<sup>4</sup>Mi GK fvM \_vtK|  
gly wbtPi w`tK \_vtK| tVwL cvZjv Ges ZvtZ tKvb gvsm tbB ev fv<sup>o</sup>B tbB| G gv<sup>4</sup>Qi t`tni  
wbtPi Ask mv`v n<sup>4</sup>tq \_vtK (wP<sup>o</sup>T-39) |



wP<sup>o</sup>T 39 t g<sup>4</sup>Mj

GKwU gv<sup>o</sup> i 18 Bw<sup>o</sup>A ch<sup>o</sup>S  
j <sup>o</sup> n<sup>4</sup>Z cv<sup>o</sup>i | GwU ex  
cwb<sup>o</sup>i gvQ|

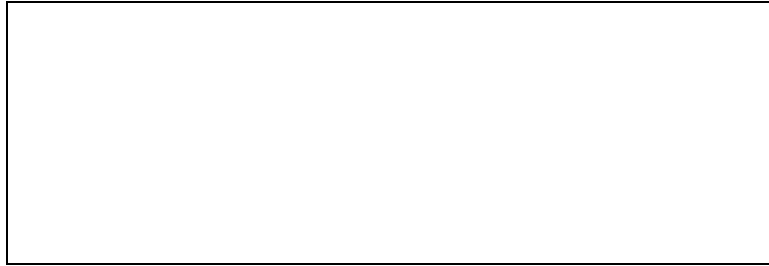
**gv<sup>o</sup> i (Clarias batrachus)**

fvi Zxq Dcgnvt`k n<sup>4</sup>Z \_vBj`vU I gvj tqwkqv ch<sup>o</sup>S(Gi we`Z| GKwU gv<sup>o</sup> i 18 Bw<sup>o</sup>A ch<sup>o</sup>S  
j <sup>o</sup> n<sup>4</sup>Z cv<sup>o</sup>i | GwU ex cwb<sup>o</sup>i gvQ|

Kul. I c j D b q b ǂ

**k b v ǂ K v i x ǂ e i k ǂ**

g v , i j ǂ K i j e v t m v b i j x i ǂ 0 i g v Q | g v , v i A s t k D c t i ǂ b t P t P ǂ v | A v e i ǂ c Q t b i A s t k c v k t ǂ f i t e P r c v | G g v t Q i M t q A v B k ǂ v t K b v | e ǂ c v L b v q ǂ ǂ k ǂ I e o K u l v ǂ v t K | c ǂ c v L b v ǂ c V n t Z t j R c h s i c t h m i Z | t ǂ k x g v , t i i A ǂ ǂ c l v j c ǂ m m e f v s t k i g Z t M j ǂ v t K | G u U G i G K K ǂ e i k ǂ | A b ǂ g v , t i G g b n q b v | n v B i e W g v , t i i t e j v q G c ǂ m m ǂ K O ǂ v j ǂ ǂ n t q t e w i t q A v t m | A b ǂ ǂ t K A ǂ m d K v b g v , t i i t e j v q A ǂ ǂ c l v j c ǂ m m ǂ ǂ f ǂ R i t K v b v i g Z e v B t i t e w i t q A v t m ( ǂ P ǂ - 4 0 ) |



ǂ P ǂ 4 0 t g v , i

**ǂ k s ( H e t e r o p n e u s t e s f o s s i l i s )**

f v i Z D c g n i t ǂ k n t Z e v g P | P ǂ t b i A s k ǂ e t k l c h s i G i ǂ e ǂ ǂ Z | G u U e x c m b i g v Q | G K d ǂ c h s i G i ǂ ǂ N ǂ n t Z c v t i |

**k b v ǂ K v i x ǂ e i k ǂ**

ǂ k s j ǂ K i j i ǂ 0 i g v Q | G i e ǂ c v L b v q ǂ e l h ǂ ǂ ǂ e o K u l v ǂ v t K | G i c ǂ c v L b v A Z ǂ s i t Q v U ǂ v t K | G i M t q t K v b A v B k ǂ v t K b v | ǂ c t v i ǂ ǂ c v t k ǂ ǂ e v q y ǂ ǂ v t K | c ǂ t ǂ Q ǂ K i t j B Z v m n t R t P ǂ t L c t o ( ǂ P ǂ - 4 1 ) |

ǂ k s j ǂ K i j i ǂ 0 i g v Q |  
G i e ǂ c v L b v q ǂ e l h ǂ  
ǂ ǂ e o K u l v ǂ v t K | G i  
M t q t K v b A v B k ǂ v t K b v |



ǂ P ǂ 4 1 t ǂ k s

**ǂ m j f v i K v c ǂ ( H y p o p h t h a l m i c h t h y s m o l i t r i x )**

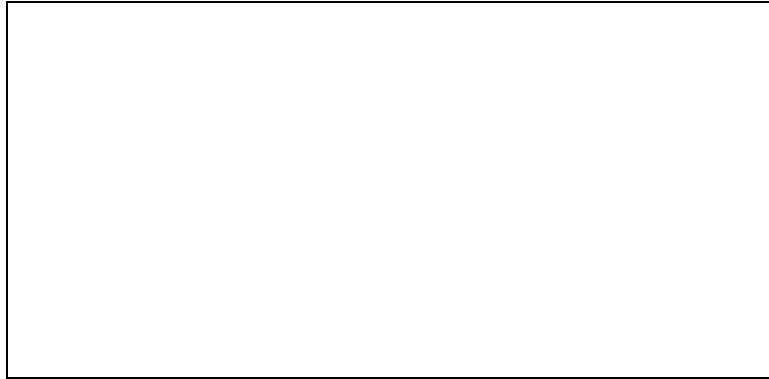
ǂ m j f v i K v c ǂ ǂ t k i g v Q | 1 9 6 9 m t b G t ǂ t k c ǂ g G i A v M g b N t U | P ǂ t b i b ǂ x , t j ǂ Z G i e v m |

**k b v ǂ K v i x ǂ e i k ǂ**

t P ǂ v P l o v t ǂ n h ǂ g v Q | t ǂ t n i M v b A t b K U v B i j k g v t Q i g Z | t c t U i ǂ b t P i A s k B i j k g v t Q i t c t U i g Z | g v t Q i M t q i i 0 i f c v j x | t ǂ t n A i A v N v Z j ǂ M t j B Z t K i ǂ ǂ R t g h v q | Z t e G t ǂ i t c t U i ǂ b t P P m c j v i g Z n v o e v S c u t e ǂ v t K b v ( ǂ P ǂ - 4 2 ) |

ǂ m j f v i K v c ǂ ǂ t k i  
g v Q | 1 9 6 9 m t b G t ǂ t k  
c ǂ g G i A v M g b N t U |  
P ǂ t b i b ǂ x , t j ǂ Z G i  
e v m |





IPĪ 42 t imj vri Kvc<sup>©</sup>

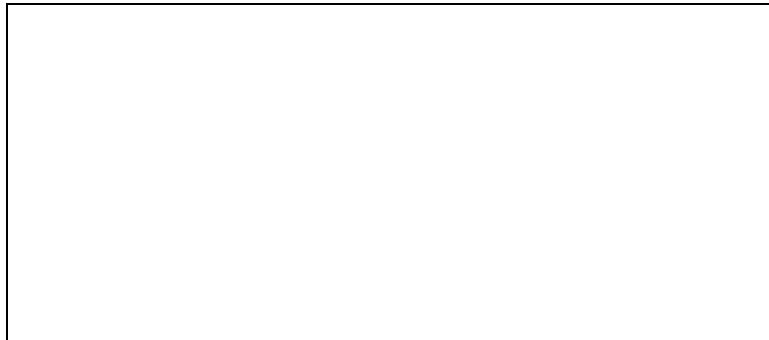
**Mām Kvc<sup>©</sup>(Ctenopharyngodon idellus)**

GiU Pxbt`tki gvQ| Gt`tk 1966 mtb G gvQwUj Avg`wb nq| Pxbt`tki b`xtZ Mām Kvc<sup>©</sup> evm Kti |

**kvb<sup>3</sup>Kvix`enkó**

G gvQ gtmj gvQi gZ j<sup>3</sup> nq| Zte Gi tctUi Ask AtbK j<sup>3</sup> nq etj cvqj Ae`vb tj tRi cġq KvQvKwQ| Giv Nm Lvq etj Gt`i tVwLmLtm ev avitjv| t`tni Zjbrq cvLbv tQvU| Mtqi iO wKQw meR (IPĪ-43)|

Mām Kvc<sup>©</sup>Nm Lvq etj  
Gt`i tVwLmLtm ev  
avitjv|



IPĪ 43 t Mām Kvc<sup>©</sup>

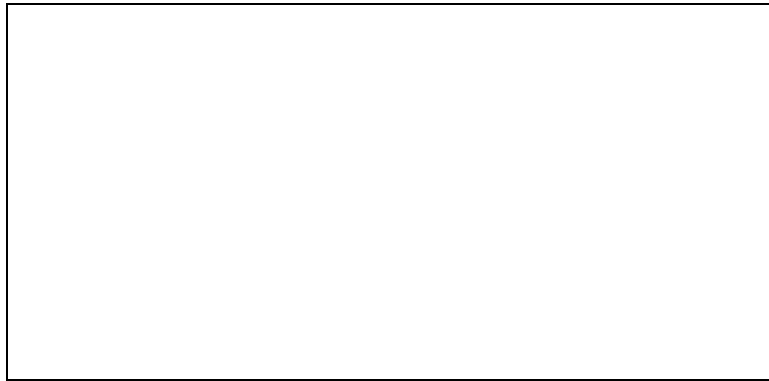
**Kgb Kvc<sup>©</sup>Kvc<sup>©</sup> (Cyprinus carpio)**

Kgb Kvtp<sup>©</sup> DrcuĒ`vb Pxb t`k ntj I GLb cv`exi eū t`tk Gi we`wZ| b`xtZ I ex cvbtZ Giv evm Kti |

**kvb<sup>3</sup>Kvix`enkó**

gvQwU t`Ltz LvU I tPv| tCU eo \_vtK Ges cvqj Ae`vb AtbK wQtb| kixti i Zjbrq gv`v tQvU \_vtK| mvi v`n AvBtk AveZ \_vtK| gylġi`gvtk`w evte<sup>©</sup> \_vtK| gyl wKQw wbtPi w`tk \_vtK| cRbb Kvij cjl<sup>3</sup> DftqiB tCU AZ`šldzj Dtv| Zte`gvQi tCU AZ`šitenk dzj Dtv| cō cvLbv tj tRi w`tk AtbK`i-chšme`-Z \_vtK (IPĪ- 44)|





ɛP̃ 46 t \_vB mi cɛ̃

**bvBɛ̃j ɛUKvi (Sarotheradon nilotica)**

G gvQɛ̃Uɛ̃K 1974 mɛ̃j \_vBj ɛ̃U nɛ̃Z Avg ɛ̃mb Kiv nɛ̃qɛ̃Q| Gɛ̃U tZj ɛ̃mcqɛ̃ gvɛ̃Qi tP̃tq AtbK eo nq|

**kɛ̃vɛ̃Kvix ɛ̃ɛ̃kɔ̃**

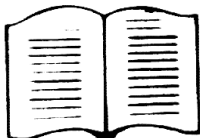
bvBɛ̃j ɛUKvi tɛ̃j tRi cɛ̃Lbvq mɛ̃mɛ̃mɛ̃ Kɛ̃tɛ̃j vɛ̃Wɛ̃v \_vɛ̃K| Gɛ̃ ɛ̃i ɛ̃cɛ̃tɛ̃Vi Ges cɛ̃qɛ̃cɛ̃Lbvq kɛ̃<sup>3</sup> Kɛ̃ɛ̃v Avɛ̃Q (ɛ̃P̃ - 47)|

bvBɛ̃j ɛUKvi tɛ̃j tRi  
cɛ̃Lbvq mɛ̃mɛ̃mɛ̃  
Kɛ̃tɛ̃j vɛ̃Wɛ̃v \_vɛ̃K| Gɛ̃ ɛ̃i  
ɛ̃cɛ̃tɛ̃Vi Ges cɛ̃qɛ̃cɛ̃Lbvq  
kɛ̃<sup>3</sup> Kɛ̃ɛ̃v Avɛ̃Q|



ɛ̃P̃ 47 t bvBɛ̃j ɛUKvi

**Abɛ̃ɛ̃j b (Activity) t** Avcbɛ̃i ɛ̃mɔi cɛ̃tɛ̃kɛ̃B Pɛ̃l nɛ̃Q Ggb 6ɛ̃U ( 3 + 3) t ɛ̃kɛ̃ I ɛ̃ɛ̃t ɛ̃kɛ̃ gvQ mɛ̃Mɛ̃h Kɛ̃ɛ̃ Ges Zɛ̃t ɛ̃i kɛ̃vɛ̃Kvix ɛ̃ɛ̃kɔ̃ Dɛ̃tɛ̃ɛ̃ɛ̃ɛ̃ Zɛ̃t ɛ̃i ɛ̃ɛ̃ɛ̃mbK bɛ̃g ɛ̃j Lɛ̃y Ges h\_vmgɛ̃tq ɛ̃ɛ̃nɛ̃mɛ̃ K LvZɛ̃q Gɛ̃ ɛ̃i Qɛ̃e Gɛ̃tK ɛ̃UDUɛ̃i tɛ̃K t ɛ̃Lɛ̃tq ɛ̃ɛ̃ɛ̃ɛ̃ɛ̃ ɛ̃bb|



**mviɛ̃gɛ̃t** Kɛ̃Zj v, iɛ̃, gɛ̃tMj, ɛ̃ks, gv, i Pɛ̃tɛ̃ɛ̃ɛ̃ɛ̃ɛ̃ t ɛ̃k gvQ| ɛ̃mɛ̃j Fɛ̃i Kɛ̃c, Mɛ̃m Kɛ̃c, Kgb Kɛ̃c, ɛ̃gɛ̃i Kɛ̃c, i vRcɛ̃ɛ̃, bvBɛ̃j ɛUKvi, Aɛ̃mɛ̃Kɛ̃v gv, i Pɛ̃tɛ̃ɛ̃ɛ̃ɛ̃ɛ̃ ɛ̃ɛ̃t ɛ̃kɛ̃ gvQ| ɛ̃ɛ̃, gv\_v, t ɛ̃tɛ̃ni Dɛ̃PZv, Kɛ̃ɛ̃v, cɛ̃qɛ̃cɛ̃Lbv, is, AtbK BZ ɛ̃ɛ̃ t ɛ̃L gvQ kɛ̃vɛ̃<sup>3</sup> Kiv mɛ̃ɛ̃|



### cvVvĚi gjvqb 4.6

mUK DĚti i cvk UK Pý (✓) ů b |

- 1/ tKvb&gvfQi gv\_v eo l gly Dcti i ů tK?  
K) i B  
L) g&tMj  
M) KvZj v  
N) ůmj fri Kvc©
  
- 2/ tKvb&gvfQi tVtU fivB AvtQ?  
K) KvZj v  
L) i B  
M) g&tMj  
N) Kgb Kvc©
  
- 3/ tKvb&gvfQi gly ůbtP Ges tVU cvZj v?  
K) i B  
L) KvZj v  
M) g&tMj  
N) ůgi i Kvc©
  
- 4/ tKvb&gvfQi Mrtq AvBtki msL'v Af?  
K) Kgb Kvc©  
L) i vRců  
M) KvZj v  
N) ůgi i Kvc©
  
- 5/ tKvb&gvfQi ůctVi Ges cvqjy cvLbvq k<sup>3</sup> Kivů AvtQ?  
K) ůks  
L) gv\_s i  
M) bvBtj ůUKv  
N) ůgi i Kvc©



### Povšgji`iqb

#### msuŋB I iPbvji-K ckae

- 1/ gvQ Pvl i cŋ\_ugK ubYŋKmgŋ gvŋQi Drcv`bK Kxfvte cŋmeZ Kti Zv e`Lv Kily|
- 2/ Pvl i ubvgtE cŋwZ ubeŋPbi Rb` thme `enkó` ubeŋPb Kiv cŋqvRb Zvi Zvij Kv cŋvb Kily|
- 3/ cŋzi tKvb&tKvb&cŋwZi gvQ Kx nŋti Qvoteb? tKvb&cŋwZ cmbi tKvb&`ŋi Lv` MhY Kti Zv Dŋj L Kily|
- 4/ ivRcŋi GKK Pvl cŋwZ eYŋv Kily|
- 5/ ugk^Pvl i cŋwZ eYŋv Kily|
- 6/ tcvbv Qvovi ubqg eYŋv Kily|
- 7/ Lvŋq gvQ Pvl cŋwZ eYŋv Kily|
- 8/ tPŋer^Pvq gvQ Pvl cŋwZ eYŋv Kily|
- 9/ avb tŋŋZ gvŋQi Pvl cŋwZ eYŋv Kily|
- 10/ gvQ I gjwMi mgwŋZ Pvl eYŋv Kily|
- 11/ gŋ Rj vktq gvŋQi Drcv`b Kŋg hvl qvi Kvi Y\_ tŋ v ij Lŋj|
- 12/ Kx Kx Dcvq Aej =b Kiŋj gŋ Rj vktq gvŋQi Drcv`b eivotbv m=ŋ Zv eYŋv Kily|
- 13/ GKwU A`vKwz qvg emvevi `vb tKgb nI qv DŋPZ Zv ij Lŋj|
- 14/ A`vKwz qvtgi cmb Kx Kx KviŋY Acwŋ^vi nq Ges Kxfvte Zv cwi^vi KiŋZ nq ij Lŋj|
- 15/ A`vKwz qvtgi gvŋQi ti vM nŋj Kxfvte wPvKrmv KiŋZ nte Zv eYŋv Kily|
- 16/ ivRcŋi Ges gv\_ i gvŋQi `enkó` eYŋv Kily|
- 17/ t`kx I weŋ`kx gvŋQi Avj v`v Avj v`v Zvij Kv cŋvb Kily|



**DĒigvjv**

**cW 4.1**

1 | M            2 | M            3 | L            4 | M            5 | M

**cW 4.2**

1 | M            2 | L            3 | L            4 | L            5 | L

**cW 4.3**

1 | L            2 | M            3 | L            4 | L            5 | L

**cW 4.4**

1 | L            2 | M            3 | N            4 | M            5 | L

**cW 4.5**

1 | M            2 | N            3 | M            4 | N            5 | N

**cW 4.6**

1 | M            2 | L            3 | M            4 | N            5 | M

**BDibU 5 iPsiO Pvl**

iPsiO Pvl evsjv`tki Rb` AZ`sl , iZcYf miv cv\_extZ iPsiO Pvn`v erovi dtj ewnefk;l evsjv`tki iPsiO Pvn`v ewx cvt`Q| MZ GK `kK evsjv`tk iPsiO Drcv`b e`vcKfite tetotQ| evsjv`tk eZgvtb 1,40,000 tn±i RigtZ iPsiO Pvl nt`Q| evsjv`tk iPsiO Pvl thvM` AtbK , tjt cRwZ \_vKtjI eZgvtb c`vbZ Mj`v I eM`v iPsiO Pvl nt`Q| Mj`v igVv cmbi Ges eM`v tjt vbr cmbi iPsiO | iPsiO PvlI `vb ubePb AZ`sl , iZcYf `vb ubePb ci cKz Lbb, cmb mieivn, tcvbr Ovovi nvi, Lv` I mri c`qM Lg , iZcYf iPsiO tcvbr Ovovi thgb mgq AvtQ tZgub iPsiO eo nlqvi ci AvnitYiI mgq AvtQ| mWK cxwZtZ iPsiO AvniY Kti evRiRvZ KiZ cvi tjt Pvlxv jvferb nteb|

G BDibU iPsiO m`ut`i , iZi I PvlI cUfig, `v`yl tjt vbr cmbi iPsiO cRwZ Ges evsjv`tk Pvl thvM` cRwZ, evsjv`tk eZgvtb weifbecKvi iPsiO Pvl cxwZ, iPsiO PvlI `vb ubePb, eM`v I Mj`v iPsiO Pvl cxwZ I e`vcbv, iPsiO AvniY, AvniY Kvtj j`Yxq nelq, Mj`v I eM`v iPsiO ti Yykbv<sup>3</sup>KiY m`ut`K`e`wZ Avtj vPv Kiv ntqtQ|

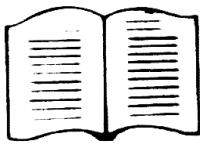
**cW 5.1 iPsiO m`ut`i , iZi I PvlI cUfig, `v`yl tjt vbr cmbi iPsiO cRwZ Ges evsjv`tk Pvl thvM` cRwZ**



**G cW tkI Avcib –**

- iPsiO m`ut`i , iZi I PvlI cUfig eY`v KiZ cvi teb|
- `v`yl tjt vbr cmbi iPsiO cRwZi big RvbtZ cvi teb|
- evsjv`tk Pvl thvM` iPsiO cRwZi big Djt L KiZ cvi teb|

**iPsiO m`ut`i , iZi I PvlI cUfig**



evsjv`k iPsiO m`ut` LgB mgx| eZgvtb evsjv`tki gntmivcib AAjt i AvqZb 27,000 eM`vBj | evsjv`tki 2q cAewl R cwi Kiv bq gntmivcib AAjt i cwi gvY t`Lvtrv ntqtQ 20-50 j`j tn±i | gntmivcib AAjt i clq 6 j`j tn±i figtZ g`vbtMf ebfug we`gvb| tPov Ki tjt Gme fig ntZ 2.0-2.5 j`j tn±i fig iPsiO PvlI Avl Zvq Avbv m`e|

eZgvtb evsjv`tki DcKj xq AAjt clq 1,40,000 tn±i RigtZ iPsiO Pvl nt`Q| Gi gvtS Ljvbr AAjt clq 1,10,000 tn±i I K- evRi AAjt clq 30,000 tn±i |

eZgvtb evsjv`tki DcKj xq AAjt clq 1,40,000 tn±i RigtZ iPsiO Pvl nt`Q | Gi gvtS Ljvbr AAjt clq 1,10,000 tn±i I K- evRi AAjt clq 30,000 tn±i | 1989-90 mvtj iPsiO PvlI Rigi cwi gvY wj 64,000 tn±i | grm` Ana`Bti i Z` Abbvqx evsjv`tk tgvU iPsiO Drcv`b cwi gvY 1,10,790 tgvUK Ub| G Drcv`b 4,188 tgvUK Ub GtmtQ Ujvi KZR| j`tRtj iv AvniY Kti tQ 19,545 tgvUK Ub| DcKj xq Lvgrv ntZ GtmtQ 26,335 tgvUK Ub| Ab`vb` Dcvtq AvniZ ntqtQ 60,722 tgvUK Ub| 1997-98 mvtj evsjv`k iPsiO i Bmb Kti `et`wkK gyv Avq Kti tQ 11,745 tkvU UvKv| i BmbKZ. iPsiO cwi gvY wj 22,054 tgvUK Ub| i agvI iPsiO tcvbr aivi KvRB RwoZ itqtQ 2-5 j`j tjt vK| iPsiO Drcv`b I c`uqvRvZKiY KvR clq 1.5-2 j`j tjt vK RwoZ AvtQ|



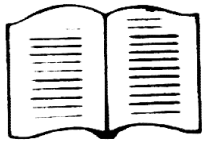




Kul. I cju Dbqbb`z

evsj vt`tk eZ@vrb e`vcK nvti eM`v wPswoi Pvl nt`Q | GwU tj vbr cmbi cRwZ Ges DcKj GjvKvq Gi Pvl nt`Q | eM`v wPswoi tcvbi mt`Pvc`v I tWwivKvUv wPswoi tcvbi tNti ev cKzi Xzk \_vtK| G\_s tju eM`v wPswoi mt`B eo nq Ges evRvRvZ Kiv nq| mtPZb Pvlxv tcvbr evQvB Kti eM`v wPswoi GKK Pvl Kti \_vtKb| Pvc`v ev tWwivKvUv wPswoi GKK Pvl GLbl evsj vt`tk nt`Q br|

wgVvcmbi wPswoi mt`\_ eZ@vrb tKej Mj`v wPswoi Pvl nt`Q Ges QUKv wPswoi Pvl I AwZ mntr Kiv m`e|



**miigg** evsj vt`tki gnxtmrcvb AA`tj i cwi grY 27000 eM@vBj | gnxtmrcvb AA`tj i clq 6 j`l tn±i RwgZ gvbtMf ebfwg we`gvb| eZ@vrb evsj vt`tk 1,40,000 tn±i RwgZ wPswoi Pvl nt`Q | eZ@vrb wPswoi me`gvU Drcv`b 1,10,790 tgt Ub| 1997-98 mtj wPswoi iBwib Kti Avq ntqtQ 11,745 tKwU UvKv| 2000 mtj wPswoi Drcv`tbi j`l`gvUv 4,32,000 tguUK Ub| evsj vt`tk `r`yl tj vbr cmbtZ wPswoi clq 60 wU cRwZ cvl qv hvq| eZ@vrb *Penaeus monodon* Ges *Macrobrachium rosenbergii* Gi Pvl nt`Q| c`\_gwU tj vbr cmbi Ges wZxqU `r`yev wgVv cmbi |



### cvfVvEi gj`iqb 5.1

#### mWk DEti i cvk Wk WPy (✓) w b|

- 1| evsj vt`tki gnxtmivcib AAjtj i cwi gvY KZ?  
K) 10000 eMgvBj  
L) 18,000 eMgvBj  
M) 25,000 eMgvBj  
N) 27,000 eMgvBj
  
- 2| evsj vt`tk eZgvfb Wk cwi gvY RvgtZ WPsioi Pvl nt`Q?  
K) 90,000 tn±i  
L) 1,10,000 tn±i  
M) 1,30,000 tn±i  
N) 1,40,000 tn±i
  
- 3| 2000 mrtj evsj vt`tki WPsio Drcv`tbi j qj`gvT v KZ?  
K) 3,88,000 tgvUK Ub  
L) 4,20,000 tgvUK Ub  
M) 4,32,000 tgvUK Ub  
N) 4,42,000 tgvUK Ub
  
- 4| evsj vt`tk v`y tj vbr cvmbi KZwJ cRvZ AvtQ?  
K) 40 WJ  
L) 50 WJ  
M) 60 WJ  
N) 65 WJ
  
- 5| eZgvfb tKvbRvZi WPsio Pvl nt`Q ?  
K) *Acetes sp*  
L) *Palaemon sp*  
M) *Metapaeneus sp*  
N) *Penaeus sp*







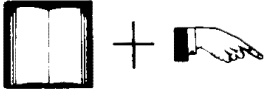
## cuVvEi gj`iqb 5.2



mWk DEti i cuK UK iPy (✓) i b|

- 1/ tNti KLB tj vbr cwb XKvZ nq?  
K) RjvB - AvM÷  
L) A±vei - btf=†  
M) Wtm=† - Rvbgvix  
N) tdeyrix - gvP©
- 2/ evM`v iPsvoi cKzi i cwbi Mfxi Zv KZ nI qv DuPZ?  
K) 0.5 - 1.0 ugUvi  
L) 1.0 - 1.5 ugUvi  
M) 1.5 - 2.0 ugUvi  
N) 2.0 - 2.0 ugUvi
- 3/ Mj`v iPsvio Priti Rb` cKzi i cwbi jeYv<sup>3</sup>Zv KZ nI qv cQvRb?  
K) 0.1 iCiCiU  
L) 0.2 iCiCiU  
M) 0.4 iCiCiU  
N) 0.6 iCiCiU
- 4/ cKzi Mj`v iPsvoi tcvbr Qvovi nvi KZ?  
K) 5,000 - 10,000iU/†nt  
L) 5,000 - 30,000iU/†nt  
M) 10,000 - 50,000iU/†nt  
N) 20,000 - 70,000iU/†nt
- 5/ ersj vt`k iPsvoi cãvbZ tKvb&ai†bi Pvl nt`Q?  
K) mbvZb c×iZ†Z  
L) nvj Kv iBieo c×iZ†Z  
M) Avav iBieo c×iZ†Z  
N) iBieo c×iZ†Z

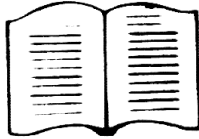
### cW 5.3 vPswi Pwli 7b bePb, eMv I Mj`v vPswi Pvl cxwZ I e`7cbr



#### G cW tkI Avcb -

- vPswi Pwli 7b bePb KiZ cvi7eb|
- eMv vPswi Pvl cxwZ I e`7cbr eYbv KiZ cvi7eb|
- Mj`v vPswi Pvl cxwZ I e`7cbr m`utK`vL`v KiZ cvi7eb|

#### vPswi Pwli 7b bePb



##### eMv vPswi

DcKj xq Gj vKvi thL7b tRvqi fivvi c7ve 7vK tmL7bb eMv vPswi Pwli 7b bePb Kiv m`e| eMv vPswi Pwli Rb` tjvbr cmbi chP3 mieivn c0qvRb Ges mgy`7\_tKB Zv cvlqv m`e| cKZ ev Lvgtii Rb` G7Wj ev t`v-Avka g7U metPtq fij| thme AA7j DwM`i cmigvY Kg 7vK tmme AA7j cKZ `Zwi i LiP Kg nq| cKZ `Zwi i 7b mgZj ntj cKZ `Zwi i LiP Kg nq| tmRb` fvgi eUzZv t`Lv c0qvRb| R7jv`Ov7mi ev mgy` S7oi Avl Zvq cKZ c7o wK bv Zvl t`7L w7Z n7e| thvM7hvM I we`y mieiv7ni e`7v 7vK7Z n7e|

eMv vPswi Pwli Rb`  
tjvbr cmbi chP3  
mieivn c0qvRb Ges  
mgy`7\_tKB Zv cvlqv  
m`e|

##### Mj`v vPswi

thL7b cKZ ev Lvgti wbgP7 Ki7e tm 7v7bi g7U cmb a7i ivLvi 7vgZv 7vK7Z n7e| Gi Rb` G7Wj I t`v-Avka g7U m7eP7g| c0qvRbxq cmb mieivn Kivi e7`ve 7vK7Z n7e| eb`v gy` Gj vKv n7Z n7e| Ovqvgy` 7b n7Z n7e| thvM7hv7mi m7eav 7vK7Z n7e|

eMv vPswi cKZi i  
Mfxi Zv KiZ n7e 1.0-  
1.5 w7Uvi |

##### eMv vPswi Pvl I e`7cbr

7b beP7bi KivR m`ubantj cKZ Lbb`iiyKiZ n7e| eMv vPswi cKZi i Mfxi Zv KiZ n7e 1.0-1.5 w7Uvi | cKZi AvKwZ AvqZvKvi ntj e`7cbrv m7eav nq| cKZi AvqZb GK ev GKwaK 7n7i n7Z cvi7e| c0ZvU cKZi cmb X7vi I tei nlqvi Rb` u7m t7U 7vK7Z n7e| cKZi era h7\_ó DBzn7Z n7e hv7Z mn7R tRvgtii cmb ev e7oi cmb7Z cmeZ bv n7Z cvi7e|

cKZi i Zjvq hv7Z tKvb M77oi 7vo bv 7vK Zvi e`7v KiZ n7e| cKZi i Zjvq tK7vYK fite GKwU bvjv `Zwi KiZ n7e| bvjvU cKZi i cmb tei nlqvi u7m t7U7i m7\_ mshy` 7vK7e| cKZ `Zwi i mgq cmb7Z evZim t`qvi Ges cmb wOv7bvi e`7v ivL7Z n7e|

cKZ Lb7bi KvR m`ubantj qvi ci 7civr Ovovi Rb` cKZ c7Z KiZ n7e| c07gB cKZi mvi wY-1 Av7v7i P7 c0qvM KiZ n7e|



mvi wY 1 t gvUj iCGBP Abhvx Pz c`qvM i cwi gvY |

gvUj iCGBP	c`Z kZistk P`bi cwi gvY (tKuR)
4.0	11.0
5.0	7.0
6.0	3.5
7.0	c`qvRb tbB

Pz c`kzi cmb t`qvi AvtM ev cti e`enri Kiv thtZ cvti | Pz c`qvM m`ubentj mvi wY-2 Abhvx mvi c`qvM KitZ nte |

mvi wY 2 t weifbentj i c`qvM gvIv |

m`i i bug	m`i i cwi gvY (tKuR/tnt)
gvM i weov A_ev tMve i	250 - 270
BDwi qv	50.0
u.Gm. iC	50.0

mvi t`qv m`ubentj c`kzi cmbi MfxiZv 1.0 - 1.5 wUvti DbkZ KitZ nte | `B t`k wZb mBvtni wfZi c`kzi cmbi is meR ntq DVte | ZLb nij Kv ubneo Pvl c`wZi Rb` c`Z tnzti 15,000 - 30,000 uU tcvbv, Avav ubneo P`tli Rb` 30,000 - 50,000 uU tcvbv Ges ubneo P`tli Rb` 2,80,000 uU tcvbv QvotZ nte | tcvbri Avk`qi Rb` duk duk Kti c`Z tnzti 4-6 uU bwi tKtj i Wlv c`kzi i Zj vq tdj tZ nte |

evM`v uPsvio P`tli Rb` cmbi e`e`vcbv LyB iZcY` nij Kv ubneo P`tli tejvq c`Z Agvem`v I c`v`vq tRivq`ti mgq c`kzi cmbi 40-50% tRivq`ti cmbi 0viv e`j Kti w`tZ nte | Avav ubneo P`tli tejvq c`Zw`b c`kzi cmbi 30-40% tjvrb cmbi 0viv e`j Kti w`tZ nte |

ZvQvov Avav ubneo P`tli tejvq c`Z w`b 18 - 20 NvUv mgq c`kzi cmbtZ evZvm t`qvi e`e`v KitZ nte | evZvm t`qvi hS;0viv G KvRwU Kiv m`e | c`kzi cmbi uQvrtZ nte |

nij Kv I Avav ubneo P`tli tejvq w`vqgZ mvi e`enri Kti cmbi `QZv 25 - 40 tmt wgt ivL`tZ nte |

c`Zw`b uPsvio tK 3-6 evi m`u`i-K Lv` w`tZ nte | Lv` mieivn Kivi Rb` tU`e`enri Kiv thtZ cvti | KLbl thb Lv` Awak cwi gvY bv t`qv nq | Lv` tewk ntj cmbi b`o ntq hvq Ges G`tZ cmbi `w`tZ ntq uPsvio gviv hvq | uPsvioi m`u`i-K Lv` mvi wY-3 Abhvx `Zwi Kiv thtZ cvti |

Kul.1 cji Dbqb ž

mviwY 3 t wPswoi m=úí-K Lv` Zwi i Dcv`vb l cwi gvY|

DcKiYi big	cwi gvY (%)
Mtgi fwl	15
Ptji i wgnKgn	25
wdkwgj	40
AvUv	15
%j (mqweb ev mvi lv)	5
tgU	100

Gfite e'e`lcbv Kitj RjvB gvpmi wFzi cZwU wPswoi Mo lRb `wvq 50-60 Mtg| mvariYZ Agvem`v ev cWgvi URyGi mgq cKz ev Lvgvi ntZ wPswoi aiv nq| RjvB gvpmi gvSvgnS wPswoi aiv tkl nq|



**Ablyj b (Activity) t aly,** Avcbvi cZtekx Rbve kvnRvjvj mvtntei GKwU eo AvKvti i wPswoi Lvgvi AvfQ Ges Avcbv H Lvgvti i GKRb grm` KgRZPwntmte KgPZ| H Lvgvti i Rb` Dcfr<sup>3</sup> DcKiY, tjv w`tq 500 tKwR wPswoi Lveri `Zwi Kivi Rb` tKvbu Kx cwi gvY e`envi Kitjeb Zvi GKwU mviwY `Zwi Kily|

**Mj`v wPswoi Pvl l e'e`lcbv**

Mj`v wPswoi cKzi i AvKvi 0.5-5.0 tn±i ntZ cvti | cKzi i Mfxi Zv`vKtZ nte 1.0-1.5 wglvri | cmbi jeYv<sup>3</sup>Zvi cQvRb 0.4 wciwU (Parts per thousand) | cKzi i cvo Ggb DpntZ nte hrtZ ep ev eb`vi cmbtZ cmeZ bv nq|

cjvZb cKzi Pvl KitZ ntj cUtg we`gub Dm`c, gvQ l tcvKv-gvKo mivtZ nte| cKz i`wKtq ev Jla ev KxUbvkK e`envi Kti G KvRwU Kiv thtZ cvti | Gici gwUj wGBP t`tL Pz cQvM KitZ nte Ges mviwY-4 Ablyti Pz cQvM KitZ nte|

mviwY 4 t gwUj wGBP Ablyqx Pz cQvMi gvTv|

gwUj wGBP	Pzbi cwi gvY (tKwR/kZisk)
4.0	8 - 15
5.0	4.5 - 3.5
6.0	2.0 - 2.5
7.0	1

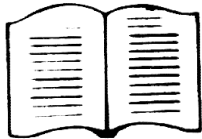
Pz cwb t`qvi AvfM ev cti cQvM Kiv thtZ cvti | Pz cQvMi ci mviwY-5 Ablyqx mvi e`envi KitZ nte|

mviwY 5 t Pz cQvMi ci wvfbmvti i cQvM gvTv|

mvti i big	cwi gvY
------------	---------

	(tKvR/tn±i)
gyMi weôv ev tMvei	300
BDwi qv	25
uJ.Gm.uC	12
cUvk	5

mvi e`envtii ci cmbi Mfxi Zv 1.0 - 1.5 ugUvi Ki±Z nte| mvi e`envtii 2-3 mBvtni gvtS cKzi i cwb meR eYp nte| G mgq cwb i`^QZv`wvte 25-35 tm. ug. | G Ae`vq GKK Prli Rb` c±Z tn±ti 10,000 - 50,000 uJ Mj`v uPsvoi tcvbri QvotZ nte| tcvbri Avk±qi Rb` bwi±Ktji WMv e`envi Kiv th±Z cvti | ugk±Prli Rb` Ab`vb` gvtQi tcvbri mvt\_ c±Z tn±ti 8,000 - 10,000 uJ tcvbri Qvov th±Z cvti | uSbt±Ki gvsm, kvgt±Ki gvsm, tQvU gvQ, gvtQi uWg, tKtPr, giv uPsvio BZ`w` uPsvio Lv` unmt±e e`envi Kiv hvq| ZvQvov evM`v uPsvio Rb` th m±u±K Lv` e`envi Kiv nq (Av±MB ejv ntqtQ) ZvI Mj`v uPsvio Rb` e`envi Kiv Ptj | btf±t - tde±vixi wFZi uPsvio aiv nq| G mgq Mto c±ZuU uPsvio I Rb` wvq 40 - 60 Mg|



**mvi gg**±t DcKj xq Gj vKvq tRvqvixq A±tj evM`v uPsvio cKz ev Lvgi uBg±Y Ki±Z nq| GtWj I t`v-Avk gvU cKzi i Rb` DEg| Rtjv`Qvm ev mgy±Sto hv±Z cKzi i qWZ bv Kti tmv±K j q` ivL±Z nte| cKzi cwb XKv I tei nlqvi e`e`v ivL±Z nte| tcvbri Qvori Av±M gyMi weôv/tMvei, BDwi qv, uJ.Gm.uC. mvi e`envi Ki±Z nte| GtWj I t`v-Avk gvU cKz Mj`v uPsvio Rb` Dc±hvMx| Prli Rb` cwb mieivm AZ`vek`K| cwb i jeYv<sup>3</sup>Zv ivL±Z nte 0.4 uCvU| cjuZb cKzi i t±t±t we`gvb AvMvQv I c±Yx`i Ki±Z nte| uSbt±Ki I kvgt±Ki gvsm, tQvU gvQ, tKtPr, gvtQi uWg, uPsvio Lv` unmt±e e`envi Kiv hvq| btf±t - tde±vix gvtmi wFZi uPsvio aiv nq|



### cuVvĚi gj'iqb 5.3

#### mĚK DĚti i cuK ĚK ĚPý (✓) ě b|

- 1/ eM`v ě Pšioi cĵzi i Rb` tKĭb&tKĭb&gMĭ Fĭj ?  
K) tetj, ewj  
L) Gĭĭj, t`uAĭk  
M) AbġP, tetj  
N) A=0I Kĭ`v
  
- 2/ eM`v ě Pšioi cĵzi i Mfxi Zĭ KZ ĩvLĭZ nĕe?  
K) 0.5 - 0.75 ĩgUĭi  
L) 1.0 - 1.5 ĩgUĭi  
M) 2.0 - 2.5 ĩgUĭi  
N) 2.5 - 3.0 ĩgUĭi
  
- 3/ eM`v ě Pšioi cĵzi i cĭbi j eYr<sup>3</sup>Zĭ KZ ĩvLĭ DĚg?  
K) 10 - 15 ĩĭĭĭĭU  
L) 15 - 20 ĩĭĭĭĭU  
M) 15 - 25 ĩĭĭĭĭU  
N) 25 - 30 ĩĭĭĭĭU
  
- 4/ Mj`v ě Pšioi cĵzi i gMĭi ĩcGBP 6 nĕj Kx nĕti Pĭ e`envi KĭĭZ nq?  
K) 1.5 - 2.0 tKĭR/kZĭsk  
L) 2.0 - 2.5 tKĭR/kZĭsk  
M) 2.5 - 3.0 tKĭR/kZĭsk  
N) 3.0 - 3.5 tKĭR/kZĭsk
  
- 5/ Mj`v ě Pšioi GKK Pĭĭi i Rb` Kx nĕti tĭvĭv QvotZ nq?  
K) 10,000 - 20,000/ĕnt  
L) 10,000 - 30,000/ĕnt  
M) 10,000 - 40,000/ĕnt  
N) 10,000 - 50,000/ĕnt

### cw 5.4 **¶Pswi AvniY mgq, AvsikK AvniY, m=úY@AvniYKtj j ¶Yiq veiq**



**G cw tkli AvciB -**

- ¶Pswi AvniYi mgq m=úY@RvtZ cvi teb|
- ¶Pswi AvniYi c×iZ eYv KiZ cvi teb|
- ¶Pswi AvniYi mgq Kx Kx mvearbZv AeJ =b KiZ nte Zv Dvj - L KiZ cvi teb|

#### **¶Pswi AvniY mgq**



Mj`v ¶Pswi btf= Ges tdeyix gvmti wFzi aiv nq| Ab`w tK evM`v ¶Pswi aiv iinyq tg gvmti tkli w`tK Ges aiv tkl nq RjvB gvmti gvSvms| A\_¶Pswi I Rb hLb Mto 30 Mlg ev Zvi Dcti tcti ZLb ¶Pswi aiv nq|

#### **¶Pswi AvniY c×iZ**

#### **AviskK AvniY**

¶Pswi hLb 30 Mlg ev Zvi tPtq teik I Rtbi nq ZLb ¶Pswi aiv iinyq| ¶Pswi aivi mgq `jv`v bqg AbyiY Kiv thtZ cvi | h\_v AviskK AvniY Ges m=úY@AvniY|

eo ¶Pswi ati Zvt`i `tj Avevi tQvU ¶Pswi cktzi Qvov nq| G ai#bi AvniY c×iZtK weivgnib ev Continuous c×iZ ejv nq|

AviskK AvniYi mgq eo eo ¶Pswi ,tjvtK cŭg aiv nq Ges tQvU ,tjvtK cti aiv nq| ZvQvov eo ¶Pswi ati Zvt`i `tj Avevi tQvU ¶Pswi cktzi Qvov nq| G ai#bi AvniY c×iZtK weivgnib ev Continuous c×iZ ejv nq|

Avevi AtbK t¶¶i cktz, avb t¶¶Z, ev tNi t`tK cŭg ¶Pswi aiv nq Zvici az ¶Pswi ntZ eo ¶Pswi ,tjvtK ti#L tQvU ,tjvtK Rjvktq tQto t`qv nq|

AviskK AvniY c×iZtZ Drcw`Z ¶Pswi GKiu Ask (eo) Aí mgqi wFzi wev iiyKiv hvq| GtZ tQvU ¶Pswi ,tjv eo nl qvi Rb` teik Lv` ,`vib I mgq crq| ZvQvov B`Qv Kijt GKiu ibv` AvKvti cŭg me ,tjv ¶PswotK eo Kiv hvq| Zte AviskK AvniY wKQyKQy¶Pswi AvNvZ cvl qvi dtj ev tLij m e`tj i KviY gviv thtZ cvi ev tiMvLvišntZ cvi | GtZ Drcv`b wKQy nvm tctZ cvi | ZvQvov AviskK AvniY c×iZtZ ¶Pswi UvKv GK mvt\_ Pvlxi nvtZ Avtmbv| eis `xN`mgq ati Pvlxi nvtZ Avtm| Gi dtj Pvlxi gj-ab `Zvi nl qvi mthvM Ktg hvq|

#### **m=úY@AvniY**

m=úY@AvniYi tejvq hLb ¶Pswi aivi mgq nq ZLb tQvU eo me ¶PswotK GK mvt\_ aiv nq| Rjvktq tKvb ¶PswiB ivLv nq bv| G ai#bi AvniY ¶Pswi AvKvi bvbv ai#bi \_vtK| dtj me ,tjv ¶Pswi tMv GK nq bv| G c×iZtZ ¶Pswi ,tjvtK `xN`b Rjvktq ivLtz nq| Gidjtj AtbK ¶Pswi gviv cto Ges tQvU ¶Pswi ,tjv Lv` Mh`Yi cŭZthvMzVq ev eot`i ŐAe`vbMZ PvtcŭmntR eo ntZ cvi bv| ZvQvov ¶Pswi th AskvU AvKvti tQvU \_vtK Zvt`i evRvi `iI Kg \_vtK| m=úY@AvniY tLij m e`j big ¶Pswi ,tjvtKl ati tdjtZ nq| G ,tjvi I evRvi `i Kg|

m=úY@AvniY c×iZtZ me ,tjv ¶Pswi GK mvt\_ ati GK mvt\_ wev iiyKiv nq etj Pvlxi gj-ab mto nl qvi mthvM teik \_vtK| ZvQvov GK mvt\_ Rjvktq Lvij nq etj cieZ`Pvtli Rb`





### cu#VvEi gj`iqb 5.4

m#K DEti i cu#k #K #Py (✓) # b|

- 1| Mj`v #P#o Avni#Yi mgq KLb?  
 K) Rj#B - AvM÷  
 L) AvMó - tm#P#f  
 M) tm#P#f - Rvbsvix  
 N) b#f#f - tdi#vix
  
- 2| e#M`v #P#o tKvb&gv#m aiv`i yq Ges tKvb&gv#m tkl nq?  
 K) #M#m#f - Rvbsvix  
 L) Rvbsvix - gvP©  
 M) tg - Rj#B  
 N) tg - AvM÷
  
- 3| #P#o Avni#Yi c#Z Kq#U?  
 K) 1  
 L) 2  
 M) 3  
 N) 4
  
- 4| tKvb c#Z#Z me #P#o GK m#\_ aiv nq?  
 K) m#úY#Avni Y c#Z#Z  
 L) Avs#kK Avni Y c#Z#Z  
 M) me ai#Yi c#Z#Z  
 N) #ei vgn#b c#Z#Z
  
- 5| Avs#kK Avni#Yi tejvq tKvb&AvKv#i i #P#o ,#jv aiv nq?  
 K) tQ#U AvKv#i i  
 L) eo AvKv#i i  
 M) me AvKv#i i  
 N) tcv#v AvKv#i i

# e'enwiK

## cW 5.5 Mj `v I eM`v iPsiD kbr³KiY

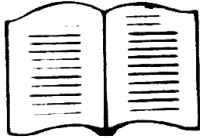


G cW ǂkǂI AvciD –

- Mj `v iPsiD i %ǂkó“ Dǂj LceR kbr³ KiǂZ cviǂeb|
- eM`v iPsiD i %ǂkó“ Dǂj LceR kbr³ KiǂZ cviǂeb|

DcKiY

Rij , evj uZ, di gwj b, tgmmbdiBs Mm, tU, mrvh“Kvi x eB|



cǂmǂK Z\_“

Mj `v iPsiD (Macrobrachium rosenbergii)

- |               |                         |   |
|---------------|-------------------------|---|
| meǂpr -       | cjy iPsiD -             | 320 ugwj uGUvi                            |
|               | ǂj iPsiD -              | 250 ugwj uGUvi                            |
| is -          | nij Kv bxj A_ev         | nij Kv meR                                |
| D`i -tLvj m - | D`i I tLvj m thLvǂb     | uǂkǂQ tmLvǂb (msthvM`ǂj) bxj eUbx_vǂK     |
| cv -          | 2q Pj b c`eo I          | iPgUvhǂ_vǂK                               |
| KivZ/i ÷ǂg -  | KivZi Dcwi fvǂM 11-14uU | `vǂ_vǂK  uǂǂPi Astk_vǂK 8-14uU            |
|               | KivZi gv_v abǂKi        | gZ tetK Dcǂi DǂV hvq                      |
| `vM -         | uǂQǂbi w`ǂK tMj ǂKi     | uǂj Z `vǂb uǂǂPi w`ǂK 3-4 uU nj ž `vM_vǂK |

KivZi gv\_v tetK hvl qv  
 Ges uǂQǂbi njy `vM  
 kbr³KiǂYi metPǂq mnR  
 Dcvq|



metKl j ǂYǂq

KivZi gv\_v tetK hvl qv Ges uǂQǂbi njy `vM kbr³KiǂYi metPǂq mnR Dcvq| (iPǂ-48)



iPǂ 48 t Mj `v iPsiD



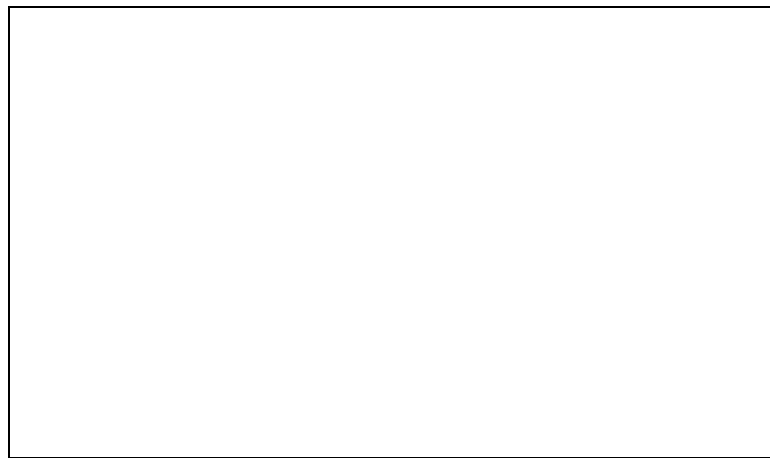
**evM`v vPswO (Penaeus monodon)**

- me@pr - cjtj 298 ugij guUvi  
`x 336 ugij ugUvi
- is - nij Kv meR
- tWviv - evfNi Mtqi tWvivi gZ Kvj tP i tOi tWviv KvUv `vM\_vtK|
- cv - BDtvc tW bxj e tYp` tWviv KvUv `vM\_vtK|
- D`i - D`i AA t j i mbP w tK I cvtq nj t` I j vj ugkv t b v tWviv `vM\_vtK|
- tUj mb (tj R) - cvtki KvUv tbB|

evfNi Mtqi tWvivi gZ  
Kvj tP i tOi tWviv KvUv  
`vM\_vtK|

**vetkl j tYiq**

evfNi gZ tWviv KvUv `vM\_vtK| GRb` Gi bvg Giant tiger shrimp (vP^T-49)|



vP^T 49 t evM`v vPswO

**Kih@vj x**

Rij 0vi v vPswO a ti XvKbv I qvj v evj vZ tZ 5% di gmvj b 0vi v msi tY Ki tZ nte| Mtel YvMvi  
Kv tQ n t j msi tY i c qvRb tbB|

Mtel YvMv t i vPswO t j v tK Ab`vb` gvQ ev KxUcZ 1/2 n tZ Avj`v Ki tZ nte| Gici vKQv  
Av`v tRi I ci cRv vZ v f v E K vPswO t j v tK Avj v`v Ki tZ nte| Gici eBtqi eY0vi mv t\_  
ugvj t q Mj`v I evM`v vPswO t j v tK kbr` K i b Ges e`en vvi K LvZiq Kih@vj x mn Qie G t K  
vDUi t K t`vL t q` t j i v b b|





## Povšigj`iqb

### msuŋB I iPbvj-K ckae

- 1| evsj v`k tKvb&M#Yi tenk cRvuz ue`gib| MY, tj vi bvg wj Lj|
- 2| tjvbr cmb I `f`ycmbi MY, tj vi bvg Avj v`v Avj v`v fite wj Lj|
- 3| evsj v`k ki Pvl thvM` cRvuz, tj vi bvg wj Lj|
- 4| 10wU wPswoi evsj v bvg I `eÁmbK bvg wj Lj|
- 5| tNti wPswoi Pvl i c×wZ eYŋv Kij|
- 6| avb tŋtzi wPswoi Pvl c×wZ eYŋv Kij|
- 7| mbvZb c×wZtZ Pvl Kxfite Kiv nq Zv wj Lj|
- 8| Avav wbowo Pvl Kxfite Kiv nq Zv Dŋj - L Kij|
- 9| wbowo Pvl Kxfite Kiv nq Zv wj Lj|
- 10| Mj `v wPswoi Pvl cŋvj x eYŋv Kij|
- 11| evM`v wPswoi Pvl cŋvj x eYŋv Kij|
- 12| wPswoi cŋzi i `vb wbeŋt b tKvb&tKvb&wel q t`LtZ nte Zv wj Lj|
- 13| wPswoi aivi wμqv, tj v eYŋv Kij|
- 14| Rjvkq i`Ktq wPswoi ai tj Kx Kx DcKvi nq Zv eYŋv Kij|
- 15| tKvb w`K, tj v j`ŋ` ti tL wPswoi Avni Y Ki tZ nte Zv wj Lj|
- 16| AvsikK I m=úY@Avni Y c×wZi mjeav I Amjeav, tj v eYŋv Kij|



## DĚigjv

### cW 5.1

1| N                      2| N                      3| M                      4| M                      5| N

### cW 5.2

1| M                      2| L                      3| M                      4| M                      5| K

### cW 5.3

1| L                      2| L                      3| M                      4| L                      5| N

### cW 5.4

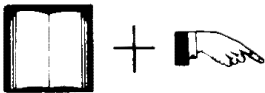
1| N                      2| M                      3| L                      4| K                      5| L

**BDibU 6 RjR Dirmc I KxU cZ½**

RjR Dirmc I KxUcZ½ cKzi i gvtQi Rb` thgb c0qurB AvtQ tZgub Gt` i AwAK Drcri b gvtQi Rb` qWZKi I ntZ cvti | tkIjv cKzi i gvtQi Lv` wKŠ Gt` i cwi gvY teuk ntq eg ntj gvtQi Rb` qWZKi ntZ cvti | cKzi i RjR Dirmc i gvtS j Zvtbv, fimgvb, wMg@bkij, I Wzšl Dirmc i bvg wetkl fite Dvj LthvM | Gt` i cwi gvY teuk ntj cKzi gvtQi Drcri b Ktg hvq Ges gvtQi qWZ nq | newfbecxwZtZ qWZKi Dirmc `gb mæ | thgb - hwišK, i vmiqubK I RweK Dcrtg cKzi i qWZKi Dirmc `gb mæ | newfbæitbi KxU gvtQi qWZ Kti | AtbK i vmiqubK `e` Øivv KxU `gb mæ | RjR AvMvQv Øivv Ktæuv÷ mvi `Zwi Kti cKzi mvi wmwte e`envi Kiv hvq |

G BDibU RjR Dirmc i cKvi f` I c0qurBxqZv, RjR AvMvQv I qWZKi KxUcZ½ `gb I wqšy, cwbZ tkIjvi eg I Dnri wqšy, AvMvQvi mrvth` Ktæuv÷ mvi `Zwi I e`envi, RjR AvMvQv I qWZKi KxUcZ½ mSth I kbr³KiY Ges Ktæuv÷ mvi cŹZ mæutK® we`hwi Z Avtj vPbv Kiv ntqtQ |

**cW 6.1 RjR Dirmc i cKvi f` I c0qurBxqZv**



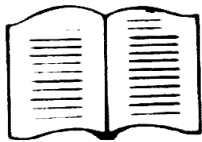
**G cW tkI AvciB –**

- RjR Dirmc i cKvi f` D`vni Ymn Avtj vPbv Ki tZ cvi teb |
- RjR Dirmc i c0qurBxqZv e`vLv Ki tZ cvi teb |

**RjR Dirmc i cKvi f`**

cKzi i ev newfbæitbi Rjvktqi Dirmc KžtK cævbZ `gfvM fVM Kiv Ptg | h\_v -

- tkIjv RvZxq wæzi Dirmc Ges
- džavix D`Pzi Dirmc |



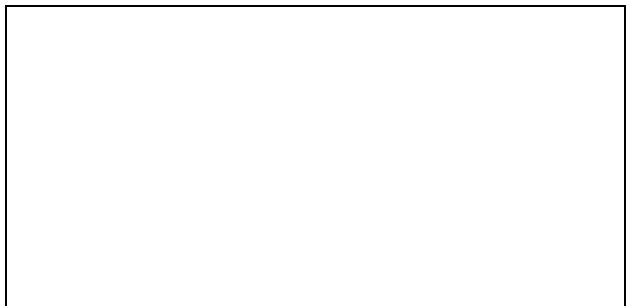
**tkIjv RvZxq wæzi Dirmc**

Gt` i tK t`n MVtbi I ci wfiE Kti wæfvM fVM Kiv hvq t

cv¼Ub RvZxq tkIjvi  
 AwAKvsk Lwj tPvL  
 t`Lv hvq bv | Giv cwbi  
 mvt\_ GK`vb ntZ Ab`  
 `vfb `vbsšii Z nq |  
 D`vni Y - Phacus,  
 Pandorina BZ`w` |

**cv¼Ub RvZxq tkIjv**

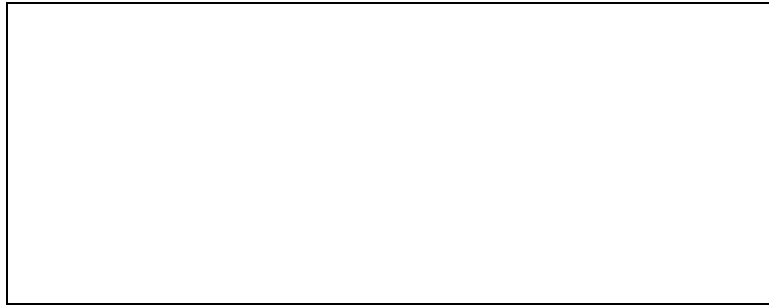
cv¼Ub RvZxq tkIjvi AwAKvsk Lwj tPvL t`Lv hvq bv | Giv cwbi mvt\_ GK`vb ntZ Ab`  
 `vfb `vbsšii Z nq | D`vni Y - Phacus, Pandorina BZ`w` (wPŹ-52) |



Kul. I cju Dbqbb`z

**ZŠRvZxq tkIjv**

G aiþbi tkIjv ZŠ`ev mÿvi gZ AþbK j`nq Ges cmbi wK wbtPB Giv Ae`vb Kti |  
ex cmbtZ Giv tenk cmigtY Rtb#| Gt`i is Nb meR| D`vniY - Spirogyra,  
Zygnema BZ`w`| Giv cÿzi cyo e`envi Kti tdj I mþhP Avtjv cÿzi cmbtZ  
cletk erav t`q (wPÎ-53)|



wPÎ 53 t ZŠRvZxq tkIjv

wbgw%Z tkIjv t`LtZ  
Dbz Dw`m`i gZ gtb  
nq| Giv cmbi wbtP  
gmUz tj #M\_vtK Ges  
t`n Dctii w`tK DfV|  
cmbi th AAj mþhP  
Avtjv cto tm AAj Giv  
Rtb#|

**wbgw%Z tkIjv**

wbgw%Z tkIjv t`LtZ Dbz Dw`m`i gZ gtb nq| Giv cmbi wbtP gmUz tj #M\_vtK Ges  
t`n Dctii w`tK DfV| cmbi th AAj mþhP Avtjv cto tm AAj Giv Rtb#| D`vniY -  
Chara, Nitella BZ`w`| Giv cÿzi cyo e`envi Kti tdj Ges mþhP Avtjv cÿzi  
cmbtZ cletk erav t`q (wPÎ-54)|



wPÎ 54 t wbgw%Z tkIjv

**djavixD`Pzi Dw`m`**

Giv bvbv iKtgi ntZ cvti | Gt`i Rrebe#vtšš I ci wfwE Kti wbtuj wLZ fite wfwRZ Kiv  
hvq t

**fungvb Dw`m`**

Gaiþbi Dw`m` cmbi Dcti tftm\_vtK Ges `j`eta Rtb#| Giv mþhP AvtjvtK cmbi wbtP  
cletk KtZ erav t`q| D`vniY - KPwi cvbv, Kul cvbv, ¶w cvbv BZ`w` (wPÎ-55)|



KPzi cvbv

KuJ cvbv

q|z cvbv

uPÎ 55 t fvmgvb DvM`c

**j Zvfbv DvM`c**

Giv ukKo Øviv Rjvktqi cifo ev Kg cwbZ tj tM \_vtK | Gt`i t`n j Zvi gZ \_vtK Ges  
cvo t`tK Wlv cktzi i gvtSi w`tK tefo Pij | Giv cktzi i cwb tXtK ivtL Ges mthP Avtj v  
cktzi cotZ evav t`q | D`vni Y- Kj ugj Zv, tntj Av BZ`w` | (uPÎ-56) |



uPÎ 56 t j Zvfbv DvM`c

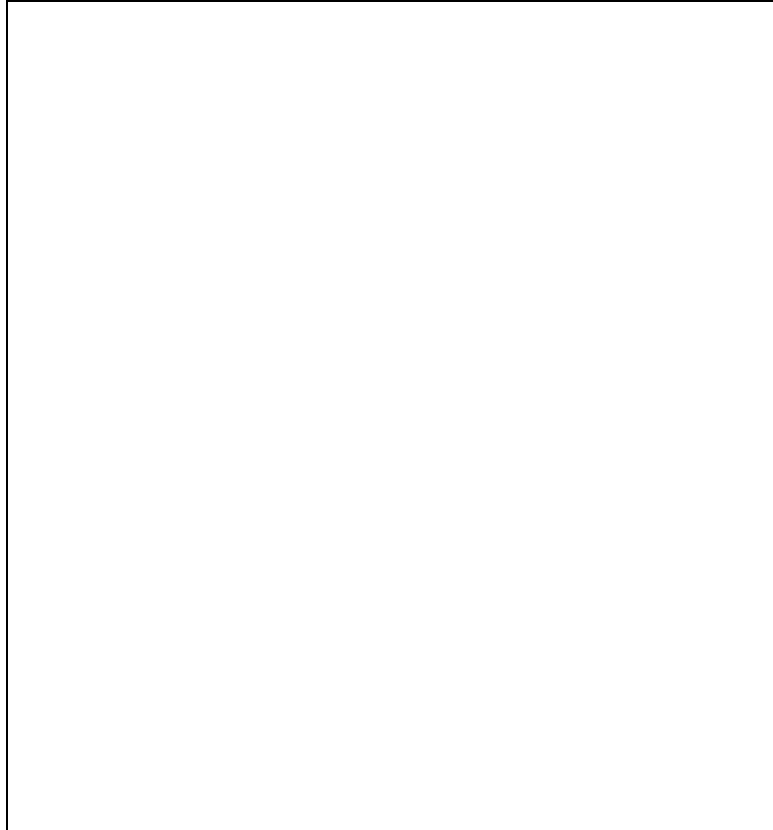
**ubMgkij DvM`c**

G aiþbi DvM`c`i gj- Rjvktq Zj t`tki Kv`vi mvt\_ mshP \_vtK | Gt`i KvÛ, cvZv Ges djz  
cwbv Dcwi fvM fvmZ \_vtK | Giv mthP Avtj vtK cwbv ubtP ctek KitZ evav t`q |  
D`vni Y- vel KvUvj x, Avtj vtW BZ`w` |



gvtQi Pvl I e`e`vcbv

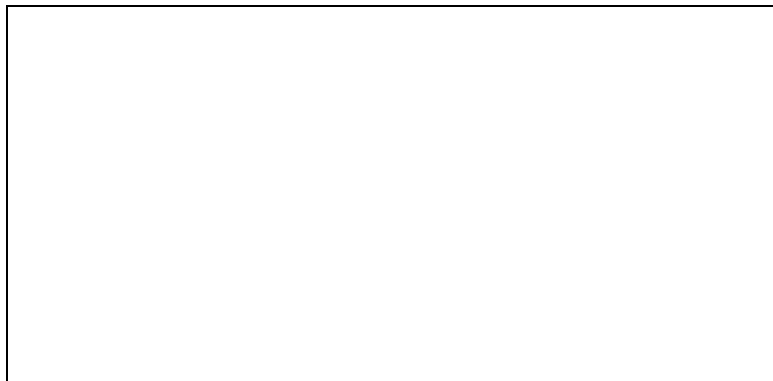
Kul. I cju Dbqob 7z



1P1 57 t 1bM9bkj D11c

Wz1D11c

G ai1bi Rj R D11c cwbi Zj t1k Wz1Ae1iq 1v1K| c1k1i ev Rj v1k1q G1 i AwaK1  
c1p1i c1i1g1Y K1g1q t1q 1eavq g1v1Q1i Drcv11b e1v1N1Z N1U| D1v1ni1Y- c1Z1v1S11S, b1v1R1v1m,  
K1v1U1v1S11S BZ1v1v1 (1P1-58)|



1P1 58 t Wz1D11c

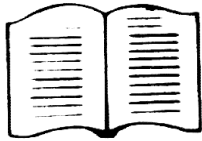
**Rj R Dwt` i c0qvRbxZv**

gvfQi Rj vktq tkljv RvZxq Dwt` i c0qvRbxZv metPtq tenk| Dwt` tfvRx gvQ thgb- iB, KivZjv, Pmcjv, cwt BZ`w` cavbZ tkljv tLtg evtP| Zv Qvov AtbK tkljv AvtQ th`tjv Abg0bx ev zooplankton Gi Lv`| Avevi zooplankton Avakisk gvfi Lv`| tkljv ntjv Rj vktqi metPtq eo c0ugK Drcv`bKvix Dwt``j| cktzi Gt` i cwi gvY tenk \_vktj gvfi Drcv`b tenk nq| cktzi mvi e`envi Kiv nq tkljvi cwi gvY evovevi Rb`| cktzi tkljv tenk \_vktj Wzsl Dwt` ntZ cvtibv|

tkljv ntjv Rj vktqi  
metPtq eo c0ugK  
Drcv`bKvix Dwt``j |  
cktzi Gt` i cwi gvY tenk  
\_vktj gvfi Drcv`b tenk  
nq|

M0m Kiv RvZxq gvQ Zs`RvZxq I mbgw34Z tkljv Lvq| G`tjvi cwi gvY tenk \_vktj cktzi M0m Kiv RvZxq gvfi Drcv`b tenk nq|

djavix D`Pzi Dwt` wKQygvfi Lv` inmtete e`euZ nq| thgb- 9l2` cvb tZj mcqv I \_vB micwt Lv` inmtete e`envi Kti| ZvQvov hv` KLbl cktzi i cwti Mfrix Zv Ktg hvq ZLb Gaitbi Dwt` cktzi i cwtiK ViUv ivLtz mrvh` Kti| KLbl KLbl djavix Dwt` gvfi Avktj`j inmtete e`euZ nq|



**mvi gg** Rj R Dwt` c0gz` Gaitbi | h\_v- tkljv RvZxq mbw3Zi Dwt` Ges djavix Dbz Dwt` | tkljv RvZxq Dwt` i gvfiS Abyev cwt4Ub RvZxq tkljv, Zs`RvZxq tkljv, mbgw34Z tkljv Dtg LthvM`| djavix D`Pzi Dwt` i gvfiS fimgvb Dwt`, Wzsl Dwt`, mb0bkxj Dwt` I j Zvfbv Dwt` i big Dtg LthvM`| AbyDwt` gvfi Ges AYyc0Yx ev zooplankton Gi Lv`| wKQydjavix Dwt` wKQygvfi Lv`| Gme Dwt` tKvb tKvb mgq gvfi Avktj`j inmtete e`euZ nq|





### cuVvEi gj'iqb 6.1

mWk DEti ctk Wk Py (✓) w b|

1| Rj R Dm cwbZ KZ ai#bi?

K) 2

L) 3

M) 4

N) 5

2| tkIjv RvZxq Dm KZ ai#bi?

K) 2

L) 3

M) 4

N) 5

3| dZavix Dm KZ ai#bi?

K) 2

L) 3

M) 4

N) 5

4| AbyDm tkwb&ai#bi cWxt`i Lv`?

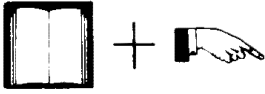
K) e'it0i

L) m'ici

M) g'itQi I Abg'Yxi

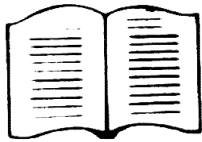
N) KxUcZt'i

### cW 6.2 Rj R AvMvQv I ųiWZKi KxUcZ½`gb I wqšY



G cW tktI Avciw –

- Rj R AvMvQv `gb I wqšY m=útk̃eYŃv Ki tZ cvi teb|
- Rj R ųiWZKi KxUcZ½`gb I wqšY m=útk̃eYŃv w`tZ cvi teb|



gvQ PviI fij Drcv`b tctZ ntj Rj R AvMvQv I ųiWZKi KxUcZ½zi `gb Ges wqšY`i Kvi|

#### AvMvQv `gb I wqšY

wb=ųj wLZ Dcvtq Rj R AvMvQv `gb Kiv m=ê t

- hwišK Dcvtq/KwqK ktg `gb
- i vmiqwbK cųuqiq `gb
- `RieK Dcvtq `gb

#### hwišK Dcvtq `gb

Dw`c Kivivi bvbv ai tbi hš; AvtQ| Gme hš; Ńviv cwi bi wbtPi, fvmgub Ges wM@bkxj I j Zvtbv Dw`c tktU mi vtv m=ê| Avgvt`i t`tk G ai tbi e`e`v e`qmvtcų| tmRb` ktgK j wMftq KwP w`tq tktU nvtZ evtku Ńviv mi vtv thtZ cvti | Zte G cųuqiq tktj v mi vtv m=ê bq|

#### i vmiqwbK Dcvtq `gb

Kcvi mij tdu ev ZtZ, Kcvi mivtUU BZ`w` i vmiqwbK `e` Ńviv tktj v RvZxq Dw`c `gb Kiv hvq| Ab`w` tK bvbv ai tbi nvi memvBW Ńviv djavix Dw`c `gb Kiv thtZ cvti |

Kcvi mij tdu ev ZtZ,  
Kcvi mivtUU BZ`w`  
i vmiqwbK `e` Ńviv tktj v  
RvZxq Dw`c `gb Kiv  
hvq|

#### `RieK wqšY

Mm Kiv,`vB mi cW, tZj wcvv BZ`w` gvQ Ńviv Rj R Dw`c `gb m=ê| Bmi vbtj Nutria bvgK B`j RvZxq cųv Ńviv cktzi i Rj R Dw`c wqšY Kiv ntq`v tK|



**Ablyj b (Activity) t aly,** Avcbri emoi cvtk Rbve isj mrtnei GKw cktz AvtQ hvZ wvfbreaitbi AvMvQv w`gub| H cktzi AvMvQv `gb Kivi Rb` Avciw ZvtK Kx ai tbi civgk` teb Zv hv` mnKvti wj Ly (Ably`100 kã)|

#### wqšY

cktz t`tk AvMvQv `gb Kivi ci hwi Zvt`i tK wqšY bv ivLv hvq Zvtj Avevi Rj R Dw`c` cktz fti thtZ cvti | tmRb` Rj R Dw`c wqšY ivLvi Rb` wb=ųj wLZ e`e`v Mhy Ki tZ nte t

- cktz wqgZ fite AvMvQv gv` ivLvi Rb` hZwb tZ nte| AvMvQv ni qvi mvt` mvt` Zv mvi tq tdj tZ nte|
- cktz Ggb Mfvi ivL tZ nte hvZ cktzi i Zj vq mth` Avtj v bv cto|
- cktzi i cto w`gub Rj R Dw`c` i tMvov Dcto tdjt w`tZ nte|

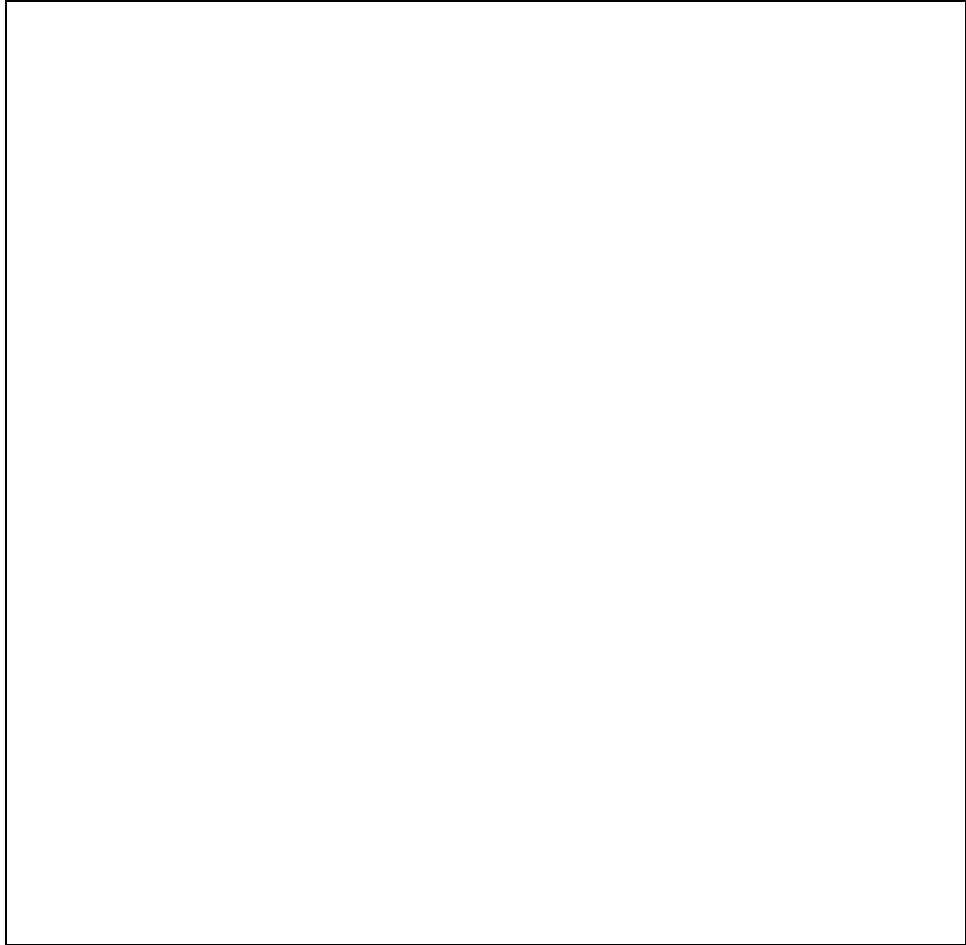
Kul. I cju Dbqbb`z

- ckyzi AZ`waK mvi c0qM bv Kitj tkIjvi Dc`e nte bv| cjuZb ckyzi i tejvq cBr Kv`v mwi tq tdj tZ nte|
- thme ckyzi teuk tkIjv nI qvi cEYZv \_vtK tm,tjvtZ wj fvi Kvc©gvQ QvoTZ nte|

thme ckyzi teuk tkIjv  
nI qvi cEYZv \_vtK  
tm,tjvtZ wj fvi Kvc©  
gvQ QvoTZ nte|

**¶wZKi KxUcZ½`gb I ubqšY**

gvfQi tcvbvi Rb` AtbK cZ½ ¶wZKi | ckyzi nwa tcvKv, jwV tcvKv I weirfbæKxUi iK Rtb#(wPÎ-59)|

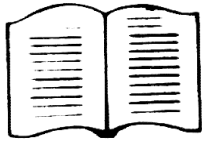


wPÎ 59 t weirfbæai#bi KxUcZ½

G,tjv gvfQi tcvbvi cPž ¶wZ Kti \_vtK| thme KxUcZ½ evZvm tbi qvi Rb` cwbi Dci Avtm tm,tjvtK gvivi Rb` tKtiwmb tZj ev wW#Rj e`envi Kiv thtZ cvfi| mwi lvi ev bwitKtj i tZtj i mvt\_ Kvc0 KvPvi mvevb wgwktq`eY`Zwi Kti ckyzi e`envi Kitj AtbK aitbi KxU gviv cto| wWcUvti. Øviv ¶wZKi KxUi`gb mæe| tKtiwmb e`envi Kitj Zvi cwigvY nte cEz kZvstK Avav wj Uvi| wW#Rj e`envi Kitj Zvi cwigvY ntZ nq 1 wj Uvi | gkwi i Rj Uvtj AtbK KxU mivtbr mæe|

**KxUi ubqšY**

gvšS gvšS Rvj Uvbŧj ¶wZKi KxUcZ½ ubqšŧY \_vŧK| gv0 eo nŧq tMtj AŧbK KxU ŧLŧq  
tdŧj |



**mvi gg** hwišK, i vmiqubK I RweK Dcŧq Rj R Dwiŧc `gb Kiv hvq| hšj Ÿviv ev kŧgK  
j wMtq Rj R Dwiŧc `gb Kiv hvq| Kcvi mŧj tdU, Kcvi mŧBŧUŸ Ÿviv Rj R Dwiŧc `gb Kiv  
hvq| ubqwgZ cŧzi i hZambŧq, cŧz Mfxi Kŧi, cŧzi i cvo nŧZ Dwiŧc`i , av mŧi ŧq cwiwgZ  
mvi cŧqvm Kŧi I mŧj fvi KvcŧQto Rj R Dwiŧc ubqšŧY ivLv mæ| ŧKŧi vmb, wVcUvŧi.  
Ÿviv ¶wZKi KxUcZ½ `gb Kiv hvq| gvšS gvšS cŧzi Rvj Uvbŧj KxUcZ½ ubqšŧY \_vŧK|

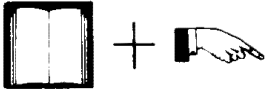


## cvčVvĚi gj'iqb 6.2

mĭWK DĚti i cvčk ĭJK ĭPy (✓) ĭ b|

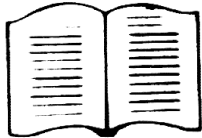
- 1| KZ i Kg Dcrtq Rj R Dĭmĉ ĭbqšŸ Kiv hĭq?  
K) 2  
L) 3  
M) 4  
N) 5
- 2| tKĭv&ai tbi c×ĭZtZ Kcvi mij tdu e'envi Kiv nq?  
K) hĭšĶ  
L) ĭvmĭqĭbK  
M) ĭRĭeK  
N) tKĭvUĭB bq
- 3| gvQ tQto tKĭv&ai tbi c×ĭZtZ Rj R Dĭmĉ ĭbqšŸ Kiv hĭq?  
K) hĭšĶ  
L) ĭvmĭqĭbK  
M) ĭRĭeK  
N) tKĭvUĭB bq
- 4| Kx ĭgtbi Rb' tKti wmb I wWcUĭti. e'euZ nq?  
K) gvQ  
L) AvMvQv  
M) KĭUcZ½  
N) Dc'ti i me,tjv

### cw 6.3 cwtZ tkI jv egr Ges Dnvi ibqšY



G cw tkI Avcb –

- egr iK Zv e`vL`v Ki tZ cvi teb |
- Kx Kvi tY tkI jv egr nq Zv eY`v Ki tZ cvi teb |
- Kxfite egr ibqšY Kiv hvq Zv Avtj vPbv Ki tZ cvi teb |



egr

hLb tKvb Kvi tY cwtZ e`vck cwi gvY tkI jvi cwi gvY teo hvq ZLb ZvtK egr (Bloom) etj | tKvb Kvi tY cktzi mti i cwi gvY teo tMtj tkI jvi egr ntZ citi | c`vZ 3u Kvi tY cktzi mti i cwi gvY evotZ citi | h\_v t

- cjuZb cktzi `RieK c`v`Rtg
- cktzi Ku`g Lv` e`envi Ki tj
- cktzi tewk mvi e`envi Ki tj

hLb tKvb Kvi tY cwtZ e`vck cwi gvY tkI jvi cwi gvY teo hvq ZLb ZvtK egr (Bloom) etj | tkI jvi egr ntj gvQ gvi v thtZ citi |

thme tkI jvi Kvi tY egr nq tm, tj vtK mec`4bK tkI jv ejv nq | Gt`i gvtS AvtQ Gbwebv, bWtj vi qv BZ`w | tkI jvi egr ntj gvQ gvi v thtZ citi | etgi mgq cwbi eY`meR, nj t` meR, jvj cvUj, bxj meR BZ`w ntZ citi |

thme tkI jv `vivi egr `Zwi nq tm, tjv Dcti tftm `vKtZ citi ev cwtZ wgtkl `vKtZ citi | etgi GK ch`q cktzi Dci mti gZ cto | evZvm c`vwnZ ntj Giv cktzi GKiv tK wltq Rtg | egr ntj cktzi i cwtZ `M` `Zwi nq |

egr `gi tYi h\_v `vqx I miguqK | `vqx egr `Zwi nq Microcystis, Anabaena BZ`w `vivi |

egr `gi tYi h\_v `vqx I miguqK | `vqx egr `Zwi nq Microcystis, Anabaena BZ`w `vivi | thme cktz cjuZb Ges th, tj vtZ c`v` `RieK c`v` `gib `vtK tm, tj vtZ `vqx egr nq | mivi YZ gRv cktzi `vqx egr t` LtZ cvl qv hvq |

Ab`v tK miguqK egr nq tKvb Kvi tY cktzi mvi tewk cotj Ges cktzi Ku`g Lv` e`envi Ki tj | etgi mgq cktzi i gvtQi t`tnl etgi MÜ `Zwi nq | ZLb gvQ tLtZ MÜh` nq | GKUvbr `vN` b tiv` cotj B egr nq | tm Rb` tm tP` t` tK wltm`ti i wFZi egr t` LtZ cvl qv hvq | A`bK mgq Wzš` Dv`c aYsm Kivi Rb` AwaK cwi gvYi BDvi qv I uJ.Gm.uc. e`envi Kti cktzi egr `Zwi Kiv nq | egr ntj thtnZm`hP Avtjv cwbi Lv` wbtP thtZ citi bv tmRb` Wzš` Dv`c Avtjvi Afite gvi hvq |

cktzi egr ntj ivtZi tejvq cktzi i cwbi Av` tRb k`b` tbtg Avm tZ citi Ges GtZ Kti gvtQi e`vck gZz ntZ citi |

cktzi egr ntj ivtZi tejvq cktzi i Av` tRb k`b` tbtg Avm tZ citi Ges GtZ Kti gvtQi e`vck gZz ntZ citi | h`w` w`tb AvKvk tgNjv `vtK Ges evZvtmi Zvcgv`v tewk `vtK Zv ntj cktzi i Av` tRtbi cwi gvY e`vck fite Ktg thtZ citi | Gi dtj cktzi i gvtQi e`vck ¶wZ ntZ citi | G Ae`vq cktzi i cwtZ w`úW tevW Pwjtq, evkur`tg cmb Avt` wj Z Kti ev `gKj `vivi cktzi i cmb cktzi wltq w`tj cwtZ Av` tRb thvM ntq gvtQi gZz nvi KgtZ citi | hLb gvQ Dcti tftm Dtv ZLb gtb Ki tZ nte cktzi i cwtZ Av` tRtbi Afite ntqtQ | ZLb Av` tRb wgv`vivi Kiv, tjv Ki tZ nte |

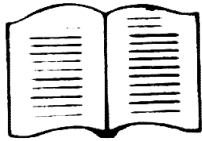
**eg ı b q Ő Y**

gRv c ı z i eg ı b q Ő Y Ki t Z n t j k i Z K v t j c ı z i i ı k t q c ı z i Z j v t t K c ı r I D ı P K v v m i i t q t d j t Z n t e | c ı r I K v j K v v m i i t q t d j t j c ı z i eg n t e b v Ges g r t Q i D r c v b f i j n t e |

c ı z i 5-12 ı c . ı c . G g .  
K c v i m i j t d U e ı e n v i  
K i t j eg ı b q Ő Y A v t m |  
A v e v i . 5-1 ı c ı c G g n t i  
K c v i m i B t U U e ı e n v i  
K i t j eg ı b q Ő Y A v t m |

Ab ı r t K c ı z i 5-12 ı c . ı c . G g K c v i m i j t d U e ı e n v i K i t j eg ı b q Ő Y A v t m | A v e v i 0.5-1 ı c ı c G g n t i K c v i m i B t U U e ı e n v i K i t j eg ı b q Ő Y A v t m |

- t k l j v g v i v i c i M u I I P - c h l o r o p h y c - 1 , I - d i m e t h y l u r e a e ı e n v i K i t j m n t R eg n t Z c v t i b v |
- 2 , 4 - ı W t m ı W q v g A v i t m b v B W ı v i v t k l j v g v i v h v q |
- ı m g v ı h b N c ı q v t M i n v i 0.25-0.50 ı c . ı c . G g |
- ı m j f v i K v c ı R v Z i q g v Q ı v i v l A t b K a i t b i eg ı b q Ő Y m e e |
- c ı z i K ı z i c v b v n t Z ı t j l eg ı b q Ő Y n q | c ı z i 10-25% A s t k K P ı c v b v i v l t Z n q |



**m v i g g ı t** h L b t K v b K v i t Y c m b t Z e ı v c K n t i t k l j v i c v i g v Y t e t o h v q Z L b Z v t K eg e t j | c j v Z b c ı z i ı R ı e K c ı v ı R t g , c ı z i K ı l g L v ı e ı e n v i K i t j Ges c ı z i t e w m v i e ı e n v i K i t j c ı z i eg n q | eg n t j g v Q g v i v t h t Z c v t i | e t j i m g q c m b i i 0 m e R Ges b v b v i t ı o i n t Z c v t i | e t j i G K c v h ı q c m b i l c i m t i i g Z c t o | eg ı g i t b i ı v q x l m v i g v q K | g R v c ı z i ı v q x eg n q | e t j i m g q g v t Q i t ı n l e t j i M U ı v t K | G K U i b v ı v ı N P b t i v c o t j eg n q | t m t P ı t ı W t m ı t n t j v c ı v b Z e t j i m g q | c ı z i c m b t Z eg ı Z v i K t i W e s ı D ı ı c ı b q Ő Y K i v h v q | c ı z i eg n t j i v t Z c m b t Z A ı t R t b i A f v e N t U Ges G t Z g v Q g v i v t h t Z c v t i | c ı z i ı ı v W t e v U P v i j t q e v k u r t q c m b t Z j ı v v t g t i A e v ı g K j ı v i v c ı z i c m b c ı z i ı Q ı U t q A ı t R b ı g k v t b v i e ı v e ı v K i v t h t Z c v t i | h L b g v Q D c t i t f t m D ı v Z L b e s t Z n t e t h c m b t Z A ı t R t b i A f v e n t q t Q | K c v i m i j t d U , K c v i m i B t U U , ı m g v ı h b l t m ı W q v g A v i t m b v B W ı v i v eg ı b q Ő Y K i v h v q | g R v c ı z i i ı k t q c ı r K v v t d t j ı t j ı v q x eg ı v t K b v | ı m j f v i K v c ı K ı z i c v b v ı t q l eg ı b q Ő Y m e e |



### cuVvEi gj`iqb 6.3

mWk DEti i cuK Wk iPy (✓) i b|

- 1/ hLb cmbtZ e`vcK nrti tkljv tefo hvq ZLb ZvtK Kx etj ?  
K) egj  
L) RbZv  
M) m`u`iq  
N) goK
  
- 2/ Wk Kvi tY egj nq?  
K) cKzi Aw tRtbi cwigvY tefo tMtj  
L) mrti i cwigvY tefo tMtj  
M) mrti i cwigvY Ktg tMtj  
N) cKzi i cmb Ktg tMtj
  
- 3/ `vqx egj tKvb&aitbi cKzi nq?  
K) cjuZb gRv cKzi  
L) bZb cKzi  
M) Mfxi cKzi  
N) AMfxi cKzi
  
- 4/ gvQ hLb l cti tftm Dtv ZLb cmbtZ Wktmi Afve nq?  
K) Lv`i  
L) KveB-WiBA- vBtWi  
M) Aw tRtbi  
N) Avtj vi
  
- 5/ tKvb&gvQ 0viv egj mbqšY m`e?  
K) KvcP  
L) Mm Kvc©  
M) mj fvi Kvc©  
N) KvZj v

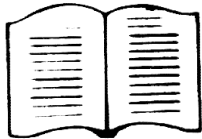


**cW 6.4 AvMvQvi mrvth" Kfuv÷ mvi `Zvi I e`envi**



**G cW tkfI Avcb –**

- Kfuv÷ mvi Kx Zv e`vL`v Ki tZ cvi teb|
- AvMvQvi 0vrv Kfuv÷ mvi `Zvi I Zvi e`envi m`utK`Avtj vPbv Ki tZ cvi teb|



**Kfuv÷ mvi**

Kfuv÷ mvi `Zvi Kiv GKw bZb chv<sup>3</sup> | G c`uqvq Ae`eüZ Dv<sup>m</sup> KjtK mvi wmvte e`envi Kivi Dc`hvMx Kti tZvjv hvq| Kfuv÷ mvi gj-Zt `RveK mvi | Gi c`q melvB tMvei I AvMvQv\_vtK|

**Kfuv÷ mvi `Zvi**

Kfuv÷ mvi `Zvi Kivi mgq wv`uj wLZ c`t`q c`\_tjv AvyviY Ki tZ nte|

th c`kzi Kfuv÷ mvi e`envi Kite tm c`kzi cvi oi Kvq GKw MZ`Ki tZ nte| c`Z 100 tKwR Kfuv÷ mvti i Rb` MtZ`P AvKvi nte 25-27 Nbd<sup>l</sup>|

Gici RjR Dv<sup>m</sup>, tMvei, Pz I BDvi qv msMh Ki tZ nte| th cvi gvY AvMvQv e`envi Kite Zvi t`o \_Y\_vKte tMvei | A\_v<sup>o</sup> 100 tKwR AvMvQvi mt\_ 150 tKwR tMvei e`envi Ki tZ nte| Av`w`k Pz I BDvi qvi c`qvRb nte AvMvQvi 2% Kti | A\_v<sup>o</sup> 100 tKwR AvMvQvi Rb` 2 tKwR Pz I 2 tKwR BDvi qv e`envi Ki tZ nte|

GKw tKv`wv w`tq Pz Ges BDvi qv Lv`fij fite wgvk`q mgvb 4 fvtM fvm Kti ivL`Z nte| GKB fite Avj v`v Avj v`v fite tMvei I AvMvQv \_tj vtK mgvb 4 fvtM fvm Ki tZ nte|

DcKiY \_tjv MtZ`Xkvevi AvtM GKw wvrfvm cvBc A\_er evk w`tq GKw cvBc `Zvi Kti D<sup>3</sup> cvBtci tKvb GK cvtk 4/5 wU wQ` Kti wbtZ nte Ges cvBcuUtK MtZ`P gvtS c`jo w`tZ nte| cvBtci gv\_v MtZ`P g`Li 1 dly Dc`i \_vKte| cvBcuU e`envi Kiv nq Kfuv÷ mvti i wFZti `Zvi M`vm tewi`q hvI qvi Rb`|

G KvRwU tkl ntj c`t`g tMveti i GKfvm MtZ`P Zjvq mgvb c`jyKti wvQ`q w`tZ nte| tMveti i `t`i Dci GKB fite RjR Dv<sup>m</sup>`i GK fvm wvQ`q w`tZ nte| Zvici RjR Dv<sup>m</sup>`i Dci Pz I BDvi qv wgvk`Yi GKw fvm wvQ`q w`tZ nte| Gi Dci Avevi tMvei w`tq `i` Kite| Gfite tkl chSf t`Lv hvte tMvei, AvMvQv I Pz-BDvi qvi PviwU Kti `li ntq`q|

me \_tjv DcKiY Xkvtbvi ci MtZ`P g`wU Lo w`tq Lv`fij fite tXtK w`tZ nte Ges KtqK evj wZ cvnb MtZ`QvUtq w`tZ nte| Gici MtZ`P g`y cvj w\_b, wUb, ev PivvB w`tq tXtK w`b hvZ tiv` ev evotZ `i KvtZ ev wFRtZ bv cvti | Gfite 15-16 w`tbi wFZi Kfuv÷ mvi e`envi i Dc`hvMx nte|

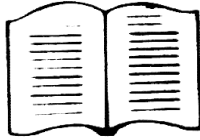
Kfuv÷ mvi `Zvi ntq tMtj c`kzi G mvi e`envi Kiv P`j | c`kzi Kfuv÷ mvi e`envi i Av`k`v`v GLbl w`i nq wv| Zte Gt`q`T `RveK mvti i e`envi i bmvZ AvyviY KivB tkq| A\_v<sup>o</sup> c`Z kZistk 8-12 tKwR mvi e`envi Kiv thtZ cvi | Zte G cvi gvY GKertv bv Kti

DcKiY \_tjv MtZ`  
Xkvevi AvtM GKw  
wvrfvm cvBc A\_er evk  
w`tq GKw cvBc `Zvi  
Kti D<sup>3</sup> cvBtci tKvb  
GK cvtk 4/5 wU wQ`  
Kti wbtZ nte Ges  
cvBcuUtK MtZ`P gvtS  
c`jo w`tZ nte|

2 evti e`envi Kitj wect`i SxK Kg \_vKte| KviY mvti i cwi gvY tenk ntq tMtj cKzi  
Avr tRtbi Afve ntZ cvti | Kt`uv÷ mvi cKzi uQuUtg br w`tq KtqK`vrb Rgv Kti w`tZ  
nte|



**Ablyj b (Activity) t** Avcbvi emoi cvtk th cKz ev Rjvkq AvtQ Zri cvtkB wevfbæ  
DcKiY mivK cwi gvY ugvkZ Kti Kt`uv÷ mvi `Zwi Kij|



**migg<sup>q</sup>** Ae`üZ RjR Dv`c , tjtK Kt`uv÷ Kti mvi wntmte e`envi Kiv hvq| Kt`uv÷  
mvi gj-Z `RweK mvi | Kt`uv÷ mvti i Rb` AvMvQv, tMvei, Pz I BDwi qv e`envi Kiv nq|  
DciKiY , tjtK `ti `ti wevQtg Lo w`tq tXtK w`tZ nq| Kt`uv÷ mvi `Zwi nI qvi mgq th  
M`vm Drcbenq Zv tawi tq hvI qvi Rb` MtZP gvS GKwU uQ`hÿ cvBc XwKtq w`tZ nq|  
15-16 w`tbi w`Zi Kt`uv÷ mvi `Zwi nq| Kt`uv÷ mvi e`envti `RweK mvi e`envti i wbgg  
Abvi Y Kiv nq|



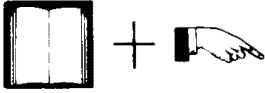
### cuVvEi gj'iqb 6.4

mWK DEti i cuK WK Pý (✓) w b|

- 1/ Ktúv÷ mvi c×wZtZ tKvb&DcKiYi mØ'envi nq?  
K) Pbi cmb  
L) BDwi qv  
M) AvMvQv  
N) tMvei
- 2/ Pbi cwi gvY AvMvQvi cwi gvYi KZ Ask ntZ nq?  
K) 1%  
L) 2%  
M) 3%  
N) 4%
- 3/ MtZcŭg tKvb&DcKiY weQvZ nq?  
K) AvMvQv  
L) tMvei  
M) Pz  
N) BDwi qv
- 4/ Ktúv÷ mti meKl tKvb&DcKiY e'envi KiZ nq?  
K) tMvei  
L) AvMvQv  
M) Pz-BDwi qvi wgvY  
N) Dcti i GKwJl bv
- 5/ Ktúv÷ mvi KZ w tbi wFzi %Zwi nq?  
K) 10-15 w`b  
L) 15-16 w`b  
M) 25-30 w`b  
N) 5-10 w`b

# e`enwiK

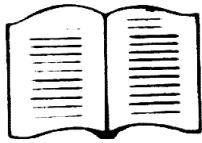
## cW 6.5 RjR AvMvQv I řwZKi KxUcZ½ mslMh I kbr³KiY



G cW řkřI Avcb –

- RjR AvMvQv mslMh I kbr³ KiřZ cviřeb|
- KxUcZ½ mslMh I kbr³ KiřZ cviřeb|

### DcKiY

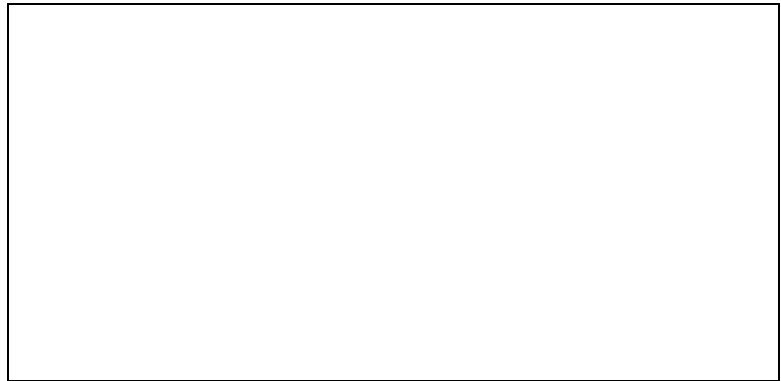


evj wZ, wřtbi mv`v \_vj, KvW, wPgUv, I qvPMm, řcUwMm, wvWj, úvBW, řgMwbdvBs Mm, evUs řccvi ev Uqřj U řccvi, KvřřřgM, Rij, cvj w\_b evM, mřv, KLbI řbřKv, j řř evka, řbvU LvZv, řcWřj, kbr³KiřYi eB, digwř b, KřřPi ev cwwřřKi řcQ řevZřj |

### cřmwřK Z\_`

#### j Zřřbv Dřřc

G řřvi řřvov cřřoi KvřQ \_řřK Ges Wwv cřřři i gvS w řř evotř \_řřK| Gme Dřřc Ař cwb nřřB Kvřřřřv KvUřřZ cviřeb| 15-20 w j Zř řřřřU cwbmn evj wřřřZ i vLřř| j řřř i vLřeb hřřř j Zř řř řřřZ cvZř, mřř ev nřř dj řř \_řřK|

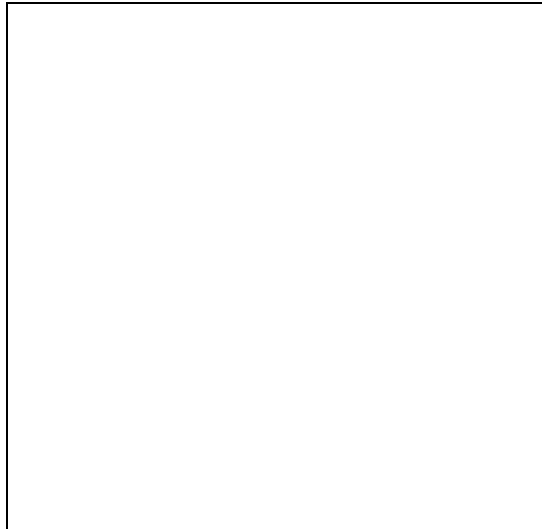


wřř 60 t j Zřřbv Dřřc

#### wBřřřřř Dřřc

cřřoi Ař cwb wBřřřřř Dřřc řřř j Zřřbv Dřřc` i gZ mnřř mslMh KiřZ cviřeb| Ař cwbřřř řřřř řřřřř KvQvKwQ Dřřc řřř v KvUřř Ges 15-20w MvQ evj wřřřZ i vLřř|

Dbřřř AwřK cwb wBřřřřř Dřřc řřř mslMh Kivi Rb` mvZřř cwbřřř břřř cřřřřř nřřZ cřři A\_ev řřřřř cřřřřř nřřZ cřři | Kvřřřřř řevUv mn cvZř, dj řř dj \_řřřř řevUvnn řřřřř mřřř řřřřř GK mřřř řřřř evj wřřřZ cwb mn i vLřř|



uPÎ 61 t ubM@bkij DîMÇ

**fimgvb DîMÇ**

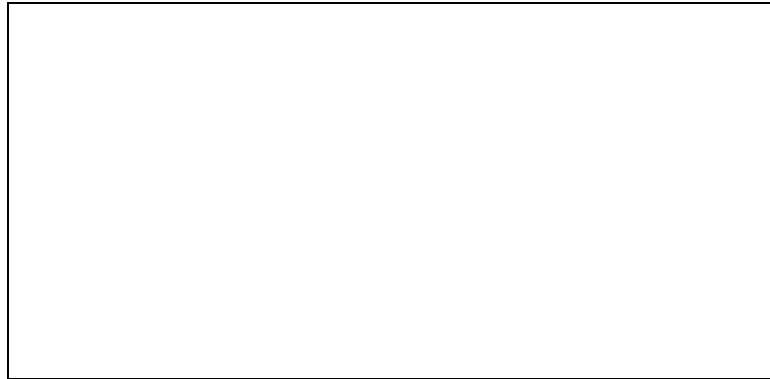
cKzi i fimgvb DîMÇ , t j v n t Z Ges g#Mi Øv in msMh Kti cwb mn#hvM evj uZtZ i vLj| G  
KvRwU cwb tZ tbtg ev tbŠKvq e#m Ki tZ cvi#eb|



uPÎ 62 t fimgvb DîMÇ

**WzŠ DîMÇ**

Gme DîMÇ cwb i ub t P \_v t K| Kv t Øv in G t i t K tMvov mn KvUz Ges cwb mn#hvM  
evj uZtZ i vLj| cwb tevk ntj Wz w t q KvU t Z n#e|



WPT 63 t WzŠ DwMč

**KihēVij x**

- evj wZ, gM, Kv t`l tevZj, cij w\_b e`vM, mZv, j e`v evk, Rvj mnthvM cKzi ev Rj vktq hrteb|
- cKzi i cwbZ me`gvb meaitbi DwMč I KxUcZ½ mSMni e`v Ki`eb Ges e`enwi K LvZvq wj tL Ges Qwe GtK wDUi tK t`wL tq h\_vmg tq`v`ji wbb|

**¶wZKi KxUcZ½**

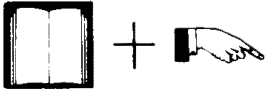
gkvi xi GKwU tQvU teo Rvj, A\_er wZb tKvYv Rvj Øviv cKzi i m`e` me aitbi AA tj KxU cZ½ mSMni Rb` Rvj UvbZ nte| cZwU Uvrb hZ aitbi KxUcZ½ Avmte tm, tj v cij w\_b e`vM, tev t ev evj wZ tZ cwb mnKv i i vL tZ nte| tewk t`ixi m`ebv vK t j 5% digvij b Øviv G, tj v tK msi ¶Y Ki tZ nte| G t ¶ t evj wZ tZ i vLv hrte b v, i vL teb tevZ t ev Rv t i mSMni KvR m`ubentj me bgbv, tj v tK M t e l Y v M t i w b t q Av m t Z n t e Ges k b r 3 K i t Y i K v R i i y K i t Z n t e |

gkvi xi GKwU tQvU teo Rvj, A\_er wZb tKvYv Rvj Øviv cKzi i m`e` me aitbi AA tj KxU cZ½ mSMni Rb` Rvj UvbZ nte| cZwU Uvrb hZ aitbi KxUcZ½ Avmte tm, tj v cij w\_b e`vM, tev t ev evj wZ tZ cwb mnKv i i vL tZ nte| tewk t`ixi m`ebv vK t j 5% digvij b Øviv G, tj v tK msi ¶Y Ki tZ nte| G t ¶ t evj wZ tZ i vLv hrte b v, i vL teb tevZ t ev Rv t i

mSMni KvR m`ubentj me bgbv, tj v tK M t e l Y v M t i w b t q Av m t Z n t e Ges k b r 3 K i t Y i K v R i i y K i t Z n t e |

- M t e l Y v M t i b g b v, t j v A v b r i c i \_ v j e v t u t Z t X t j f v j f i t e a b t q g a j v I A v e R Ø v g y K i t Z n t e |
- G i c i t` t L t` t L m`e` m e i K t g i D w M č I K x U, t j v t K A v j v` v \_ v j, I q v P M - v m e v t c w U w t m i v L t Z n t e |
- G i c i e B t q i e Y Ø v I w P t i m t \_ w g v j t q c Z w U D w M č I K x t U i c Ø v w Z e v e r s j v b v t g k b r 3 K i t Z n t e | G i R b` e B t` t L G K e r i D w M č I K x U, t j v t K w P t b t b l q v` i K v i | k b r 3 K i Y t k l n t j L v Z v q w P t G t K c Ø v w Z, t j v i b v g w j t L i v L t e b | G K w U K \_ v g t b i v L t Z n t e c Z w U c Ø v w Z t K k b r 3 K i v i R b` G K w U` w j A Z` š l` u ó` e i k ó` \_ v t K | t m` e i k ó`, t j v w P t b w b t j k b r 3 K i t Y t K v b A m y e a v n t e b v | G f i t e ¶ w Z K i K x U c Z ½ m S M n i K i t y G e s k b r 3 K v i x` e i k ó` w j t L w D U i t K t` w L t q h \_ v m g t q` v` j i w b b |

### cW 6.6 Kֆսօv÷ mvi cՕւշ

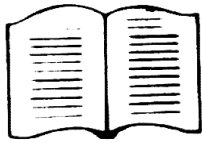


G cW ֆկՆI Avcւb –

■ Kֆսօv÷ mvi ՚Zւi Kiv I Zvi e՛envi AvqZjKiֆZ cvիեb|

#### DcKiY

Rj R DւԴԳ, ֆMvei, Pֆ, KPֆx cvbv, evk/cւBc, ֆKւ՛ւj, UKix, Lo, cւj յ\_b/Qb/ PւUvB|



#### c×ւշ

ւbֆսj յLZ cւiցւY DcKiY, ֆjv mսMձ Kily

1  AvMvQv	1000 ֆKւR
2  ֆMvei	1500 ֆKւR (AvMvQvi ֆ՛o ,Y)
3  Pֆ	2ֆKւR (AvMvQvi 2%)
4  BDւi qv	2 ֆKւR (AvMvQvi 2%)

- DcKiY, ֆjv gvcvi ci gւJi Dci Avjւ՛ւ Avjւ՛ւ ֆիե iւLֆ|
- ֆKւ՛ւj թււ Gici Pֆ I BDւi qv Lֆ ֆij ֆիե յցւKZ Kily Ges GKֆI iւLֆ|
- Gici ֆMvei, AvMvQv I Pֆ BDւi qvi յցկY G յZւU DcKiY mgvb 4 ֆիM ֆւM Kֆi Avjւ՛ւ ֆիե iւLֆ|
- Gici 4 dֆ j ֆ GKւU evֆki ւֆZֆii յMU, ֆjv ֆKֆU cvBֆci gZ Kֆi GK ւ՛ ֆK 4/5 յU յQ՛Kֆi ւbb| A\_ev յcւֆւm cvBc I GKւR e՛envi KiֆZ cvֆi b|
- Gici cֆֆi Avֆk cvֆk mgvb I DԲzRւqMv 5' x 4' x 3' AvKւֆi ev 60 NbdֆJi GKւU MZֆKily|
- MֆZֆ Zjւq cvBֆci gZ ՚Zւi Kiv evkւU ev cvBcւU cֆZ ւ՛b| cvBֆci gvc thb MֆZֆ gֆ nֆZ 1 dֆ Dcֆi ւֆK| G cvBc թււ ւֆZֆii M՛ւm ֆււղ hֆե| Gici cՕւղ ֆMveֆii 4 ֆիֆMi GK ֆւM MֆZֆ Zjւq mgvb Kֆi ււQֆղ ւ՛b| GKB ֆիե ֆMveֆii Dci AvMvQvi 4 ֆիֆMi 1 ֆւM ււQֆղ ւ՛b| AvMvQvi Dcֆi Pֆ-BDւi qv յցկֆYi 4 ֆիֆMi 1 ֆւM ււQֆղ ւ՛b| Avevi ֆMvei ւ՛ղ ՚իYKily| Gֆիե ֆkl chֆ ֆ՛Lֆeb cՆZւU Dci KiY 4ւU ՚ի nֆղQ|

GLb DcKiֆYi cւiցւY Kg ֆւk Kֆi Kֆսօv÷ mvi ՚Zւi Kivi ci cւxֆւ KiֆZ cvֆi b Ges Zv e՛envi K LvZւq ւPՆ mn ֆi KւֆKily Ges mgqgZ Avcbvi յUDUիֆK ֆ՛ւLֆղ ՚իֆji ւbb|



### Povšgji`iqb

#### mswβ I iPbigj-K cĕæ

- 1| tkIjv I džavix DirMĕ i cKviĕF` eYĖv Kily|
- 2| DirMĕ` i cĕqvRbxqZv eivL`v Kily|
- 3| Kx Kx Dcvtq Rj R AvMvQv `gb Kiv hvq Zv eYĖv Kily|
- 4| AvMvQv v̄bqšĕYi Dcvtq eYĖv Kily|
- 5| Kx Kx Dcvtq ¶wZKi KxUcZ½ `gb Kiv hvq Zv vj Lly|
- 6| Kx Kx KviĕY eg nq eYĖv Kily|
- 7| eg tKb ¶wZKi Zv Avtj vPbv Kily |
- 8| eg Kxfiĕe v̄bqšĕY Kiv hvq Zv Avtj vPbv Kily |
- 9| Kxfiĕe Kĕúv÷ mvi `Zwi Kiv nq eYĖv Kily |
- 10| Kxfiĕe cĕzi Kĕúv÷ mvi e`envi KiĕZ nq Zv Avtj vPbv Kily |



### Dĕigjv

#### cW 6.1

- |      |      |      |      |
|------|------|------|------|
| 1  K | 2  L | 3  M | 4  M |
|------|------|------|------|

#### cW 6.2

- |      |      |      |      |
|------|------|------|------|
| 1  L | 2  L | 3  M | 4  M |
|------|------|------|------|

#### cW 6.3

- |      |      |      |      |      |
|------|------|------|------|------|
| 1  K | 2  L | 3  K | 4  M | 5  M |
|------|------|------|------|------|

#### cW 6.4

- |      |      |      |      |      |
|------|------|------|------|------|
| 1  M | 2  L | 3  L | 4  M | 5  L |
|------|------|------|------|------|

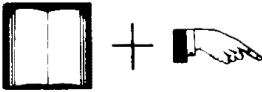


## BDibU 7 grm" Lvgvi cwiKíbv

evsj vt`tki Av\_@mrgwRK Dbqab, µgea@vb RbmsL`vi cwp Pmn`v ci-Y, wecy Rb#Mrôxi  
`wii`^wetgvPb Ges AvZKgnis`vbi mthvM mwpfZ grm" m=ú` , iZcY@fugKv ivLtz cvi |  
c0KwZK Rj vka, tj vtZ AZxfZ grm" m=ut` i c0Pb@Qj weavq grm" Pvlx Ges mvari Y RbMY  
AvaybK chvP`fZ gvQ Pftl i c0qvRbxZv Abyfe Ktiwb | wKŠ µgwmZ RbmsL`v epx i Kvi fY  
gvfQi Pmn`v e`vcK epx tctqtQ | c9všfi gvfi c0KwZK Drcv`b l gvfi c0c`Zv w`b w`b  
KgtQ | Avgvt` i t`tk eZ@vb th cwi gvY gvQ Drcw`Z n`Q Zv c0qvRfbi Zzbrq AcLz |  
gvfi eZ@vb Drcv`b epx KifZ ntj miKwi l temiKwi chf@ grm" Lvgvi `vcb AZxe  
Rijx | Gi Rb` mdj fite grm" Lvgvi cwiKíbv AZ`š , iZcY@ mWK Lvgvi cwiKíbv grm"  
PvlxK FY tctZ mnvqZv Kti | grm" Lvgvi `vcfbi Rb` BfZigta` evsj vt`tk weifbæwYwR`K  
e`isK mnRkZ`FY c0vbi KgnwP MhY KifQ |

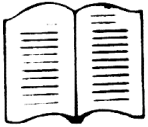
G BDibU grm" Lvgvi cwiKíbv Dfík", AvL`R mnthwMZvi Drmmgñ, Rbej, hšcwZ l  
cwiKíbv Ab`vb` c0veKmgñ, grm" Lvgvfi Avq l e`tqi nmvei 9Y Ges cYi wecyb  
cxwZ m=ut`K@e`wii Z Avtj vPbv Kiv ntqtQ |

### cW 7.1 cwiKíbv Dfík", AvL`R mnthwMZvi Drmmgñ



#### G cW tktl Avcwb-

- grm" Lvgvi `vcfbi l cwiKíbv Dfík" Avtj vPbv KifZ cvi teb |
- Kxfite GKwU grm" Lvgvi cwiKíbv Kiv nq eY@v KifZ cvi teb |
- grm" Lvgvi c0Z0vi Rb` AvL`R mnthwMZvi Drmmgñ Kx Kx Zv Avcwb wbt`R KifZ  
cvi teb |



evsj vt`tki Riviq A\_@wZK Dbqab, Rb#Mrôxi Kgnis`vb Ges `et`wK gvY AR#bi t9fI  
gvQ Pvl wekl fvgKv cij b KifQ | t`tk cte@y9 Rj vka ntZ chvB cwi gvY gvQ Aviny Kiv  
ntZv | weifbæc0KwZK l gby` m9 Kvi fY gv9 Rj vktqi gvfi Drcv`b nm cvl qvq ex  
Rj vktq gvQ Pvl Kivi c0YZv epx cif`Q | GQvov t`tk RbmsL`v epx i AbgvtZ gvfi  
Drcv`b epx bv cvl qvq gvQ Pftl i , iZcY Avtiv teto tMfQ | evsj vt`tk AmsL` cKz, tWvev l  
tQvU Rj vka i tqtQ thLvfb gvQ Pftl i c0z m=tebv i tqtQ |

eZ@vb weifbæwYwR`K e`isKmgñ FY c0vb cxwZ mijxKiY Kti 9z`grm" Pvlx` i mnR  
kZ`Ges FY w0QZv Znvej i Avl Ziq RvgvZ Qvov Z`vi Kx grm" Pvl FY c0vbi KgnwP  
MhY KifQ | ZvQvov eviwR`K wfiE`Z bZb bZb grm" Lvgvi `vcfbi Rb` weifbæ`isK  
c0vj Z KgnwP, tj vtK Avtiv MwZkj Kivi Df`wM MhY KifQ |

#### GKwU Ar`k@grm" Lvgvi `vcfbi Dfík`vejxwb@e

- K) gvfi Drcv`b epx KifZ cKí Gj vKvi gvfi Pmn`v ci-Y Kiv |
- L) Avq l Kgnis`vbi mthvM mwp Kiv |
- M) Dbz grm" Pvl chvP`/Avav wbeo grm" Pvl cxwZ c0qwm KifZ Rj vktq grm" Pftl i  
c0vbi KifZ mnvqZv c0vb |

eviwR`K wfiE`Z bZb  
bZb grm" Lvgvi `vcfbi  
Rb` weifbæ`isK c0vj Z  
KgnwP, tj vtK Avtiv  
MwZkj Kivi Df`wM  
MhY KifQ |



Kul. I cj Dbaqb ǰ

- K) e'emvqK cǒZǒvǰbi bvg
- L) Dnvi ǰfšZK Ae`vi eYǒv
- M) Drcv`Z cY` Ges Zvi gj`gvb ev`i ǰbaǰY
- N) H cǒZǒvǰbi BvZK\_v
- O) e'emvǰqi j ǰ

3/ evRvi MǰelYv Ges cwi Kí bv

- K) mǰe` ǰμZv
- L) evRvi Rixc
- M) evRǰi i ǰe`ǰZ
- N) cǒZǰhMZvi Drmmgǰ
- O) ǰeμq Ges mi ei vn
- P) ǰeÁvcb I MbmsǰhM

4/ cwi Pǰj b

- K) Drcv`ǰbi c×vZ
- L) kǰgK thvMvb
- M) mi ei vnKvi x
- N) cǒqvrBvq hšcvmZ
- O) mǰú` I mǰhM-mǰeav|

5/ cǰvb e`v<sup>3</sup>eM<sup>9</sup>(Key people)

- K) e`e`vcK ev e`e`vcK cwi I`
- L) kǰ`vbKvi x
- M) Avv\_ǰ mrvqZv cǒvbKvi x
- N) evni vMZ ci vǰk<sup>9</sup>vZv ev mǰúthvi Y Kǰx<sup>9</sup>

6/ Avv\_ǰ KǰǰP (Financing programme)

- K) A\_ǰMǰi Kvi Y
- L) j MǰKZ.Aǰ\_ǰ cwi gvY
- M) FY cwi ǰkva cwi Kí bv

7/ A\_ǰvZK cwi Kí bv (Financial plan)

- K) evǰRU
- L) Avǰqi mǰe`Zv I cwi gvY ǰbaǰY

8/ mǰVK KǰǰP

9/ `ǰ<sup>9</sup>Zv Ges SǰK|





**câvb e`ir`eM`**

Lvgvi my`i fite cwi Pj bv Kiv I `b`b Kvhfej x m`Zvte m`uv`b Kivi Rb` th mKj gvbly RwoZ \_vKte Zv`i m`ut`K`e`hwi Z Z` cwi Kí bvg wj uce`x \_vKtZ nte| cãZiU cãvb Rbetj i Rb` GKiu Abt`Q` wj LtZ nte thLvrb Zv`i AwfÁZv, `wqZ; wk`lv, tckvMZ ev e`ir`MZ B`Qv/Avb`Qv cwi ev`ti weei Y Ges Av i Ab`vb` Z` hv Aw`R cãZõrbtK Lvgv`i w`h`y Rbetj i mvg`hvPvB Kitz mnvqK nte|

KZmsL`K Abw`f`A kigK KZw`b ci ci cãqvRb nte Lvgv`ti KivR mgvav Kivi Rb` Zvi I GKiu weei Y \_vKtZ nte|

e`e`vcK, KgPvix Ges kigKtK cã`q Aw`R m`thvM m`y`av l mwe`li eYbv \_vKtZ nte| Kx cwi gvY A`cãZRBtK cãZgv`m Ges eQti cãvb Kiv nte Zv`vbxq g`v`q wj LtZ nte|

hw` ewni t`tK tKvb civgkRtK Wiv nq Zv`tK cã`q At`P cwi gvY l cwi Kí bvg wj uce`x \_vKtZ nte| Aek` m`u`hvi Y wefv`Mi Kgv`v webv cwi kig`tK mrvvh` mn`thvMZv Kti \_v`tKb|

**A`q`b Kg`m`P**

A`q`b Kg`m`P tZ GKRb e`emvq`tK LvZ D`j`L`ceR e`tqi cwi gvY wj uce`x Kitz nte| `te`i `vg l cwi gvY/msL`vi GKiu Zv`j Kv mieivn Kitz nte| `e` muq l Ab`vb` LvZ e`tqi cwi gvY tgvU Li`Pi mvt` thvM Kitz nte| tKvb mgq mvK`z` A`e` muq l m`w`f`m m`y`av eve` LiP Kiv Dv`Z bq| me mgq wKQybM` A`hv`Z ti`L e`q m`uv`b Kitz nte| msi`v`jZ At`P cwi gvY h`v`Zv D`j`L`ceR cwi Kí bvg wj uce`x Kitz nte|

**Aw`R cwi Kí bv**

Lvgv`ti ev`RU we`hwi Z fite Ges cwi`vi fite ev`tevaMg` fite wj LtZ nte| Guv tUvej AvKv`ti wj LtjB tevk my`i Ges eS`tZ mnR nte| hw` m`e` nq weMZ eQi Ges AvMvgx eQti i e`tqi Zv`j Kv msv`jB AvKv`ti wj uce`x Kitz nte| GtZ m`e` j`vf eS`v h`te|

**mweR Kg`m`P Ges câvb KivR**

Lvgvi cwi Pj bv mnR KitzYi Rb` m`e` nj msevrmwi K Kg`m`P/mgq`m`P cãqb Kitz nte| grm` Lvgv`ti câvb câvb Kv`Ri gta` gv`Qi tcvbv muq Ges Lvgv`ti KZKv`thP Rb` mnvqK Ab` tKvb S`k`c`Y`v`K ev Am`y`avi K`v l D`j`L`\_vKtZ nte| mgq`m`P cãqb`bi D`i`k` n`t`Q Aw`R cãZõrbtK eS`v`bv th KvRiU mPvi j`f`c l m`z`wi Kwí Zfite tkl nte|

**`v`v`v` K I S`k`**

G e`emv`tqi `v`v`v` K Ges S`k`mg` cwi Kí bvg Ašif` Kiv ev`gv`bi KivR| Bv`v` weib`tqvMKvix cãZõrbtK Avei l Av`v` Kite th Av`v` GB e`emvU fvj eS`b, Gi m`e` mgm`v m`e`U Av`v` c`e`B AeMZ Av`Qb hvi d`j` mgm`v` j`N`k`i`tYi KivR mnR nte| thgb`grm` Lvgv`ti i `v`v`v` l S`k`c`Y`v`K n`t`Q t

- K) cãKw`ZK `h`h`Mi Kvi`tY gv`Qi v`w`Z
- L) Zv` Qvov l KZ`tjv m`v`v`v` Y S`k` \_v`tK thgb cãZ`thvMZvi nvi cwi eZ`B, mi Kwí b`v`Z l Av`BbKv`bly cwi eZ`B BZ`v`v` |

Lvgvi my`i fite cwi Pj bv Kiv I `b`b Kvhfej x m`Zvte m`uv`b Kivi Rb` th mKj gvbly RwoZ \_vKte Zv`i m`ut`K`e`hwi Z Z` cwi Kí bvg wj uce`x \_vKtZ nte|

A`q`b Kg`m`P tZ GKRb e`emvq`tK LvZ D`j`L`ceR e`tqi cwi gvY wj uce`x Kitz nte| `te`i `vg l cwi gvY/msL`vi GKiu Zv`j Kv mieivn Kitz nte|

Kul. I cj Dbaqb ħ



**Ablyj b (Activity) t aily,** Avciub ūgŷv grm Lvgvi ō bvtg GKul cĶr Pij yĶiĶZ B"QK | D<sup>3</sup> cĶĶi cwiĶi bv c<sup>x</sup>uZ m<sup>u</sup>tĶ<sup>Q</sup>PŠ-v Kily I Zv LivZvq avivennĶfite ij Lly (Ably<sup>Q</sup> 200 kã)|

**Aw\_R mnthwMZvi Drmmgr-**

weirfbaAw\_R cĶZōvb eZŭvĵb grm Lvgvi ĩvcĵbi Rb" Aw\_R mnvqZv cŵvb KĶi ĩvĵK | ũbĵP KĶqKul cĶZōvĵbi bvg t`qv ntjv |

**eisj v`k Kul.e'isK**

Kul.i Ab'iv" kvLvi cĶkvcnk grm Lvgvi cĶZōv/grm PĶĶi Rb" eisj v`k Kul.e'isK FY cŵvb KĶi ĩvĵK | G e'isK ĩfĶgqv`x, gaĶgqv`x I `xNĶgqv`x FY ũĶq ĩvĵK | ĩfĶgqv`x FY ũbĶq gvŪ Pvl Ges gaĶgqv`x ev `xNĶgqv`x FY ũbĶq grm Lvgvi cĶZōv Kiv hvte |

ewYur`K e'isKmgñ I miKvĶi i ũbĶ`Ķk Kul. KvĶR I grm Lvgvi cĶZōvi Rb" FY cŵvb KĶiĶQ |

**ewYur`K e'isK**

ewYur`K e'isKmgñ I miKvĶi i ũbĶ`Ķk Kul. KvĶR I grm Lvgvi cĶZōvi Rb" FY cŵvb KĶiĶQ | G KvĶR mnvqZv Kivi Rb" weirfbaewYur`K e'isK grm ũelĶq `Ŷ I AwfÁ KgRZP ũbĶqvM KĶiĶQb |

**miKvi**

miKvi cĶ`ŶĶfite FY`vb KĶi ĩvĵK | mvaviYZ `ŶŶĶ, eb'v, Liv cĶwZ A\_ŶŵvZK `ŶhĶMi mgq miKvi mi vmi FY cŵvb KĶi ĩvĵK | G FYĶK ZvKivx FY etj |

**eisj v`k RivZiq mgevq e'isK ij t**

Kul.FY mi eivĶni tĶĶĶ GwU , iZcY<sup>Q</sup>fvgKv cij b KĶi ĩvĵK | eZŭvĵb Avgtv`i t`Ķk Kul. FY mi eivnKivx weirfbamgevq cĶZōvb iĶĶĶQ | G mĶj mgevq cĶZōvĵbi gĶa` DĶj ĩthvM` ntjv |

K) eisj v`k RivZiq mgevq e'isK

L) tĶ`Ķq mgevq e'isK

M) cŵ\_ugK mgevq mvgwZ

**mgwšZ cj Dbaqb KgñP**

mgwšZ cj Dbaqb KgñP GĶ`Ķki Kul.FĶYi GK , iZcY<sup>Q</sup>Drñ |

**MĶgY e'isK**

G e'isK Kul.FY mi eivĶn , iZcY<sup>Q</sup>fvgKv cij b KĶi ĩvĵK | t`Ķki cĶ`š- AĶĶi i fvgñvb cij I gñĶj vĶ`i FY cŵvb Kiv ntjv Gi gĶ- DĶĶk |



**Ablyj b (Activity) t aily,** Avciub GKul grm Lvgvi ĩvcĵbi Rb" Aw\_R mnthwMZv PĶĶQb | Gi Rb" Avciub tĶvb tĶvb cĶZōvĵbi ũbKU Kx aiĵbi mnthwMZv PĶBĶeb Zv hv<sup>3</sup> mnKĶi Dc ĩcb Kily |







### cuVvEi gj`vqb 7.1

#### miWK DEti i cuK uK iPy (✓) i b|

- 1/ grm` Lvgvi cwi Ki bv c`vbZ tKb Kiv nq?  
 K□ Znuej mi ei vtn AvMh mupó Kivi Rb`  
 L□ Lvgvi mgfÜ AwfÁZv ARB Kivi Rb`  
 M□ FY cwi tkva mnR Kivi Rb`  
 N□ FY MhY mnR Kivi Rb`
- 2/ tKvbU cwi Ki bri kZ`bq?  
 K□ evRti i Ae`v  
 L□ e`tqi cwi gvY ubafY  
 M□ kigtKi cwi gvY ubYq  
 N□ cKzi i AvMqv `gb
- 3/ tKvbU cwi Pj b KvRi Ašif?  
 K□ Lvgiti i tFvZK Ae`v  
 L□ evRvi Rixc  
 M□ `te`i gj` ubafY  
 N□ Drcv`tbi cxwZ
- 4/ ZvKvfx FY tKvb&cúZôvb c`vb Kti \_vtK?  
 K□ evsj vt`k e`isK  
 L□ mgevq e`isK  
 M□ mi Kvi  
 N□ MgxY e`isK

### cW 7.2 Rbej, hšcwZ I cwiKí bvi Ab`wb` cšveKmgšai meiy



#### G cW tkłl Avicb –

- GKul grm` Lvgvi cKšfi i Rb` KZ aišbi Rbej `iKvi nq Zv Dšj - L KižZ cvižeb|
- weifbrRbetj i cšqvRbxq thvM`Zv Kx Zv vbt` R KižZ cvižeb|
- cKšfi i Kvšri Rb` Kx Kx hšcwZ `iKvi nq Zvi Zvij Kv %Zvi KižZ cvižeb|
- cKšfi `vcb I cwi Pvj bvi cšvb melqmgš Kx Kx Zv e`vL`v KižZ cvižeb|
- cKšfi i Kwi Mui mšve`Zv Kxfiže hvPvB I e`vcbv KižZ nq Zv eYDv KižZ cvižeb|



#### cKšfi i Rb` cšqvRbxq Rbej

grm` Pvl i mdj Zv gvQ I Rj vktqi vbcy e`vcbri Dci vbfšKvj | G Rb` Pvl thvM` gvšQi cšqvRbxq eim`vb mššÜ Rivri Rb` Ges D`Pešx nvi I D`P tetP `vKvi nvi ARšbi Rb` cšqvRbxq Dcv`vb mššÜ e`vcK Ávb I `šZvi cšqvRb ižqšQ| Amig `ah`I gšbvthvM grm` Lvgvši i mdj Zvi Rb` Acvi nvhš cšqvRbxq `šZvi I cškvšYcšš Rbkviš i Afiže AšbK grm` Pvl KgšmP e`Zvq chšmZ nq|

Amig `ah`I gšbvthvM grm` Lvgvši i mdj Zvi Rb` Acvi nvhš

#### gvQ Pvl Rbetj i cšvif`

weifbršfi i Kwi Mui Kgxš melq Avšj vPvri cšeb e`vcbv `šZvi Dci tenk šRvi š`qv evÁbxq| AšbK mgq grm` Pvl `š Kwi Mui i K`v mekl `ižj mšš` mešPbv Kižj I e`vcbri th gE` fvgKv ižqšQ Zv fvev nq bv| `šZvi gta` cv`R` `vKšj I šž`ev epr th šKvb Lvgvi cwi Pvj bvi Rb` e`vcbv `šZvi cšqvRb AvšQ| G aišyi Rbetj i cškvšY `šfiže š`qv thžZ cvši | thgbt th e`vš i gvQ Pvl fij AvšÁZv AvšQ ZvšK e`vcbv melšq cškvšY š`qv thžZ cvši | Ab`v šK hvi fij e`vcbri Ávb I `šZvi ižqšQ ZvšK gvQ Pvl i Dci mšššB cškvšY š`qv thžZ cvši |

gvQ Pvl i Rb` cšqvRbxq Kwi Mui KgšK tUKvbkqvb, gvrme`, šKvb mekl melšq meklÁ thgb dšy tUKšvj vRš, vdk c`v`šj vRš; Lvgvi cšKšKjx Ges grm` Pvl mšššvi Y meklÁ/gvrme` BZ`w` fišM fiM Kiv hvq| gvQ Pvl mniqK Rbetj i cvkvčvik gvQ mecyšbi Rb` Rbej `iKvi nš| thšnZcššZv Lvgvši cššZv mekl melšq meklÁ vbtqvm Kiv A`ššwZKfiže jvšRbK nš bv ZvB Gme melšq mššvi Y šmev e`vi Avktš tbqv thžZ cvši | Žte `šš` šfi grme` I tUKvbkqvb, e`vcbv Rbetj i cvkvčvik vbtqvm Kiv Acvi nvhš GB `šš` šfi i Rbej šK Zvš i vkvšMZ thvM`Zv I cškvšYi Dci vbfš Kš i Avšv`v Kiv nq|

gvrme` Kg cšš mššk-ó melšq MšRšqkb `vKšZ nš| thgb- me.Gm-vm., vdmvišR (Abvmš ev mgvšbi vWvMš) Zvi D`PZI cškvšY `iKvi Kvi Y vZvš gvQ Pvl KgšmPi mKj melšq Z`vi Kx I AskMšY Kš i všKb| vkvšMZ thvM`Zv I cškvšY ZvšK gvQ Pvl i weifbrššš cššvM KižZ Ges gvQ Pvl šKvb mgm`v š`Lv v`šj Zvi mgvšv v`ž mniqZv Kiže| cšqvRšb šKvb meklÁšK šWšK Avšri cšvgk`v`ž cvše| Žte cššvZ vbcy tUKvbkqvb mniqZv ZvšK cššv Drcv`b e`v Pvj jvLšZ nq|

Kul. I cj. Dbqb ž

GKRb tUKubikqv̄tbi cĕtqumK mel̄q mētkl cĕkŕY \_vKž n̄e| tUKubikqv̄tbi cĕkŕY tKvb mētkl mel̄qi Dci n̄ž n̄e| thgb- gvQ Pvl/ŕPsmo Pvl, n̄vPvni cwi Pvj b, Lvevi cĕZKiY, cĕž ēe-vcbv BZ`w̄ |

**cĕtŕi i Rb` cĕqvRbq hšcwmZ**

GKul grm` Lvgvi ēe-vcbv I cwi Pvj bvi Rb` ŕb̄t̄ē hšcwmZ cĕqvRb| thgb -

K) gvQ aivi Rb` Uvbr Rvj , SmK Rvj

L) gvQ ivLv I I Rb Kivi Rb` h\_v̄m̄tg evj wZ, ŕb̄w̄³ |

M) cĕž i cmb̄ž Kx cwi gvY c̄w̄Ub (Plankton) Av̄Q Zv Rvbi Rb` c̄w̄Ub Rvj (c̄w̄YR c̄w̄Ub Rvj I D̄w̄m̄ c̄w̄Ub Rvj)

N) cĕž i cmb̄ž Av̄ žRb /M̄vm mieiv̄t̄ni Rb` Ḡv̄tiUi

O) Av̄ žRb ŕgUvi

P) cmb I gml̄i cixŕv̄KiY KxU (water and soil testing kit)

Q) ŕcKAv̄c, cmbi ŕcGBP ŕgUvi BZ`w̄ | GQ̄vov `iKvi GKul AYcŕY hšj

**cĕtŕi `vc̄tbi cĕvb ŕelqmḡ**

K) grm` Lvgvi ŕbgŕYi Rb` Rv̄g

L) Rv̄g Dbqb/cĕž Lbb/Dbqb cmb ŕeZiY ŕb̄w̄kb b̄vj v BZ`w̄`

M) Ab`vb` AeKv̄v̄t̄gv : Av̄dm Ni/M̄w̄ŕkW , `vg Ni BZ`w̄`

N) Kv̄Uv Zv̄t̄i i teor

O) AMf̄xi bj Kc A\_ev̄ t̄j v-ŕj dU cv̄ú

P) grm` P̄t̄l i hšcwmZ: Rvj , cv̄ú, Ḡv̄tiUi, ŕb̄w̄³, evj wZ, tU²BZ`w̄ |

**cwi Pvj bvi cĕvb ŕelqmḡ**

K) cmb ŕb̄w̄kb

L) P̄b cĕqv̄M

M) cĕž i c̄v̄o I Zj t̄`k tgiv̄gZ

N) K̄t̄úv̄÷/ `Re mvi

O) i v̄m̄qv̄bK mvi : BD̄wi qv, ŕU Gm ŕc, cUvk

P) t̄cv̄v

Q) gv̄t̄Qi Lvevi : `Lj, M̄t̄gi f̄w̄l, Kzv, i UKx gv̄t̄Qi , ov

R) gv̄Qaiv̄ev̄Rvi Rv̄ZKiY

S) JIa/ŕP̄v̄Krmv

T) Rbej

U) Av̄b̄jw̄zK (ŕe`ž. Rvj vbx, ḡt̄bv̄nix `è`w̄`)

**cĕtŕi i KwiMi m̄e`Zv h̄v̄P̄B**

**cĕtŕi i Ḡjv̄Kv ŕP̄v̄ZKiY t Af`šl̄ixY mgZj f̄vgi eb`vḡ th tKvb Ḡjv̄Kvq ŕgVv cmbi grm` Lvgvi `vc̄b Kiv hv̄q|**

gml̄i t̄fšZ , Yv, Y t grm` P̄t̄l i Lvgvi ŕbeŕt̄b t̄v̄Av̄k Ges Ḡw̄j gml̄ DĚg, Gi Drcv`bkj Zv tēk| ŕcU gml̄ Ges tēj gml̄ cwi nvi Kiv D̄v̄PZ| jvj gml̄ Ges ēt̄i`² AĀt̄j i k³ gml̄i cĕž i Drcv`bkj Zv Kg|

ŕgVv cmbi grm` P̄t̄l i Lvgvi ŕbeŕt̄b cmbi D̄rm ŕn̄t̄m̄te t̄j ŕb̄vḡ Ges ŕeŕfb̄m̄el v³ M̄v̄mḡ cmb DĚg|





## cuVvEi gj`vqb 7.2

mW/K DEti i cuK UK vPy (✓) w b|

1/ cKti i Rb` cAvb tKvbWZb ai#bi Rbetj i` i Kvi?

- K) e`e`vcK, gvrme` I tUKubukqvb
- L) e`e`vcK, tUKubukqvb I Avi Z`vi
- M) gvrme`, tUKubukqvb I ubKvi x
- N) gvrme`, Avi Z`vi, tRtj

2/ cuUv Rvj w` tq Kx ai v nq?

- K) gvQi tcvbr
- L) eo gvQ
- M) tcvKv gvKo
- N) AbxTY DvM I cYx

3/ cKt`vc#bi Rb` Kx ai#bi gWU me#Ptq fij?

- K) tetj
- L) jvj
- M) GtWj
- N) b`xi PivAj

4/ 1 (GK) tn±i wU Rj vqvZ#bi Lvgi`vc#b Kx cui gvY Rvgi` i Kvi n#e?

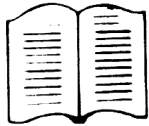
- K) 1.00 tn±i
- L) 1.25 tn±i
- M) 1.50 tn±i
- N) 2.00 tn±i

### cW 7.3 Avq I e`tqi nmmei qY



#### G cW tk`l Avcib -

- nmmei qYi gjbmZ Ztj aiZ cvi`teb|
- w`i e`q I cwi eZBkxj e`q Kx Zv e`vL`v KiZ cvi`teb|
- Kxfvte Avq e`tqi nmmei qY Kiv nq Zv eYBv KiZ cvi`teb|
- ti KW`Kxfvte i vLv nq Zv RvbtZ cvi`teb|



#### nmme i qYi gjbmZ

nmmei qY GKU c`xvZ hvi gva`tg GKRb e`emvqx Zvi e`emv`tqi Avq I e`tqi wevfbae Drmmgr- kbr<sup>3</sup> Kti \_v`Kb| nmmei qY c`lqv Abjxj b mWk ti KW`msi qYi Dci vbfP Kti | mWk ti KW`msi qY Qvov nmmei qYi tKvb hv`ye`vB GKU e`emv`tqi j vFRbKZvi mWk vP` Ztj aiZ cvi`teb| vbfP ti KW`msi qYi Rb` GKRb e`emvqx mKj c`vB `xKvi c`I Rgv Ges Avq I e`tqi LvZqv vj vce`x KiZ nte| GKRb grm` e`emvqx Kxfvte nmmei qY Kiv m`ubaeKite Zv LvB mnR fvte Ztj aiv ntv| GtZ GKRb mvavi Y e`emvqxI e`stZ cvi`te Kxfvte Zvi e`emv`tq A\_`Avmte Ges Kxfvte e`q nte|

nmmei qY GKU c`xvZ  
hvi gva`tg GKRb  
e`emvqx Zvi e`emv`tqi  
Avq I e`tqi wevfbae  
Drmmgr- mbr<sup>3</sup> Kti  
\_v`Kb| |

Drcv`b evx`i mvt\_ thme  
e`q evx` Ges Drcv`b  
nvt`mi dtj thme e`tqi  
nm NtU tm me e`qtK  
cwi eZBkxj e`q etj |

#### w`i e`q I cwi eZBkxj e`q

th mKj Dcv`v`bi LiP Drcv`b evx`i mvt\_ mvt\_ Acv`evZ` \_v`K A\_`ev Drcv`b hvB tnvK bv tkb th mKj Dcv`v`bi LiP Aek`B enb`thvM` ZvB w`i e`q| thgb gvQ KZUKzav ntv Ges wev` Kiv ntv Zvi Dci th e`q vbfP Kti bv ZvB Gt`q`i w`i e`q| c`kz` vbg`v e`q, Rbetj i cwi klgK, c`vB hšc`vZ BZ`w` w`i e`q| Drcv`b evx`i mvt\_ thme e`q evx` Ges Drcv`b nvt`mi dtj thme e`tqi nm NtU tm me e`qtK cwi eZBkxj e`q etj | thgb c`kzi m`ub`K Lv` w`i Drcv`b evote mvt\_ mvt\_ e`q| evote|

#### Drcv`b Avq I e`tqi mgZv`e` Ges AvkU`qZ gjv`dv

w`i I cwi eZBkxj e`q c`j`bi Rb` th cwi gvY gvQ Drcv`b KiZ nq DnvB Drcv`b I e`tqi mgZv`e`y D`vniY`-tjc GKU q`z` grm` Lvgt`i w`i LiP avi 100000 UvKv| Avil gtb Kvi wevfbae`k- IY I Ab`vb` grm` Pvlxi mvt\_ Avjvc Avtj vPbvq Rvbr hvq th gvQ AvniY mgq chš`f`Kvb GKU gvt`Qi Rb` cwi eZBkxj LiP (m`ub`K Lv` I LUKvj xb klgK) nte Dnvi `vtgi kZKiv 40 fM| A\_`v` hvi GKU gvQ 100 UvKv wev` Kiv nq Zvntj Dnvi cwi eZBkxj LiP nte 40 UvKv| hvi D<sup>3</sup> grm` Pvlx 1000U gvQ wev` Kivi Avkv tcvY Kti Zvntj tgvU cwi eZBkxj LiP nte 40000 UvKv|

Drcv`b e`q I Avtqi  
mgZv`e`y` jz wev`qgj`  
= w`i e`q +  
cwi eZBkxj e`q|

Drcv`b e`q I Avtqi mgZv`e`y` jz wev`qgj` = w`i e`q + cwi eZBkxj e`q| GB mgvKiY cwi eZBkxj e`q ntv Drcv`b e`q c`j`Yi Rb` th cwi gvY gvQ c`lqvRb Zvi kZKiv 40 fM| GLb gvQ Pvlx hvi gjv`dv KiZ Pqv Zvntj tem gvQ Drcv`b KiZ nte Ges Drcv` Z gvt`Qi cwi gvY hvi Gi tP`q Kg nq Zvntj Zvi tj vKmvb nte|

#### Avq I e`tqi nmmei qY

GKU tQv grm` Lvgt`i Avq e`tqi nmmei qY c`v`y` xZ vZvU Kjvg \_v`K| me`evtgi Kjvtg Lvgt`i Kvh`ej`x m`ub`v`bi Rb` `e` muq I cwi klgK eve` th cwi gvY A\_`e`q Kiv ntv`q Zv tj Lv nq| tdiZ c`vB gvQ I gj` nm RvBZ Kg AvqI GtZ Aš`f`y`| ga` Kjvg GKU vbr` e`q wefv`Mi Aš`e`Z`v`h`vM`dj t`Lv nq| tKvb vbr` o` mg`q Lvgt`i gRz` gvt`Qi



<b>mvavi Y e`q (UvKvq)</b>		
K) i qYvte qY e`q	2400	
L) m`ú i K Lv` eve` e`q	17400	
M) AePq (gj` nwm)		
e`q (`vj vb)	8000	
N) AePq (gj` nwm)		
e`q (hšcwmZ)	1500	
O) exgv e`q	3200	
P) mvavi Y thvMvb e`q	400	
Q) wevea mvavi Y e`q	200	
<hr/>		
tgU mvavi Y e`q	33100	
<hr/>		
tgU cvi Pj b e`q		53800
<hr/>		
cvi Pj b t`tK Avq		54700
<hr/>		
Ab`vb` Avq		
mý t`tK Avq	700	
<hr/>		
Ab`vb` e`q		
mý eve` e`q	4100	
<hr/>		
wbU Avq		51300
<hr/>		

**Avq I e`q e`všf e`L`v**

GB Avq e`všf i iyntqtQ Lvgti meµj ä Avq t`tK hvi cvi gvY 147000 UvKv | gj` nwm I meµtqvEi tdi Z eve` gj` ev` w`tq DvntK 139000 UvKvq avh`Kiv ntqtQ| eQtii i ištZ Lvgti 12000 UvKvi gvQ gRž wQj | 33000 UvKvi gvQtI tcvbv 500 UvKv Ktg tKvb n`vPwi t`tK µq Kiv ntqtQ| cte`gRž gvQtI gj` 12000 UvKvi mıt\_ bZb µqKZ.gvQtI gj` 32500 UvKv thvM Kvitj eQtii i ištZ 44500 UvKvi gvQ gRž v`tK| eQtii tkł meµtqi Rb` gvQ aivi ci cKž 14000 UvKvi gvQ Aewkó itqtQ| G`ttb Lvgti t`tK 30500 UvKvi (44500-14000) gvQ meµq Kiv ntjv 139000 UvKvq hv ntZ 108500 (139000-30500) UvKvi tgU gbydv AR` nq| meµq e`tqi (20700) mıt\_ mvavi Y e`q 33100 UvKv thvM Kitj tgU cvi Pj b e`q nq 50800 UvKv| tgU gbydv t`tK cvi Pj b e`q ev` w`tj cvi Pj b t`tK (108500-53800) 54700 UvKv Avq nq| mý Avq (700 UvKv) I e`q (4100 UvKv) 54700 UvKvi mıt\_ thvM A\_ev meµqM Kitj H ermtii Rb` wbU Avq 51300 UvKv cvl qv hvq|



**Abloj b (Activity) t aily, Avcbvi GKwU grm` Lvgti AvtQ| D<sup>3</sup> Lvgti i 2 (B) eQtii Avq I e`tqi wmwie Kily (Kiv`wbK)|**

**tiKW`nsi qY**

cłZw` tbi tiKW`ivLv Lvgti i m`ú` i Review`wZvi Rb` Acwi nvh` KtqK wgvU e`q Kti tiKW`ivLv GKwU grm` Pvl e`emv`tqi gj`vq`tbi Rb` cłqvRbxq Z` mi ei v` iaZcY`fvgKv cij b Kti | Lø fij fivte tiKW`ivLštZ ntj GKwU dg`Zwi Kiv` i Kvi | wbtP D`vni Ymıfc Gıfc GKwU dtgP bgyv t`qv ntjv|

**``wbK cvi Pj b e`tqi tiKW` wj j)**

Zwi L	cKž	AvBtUg/	cvi gvY	GKK gj`	tgU e`q
	bs-	Kiv`pıg			







### cvVvEi gj`iqb 7.3

mivK DEti i cvk vUK vPy (✓) v b |

1/ vnmve i qY cxvZi gva`tg GKrb e`emvqx Kx Kti?

- K) Avq I e`tqi vevfbDrmmgR mbv<sup>3</sup> Kti
- L) Avtqi cvv gvY vnmve Kti
- M) vevvZ At`P cvv gvY vnmve Kti
- N) e`emvtqi j vf tj vKmvb vnmve Kti

2/ tKvbe`quU cvv eZbkxj ?

- K) cKz ms`vi
- L) tUvj tdrv
- M) m`u`K Lveri
- N) Avdm ÷vtdi teZb fvZv

3/ GKrb e`emvqx Zvi e`emv ntZ KLb j vf cvte?

- K) Drcv`b Avq I e`tqi mgZv vev`jZ Aev`Z gtj` vevq Kitj
- L) Drcv`b Avq I e`tqi mgZv vev`jZ Aev`Z gtj`i tPtq tevk gtj` vevq Kitj
- M) mgZv vev`jZ Aev`Z gtj`i tPtq Kg`vtg vevv Kitj
- N) vevq gj` cvv eZbkxj LiP I v`i Li tPi mgvb ntj

4/ tKvbuU v`i e`q?

- K) gvQtI Lv`Zvvi e`q
- L) cKz vbgvP e`q
- M) gvQ evRvi RivZKi tYi e`q
- N) tQvU tQvU hšcvZ vq





3/ ģ kvkj KiY (Price living)

neifbægvQ neifbæġtg neġu Kiv hvġZ GŪv eſiv hvq th GB ġtgġ cv\_ġK" cġY"i ġ Yv\_ġYi cv\_ġR" @úo nq| hLb tKvb gvQ Pvlx neifbæcġRmZi gvQ Drcv`b Kġi ZLb tgvU neġuġi cwiġvY evovġbvi Rb" tm tKvb šbiv`Ŧ gvQġK GKšU šbiv`Ŧ ġ Yv\_ġ Y ġkYġZ AſfŦ Kite| GKb ġtg me ġkYxi gvQ neġuġi Kiġj hLb tKvb tġZvi cQġ`i gvQšU neġuġi nġq hvq ZLb tm AZšbġZ tfvġM| th gvġQi Pmġv`v teġk tm gvQ teġk ġtg neġuġi nġq vi thvM`| neifbægvQ neifbæġtg neġuġi Kiġj tġZvġ`i eſġZ nġe th šbiv`Ŧ cwiġvY Aġ\_P neġbġġq Zvi v tKvb gvQ cvġ qvi thvM`|

th gvġQi Pmġv`v teġk tm gvQ teġk ġtg neġuġi nġq vi thvM`|

th šZbšU cġšZġZ gvġQi ġvg šbafġY Kiv nq Zv šbġæcŦ Ē nġj v t

1/ LiP thvM ġvg šbafġY

$$\text{ġvg} = \frac{\text{tgvU šv`i e`q} + \text{tgvU cwi eZġkj e`q} + \text{AšfšġB e`q}}{\text{cġY"i BDšbU}}$$

GB cġšZġZ ġvg šbafġY Kiv mnR šKſ' ZvġZ tġZvġ`i Pmġv`vi e`vcvġU cġZdġj Z nq bv| gvQ Pvlx hv` šbġR evRvi ġK šbġſġY KiġZ cvġi ZLb GB cġšZ Aġyri Y Kiv thġZ cvġi |

2/ ġj" eġġ neġeġPZ ġvg šbafġY

$$\text{ġvg} = \frac{\text{tgvU Drcv`b e`q}}{(100 - \text{ġj" eġġ} \%)} \times 100$$

hLb tKvb Pvlx tKvb gvQ neġuġi Kġi šbiv`Ŧ cwiġvY ġbġdv tġZ Pġq ZLb G cġšZ Aġyri Y Kiv nq|

3/ Pmġv`v-neġqM ġvg šbafġY

mġeġP Drcv`b e`q = [ (ġj" × gvġQi mſL`v) - AšKššġZ ġbġdv ]  
G ġK ġvg eġġi nvi mġġ cġKvk Kiv hvq|

$$\text{mġeġP e`emġq (Merchandise) e`q} = \text{ġvg} \times [(100 - \text{ġvg eġġ} \%)/100]$$

GKRb gvQ Pvlx Zvi Drcv`Z gvġQi Kx ġvg cvġe ZvġK KvġR j vMġbv nġQB GB cġšZi mġeġRbK šK| thġb tKvb Pvlx GK ġKšR I Rġbi 2000 gvQ Drcv`ġbi Aškv ivġL Ges eZġġb evRġi cġZ tKšR gvġQi ġvg 100 švKv| Pvlx Zvi G mg`ġgvQ neġuġi nġZ 50000 švKv ġbġdv tġZ Pġq| mġZivſ Zvi mġeġPP Drcv`b e`q nġe 150000 švKv [(2000 × 100) - 50000] švKv| hv` Drcv`b e`q eġġ cvq Zvġġj ġm eġġ cġB Ask gvQ Pvlxi ġbġdv t\_ġK ev` hvġe|

**weZiY (Distribution)**

weZiYi c0qvRbxqZv wbfP Kti grm` Lvgv`ii AvKvi, evRv`ii c0c`Zv Ges H me evRv`i gvQ tcvRv`bvi Rb` cwi enb e`e`vi c0Z`Zv BZ`w`i Dci | weZiY nt`Q LgB c0vKwUK`ij e`e`v hvi Dci wbfP Kti GKwLvgv`ii AvKvi | hw` Drcw`Z gvQ`i evRvi bv`\_vtK Zvntj nvrvi nvrvi gvQ Drcv`b tevKvgx nte|

gvQ Pvlx hw` wbfRB weZiYi `wqZ; M0Y Kti Zvntj ZvtK wbfw`LZ w`lq`\_tjv wetePbvq ivL`Z nte

- 1) Zvi wK Drcw`Z cY` mieiv`ni Rb` c0qvRbxq `qZv I e`e`v AvtQ?
- 2) Zvi wK c0qvRbxq hibeivnb mtqi Rb` AwZwi 3 At`P msKjv`b AvtQ?
- 3) Zvi wK GB bZb I AwZwi 3 KvRi Rb` chfB mgq nte? A\_ev Zvi wK tKvb e`w`3tK G KvRi Rb` wbtqvM `v`bi c0qvRbxq A\_ AvtQ?
- 4) Zvi GjvKvq wK Pw`3 wfiE`Z tbqv`i Rb` cwi enb e`e`v AvtQ?

weCYb wgtYi mefkl w`lq nt`Q cY`|

GKRb cwi ktgx gvQ Pvlx Zvi ktgx w`tq Ggb`\_Yv`\_Y m`ubv`gvQ Drcv`b Kite hv weCY`bi Ab`vb` KvR`K mnR Kti t`te|

**cY` (Product)**

weCYb wgtYi mefkl w`lq nt`Q cY`| gvQ Drcv`bi Rb` th w`wqv` k`jx, e`e`v`vcbv I cwi Phf K`\_v evj nq Zvi D`i`k` n`jv Ggb gvQ Drcv`b Kiv hv mn`RB wew`w Kiv hvq| GKRb cwi ktgx gvQ Pvlx Zvi ktgx w`tq Ggb`\_Yv`\_Y m`ubv`gvQ Drcv`b Kite hv weCY`bi Ab`vb` KvR`K mnR Kti t`te| Drcw`Z gvQ f`ij bv` ntj evRv`i w`tK`\_vK`Z LgB K0 Ki`Z nq|

**evRv`RvZKiYi aic**

gvQ`i ev Ab` th tKvb cY`i weCYb wZv`w av`c m`ubv`wq | thgb`

- 1) evRv`i Abv`lek Ges c`fve w`li t Afv`vbxq `vg w`baf`Y, weZib Ges Dbw`z ea`fbi gva`tg wew`w evov`bv|
- 2) evRv`i c`hvi t bZb bZb evRv`i bZb bZb e`eniv`i m`jwM KvR`j w`mtq wew`w cwi gvY evov`bv|
- 3) cY`i Dbq`b t GKwLvgv`Y cY`i mvt`\_ mvt`\_ bZb bZb cRw`Zi/Rv`Zi gvQ Drcv`b|

**weCYb eLwM (Marketing tips)**

1) cY`i m`vavi Y Pw`n`v evx`i Rb` c0`tg tbZ`E`i`tk`Yxi e`w`3i g`bv`thwM AvKl`P Ki`Z nte| G ait`bi e`w`3 nteb Zviv hv`i mvgw`RK gh`v, c`fve c0Z`c`w`E I mvgw`RK tKvb e`v`v`v`i teik Avb`\_vtK|

2) t`wZviv me mgq th w`Pt`Yi (e`v`v`U`i) cY` teik w`K`b I teik c0` Kti Dnvi`\_Yv`\_Y A`q`b`v`i`L mieiv`n Ki`Z nte| me mgq tKvb mtqi c0Z` t`wZvi S`wK Kgvt`bi Rb` t`Pov Ki`Z nte|

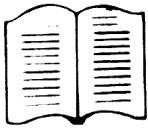
i`aycwi`ent`bi Rb` c`v`Kw`Rs bv` Kti Dnvt`K weAv`c`bi gva`g w`n`m`v`te`l e`eniv`i Kiv th`Z c`v`i |

3) c`v`Kw`Rs (Pakaging)t c`v`Kw`Rs hw` Kiv nq Zvntj Dnvi e`eniv`i evov`Z nte| i`aycwi`ent`bi Rb` c`v`Kw`Rs bv` Kti Dnvt`K weAv`c`bi gva`g w`n`m`v`te`l e`eniv`i Kiv th`Z c`v`i | evRv`i`K wev`f`b`e`A`st`k we`f`3 Kivi Rb`I c`v`Kw`Rs KvR`j w`mt`bv th`Z c`v`i | thgb`- tKvb c`v`K`t`U GKwLvgv`Q (GK e`w`3 m`vBR) ev` tKvb c`v`K`t`U GKw`a`K gvQ (d`w`w`ij m`vBR) BZ`w` |

Kul.1 cju Dbqb 7z

4) weZiY t hwi weZiY I weptqi mgi'v nq Zvntj cvBKvix wepmZvi mrvh" tbqv thtZ  
cvti | cvBKvix wepmZvii weptqi 7zvi Kgr<sup>o</sup>intmte KvR Kti wecytb mrvqZv Kti \_vtK/  
cvBKvix wepmZvii teik cwi gvtY gvQ wKbte ZvB GKmvt\_B gvQ aiv thtZ cvti | cvBKvix  
wepmZvii mrviiYZ evKvtZ cY" mq Kti Ges ctY'i Pwi, t=vti R ev bo ntq hvl qvi 7wZi  
Suk wbtq \_vtK |

5) cwi klgK c0vtbi e'vcvti bZb wKQyPŠi fvebr Kiv thtZ cvti | thgb wepmi Dci  
Kgr<sup>o</sup>K Kvgkb w' tj tKvb Kgr<sup>o</sup>teik Drmvtñ KvR Kite |



**miigg<sup>o</sup>** gvbj/i Pwi'v I Afitei mššno wbaftiYi Rb" weibgg c0uqvi gva'tg cwi Pwi Z  
mKj gvbexq KvhfvgtK wecyb ejv nq | GKwU grm" Lvgti i mdj Zv Lvgti Drcw" Z gvtQi  
h\_vh\_ evRvi RvZKiYi Dci wbf<sup>o</sup>kij | h\_vh\_ evRvi RvZ KiYi Rb" evRvti Abgdek I  
cfve we'li, evRvi c0vi I ctY'i Dbqb BZ"wi avcmgr-Abjii Y Kiv Avek"K |



### cvVvEi gj`iqb 7.4

mWk DEti i cvk Wk Py (✓)w b|

1/ grm` evRvi RvZKiY ej tZ Kx eSvq?

- K) gvQ weμq Kiv
- L) weibgq cμqvri Rb` cwi Pwjj Z mKj gvbeiq KvhPig
- M) gvQ μq Kiv
- N) gvQ cμqvRvZKiY

2/ evRvti cv`R`MZ mjev Av`vqi Rb` tKvWU mrvqK bq?

- K) D`P weμq gj`
- L) D`P , Yv, Y m`ubagvQ
- M) weifbæZvRv gvQ
- N) Dbæzi mieivn

3/ wecYb wgvkY ej tZ Kx eSvq?

- K) KtqKwU evRvti i mgvrv
- L) KtqKwU cY`i wgvkY
- M) KtqKwU KvhPitgi wgvkY
- N) KtqKwU Lvgti mgvrv

4. `vg kv<sup>3</sup>kij xKiY ej tZ Kx eSvq?

- K) `vg ewxKiY
- L) `vg nwmKiY
- M) Kvgkb c`vb
- N) weifbagvQ weifbæ`vfg weμKiY



e'enwiK

cW 7.5 ɪbR nɪʒ tɔW AvKɪi i Lugvi ɪbgɔ cwi Kɪ bɪ

GKɪW tɔW AvKɪi i Lugvi ɪbgɔ cwi Kɪ bɪ cɔɪZ chɔμtg ɪbɪP t̃ qv nɪj v



1/ cKɪi eYɔ

- K) cKɪi ɪkɪɪbvg
- L) cKɪi tʃɪZK Aẽri eYɔ
- M) Drcw`Z cY` I Zvi `vg ɪbaʃ Y
- N) cKɪi BɪZnm
- O) cKɪi Dɪk` I j ʃ

2/ evRvi MɪeLY I cwi Kɪ bɪ

- K) mɔe` tμZv
- L) evRvi Riɔ
- M) evRɪi i AvKri
- N) cɔZɪhMZv
- O) ɪeμq I ɪeZiY
- P) ɪeÁvcY I RbmsɪhM

3/ cwi Pɪj b

- K) Drcv`ɪbi cɔɪZ
- L) kɪgK tɪhMɪb
- M) mi eivnKriɔ
- N) hʃcWZ
- O) mɔú` I mɪhM mɪeav

4/ gɪ` Rbej

- K) e`e`ɪcK
- L) kɪg` ɪbKriɔ
- M) cwi kɪgK/ɪeZb fɪZw`
- N) mɔúhri Y Kgr®

5/ Av`R KgrM

- K) A\_`e`ɪqi KriY
- L) Aɪ\_`P cwi gvY
- M) cwi ɪkva cwi Kɪ bɪ

- 6/ A\_ %wZK cwi Kí bñ  
K) ev#RU ei v`i  
L) AbggZ Avq
- 7/ mmeR KgnmP I c`avb c`avb KvhPig
- 8/ `gPZv I Sdk
- 9/ Z\_`wb`R



**Ppivšgji`iqb**

**msm`B I iPbvgj-K c`kæ**

- 1/ grm` Lvgvi tKb `vcb Kiv nq Zv e`vL`v Ki ly|
- 2/ grm` Lvgvi cwi Kí bñi D`Í`k` Kx Zv wj Lly|
- 3/ Kxfvte grm` Lvgvi cwi Kí bñ Ki teb Zv eY`v Ki ly?
- 4/ evsj v`k grm` Lvgvi `vctbi Rb` tKvb&tKvb&Avw`R c`Z`vib FY c`vib K`i `v`K Zv`i biv wj Lly|
- 5/ grm` Lvgvi `vctbi Rb` c`q`vRbxq Rbetj i thvM`Zv I AvfÁZv wj Lly|
- 6/ grm` Lvgvi c`k`í i Rb` `i Kwi hšçwZi Zv wj Kv `b |
- 7/ GKwU grm` Lvgvi `vcb I cwi Pvj bñi c`avb w`l qmg`ni biv wj Lly|
- 8/ c`k`í i Kwi Mwi m`v`eZv Kxfvte hvPvB Ki teb Avtj vPbv Ki ly |
- 9/ w`mvei `q`Yi msÁv `b | tKb w`mvei `q`Y Kiv nq?
- 10/ w`i e`q I cwi eZ`kxj e`q ej tZ Kx eSvq D`vni Ymn wj Lly|
- 11/ GKwU grm` Lvgv`i Avq I e`tqi w`mvei `q`Y Kxfvte m`v`b`Kiv nq D`vni Ymn wj Lly|
- 12/ evRvi RvZKiY ev w`ecY`bi msÁv `b |
- 13/ cv`R`MZ m`v`ar ej tZ Kx eSvq? Kxfvte Avc`v cv`R`MZ m`v`ar tctZ c`vib Avtj vPbv Ki ly |
- 14/ w`ecYb w`gkY ej tZ Kx eSvq? w`ecYb w`gk`Yi Dcv`vb` t`jv mst`q`c Avtj vPbv Ki ly |
- 15/ `vg w`baf`Yi c`xwZ` t`jv w`K w`K Zv eY`v Ki ly |



**D`Eigjv**

**cvW 7.1**

- 1/ K                      2/ N                      3/ N                      4/ M

*Kul. I cjb Dbqb 7*

**cW 7.2**

1/ K            2/ N            3/ M            4/ L

**cW 7.3**

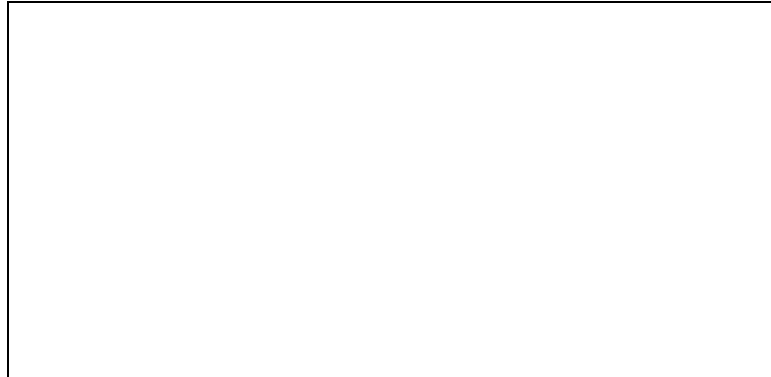
1/ K            2/ M            3/ L            4/ L

**cW 7.4**

1/ L            2/ K            3/ M            4/ N



- G gvQ cġq meai tbi cġKwZK Lv` MhY Kti Zte 9jz`Rj R Dv`G Gt` i ucġ Lv`
- 6 (Qq) gvfm GKwU i vRcW 100 t`tK 150 Mġg I Rb nq Ges evRvi RvZ Kivi Dc`thvMx nq|



uPĪ 64 t i vRcW

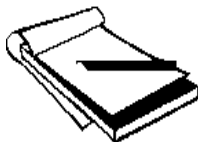
**cġz ubePb I cġwZ**

tQvU eo th tKvb AvKvtii cġzi G gvQ Pvl Kiv hvq| Zte 10 kZvsk t`tK 1 GKi AvKvtii cġz nj fij nq| cġzi Mfxi Zv 1.5 t`tK 2 uqUvi nI qv DvPZ| tgSmgx Ges evrmwi K G`ġai tbi cġzi B i vRcW Pvl Kiv hvq|

cġz i wKtq wKsev i Kvtbv m`e bv nj cġz kZvstK 30 tm.ug. Mfxi Zvi Rb` 30/35 Mġg tivUbb cġqvm Kti i vġtm Ges AewwAZ gvQ I tcvKv gvKo wbab KitZ nq| h\_viwZ cġzi cġtoi wKsev cwb i wFZtii AvMvQv cwi`vi KitZ nq| cġzi cwb tmP tdjvi ev gvQ gvivi JIa t`qvi ciciB cġz kZvstK GK tKwR nvti Pz GKwU cvTĪ i gta` Af cwb tZ ,tj mg`cġzi wQwUtq w`tZ nq| Pz t`qvi mvZw`b ci cġz kZvstK 5-7 tKwR tMvei ev 3-4 tKwR gzuMi weov, 100-150 Mġg BDwi qv, 50-75 Mġg wJ.Gm.wc Ges 20-25 Mġg Gg.wc. cwb tZ ,tj cġzi wQwUtq w`tZ nte| i Ktbr cġzi mvi t`qvi ci ciB cwb mieivn KitZ nte|

**tcvbr gRz**

me`vB cġzi eo AvKvtii tcvbr gRz Kiv DEg| cġzi gRz i Rb` 5-7 tm.ug. AvKvtii tcvbr ubePb Kiv fij | cġz kZvstK 70-80wU nvti tcvbr gRz Kiv hvq|



**Ablyj b (Activity) t aly, Avcbri 20 kZvstki GKwU cġz AvtQ| H cġzuUtZ Avcb i vRcW Pvl Kivi K\_v fvefQb| tm tġtĪ Avcb H cġzi tivUbb, Pz, `Re I i vmiqwbK mvti i tKvbwU Kx cwi gvY tKvbc`wZtZ cġqvm Kit`eb Ges KZ ,tj v gvQ Qvoteb Zv wj wce`x Kily|**

**cwi Ph**

**m`u`i-K Lv` e`envi**

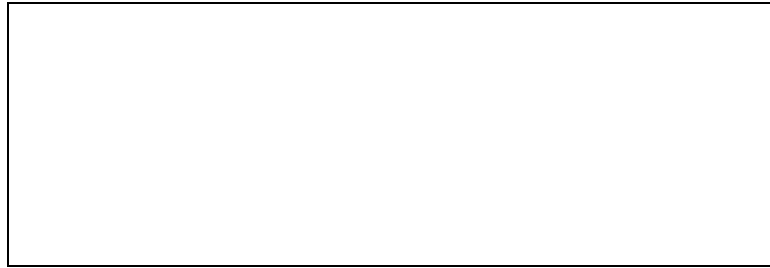
cġzi tcvbr gRz i cwi`b t`tK cZ`n gRz gvQ i I Rtbi 4-6 fivM nvti w`tb 2 evi Lvevi w`tZ nq| m`u`i-K Lv` wntmte` i ayPvDġj i Kev i Kbr Ae`vq cġzi wQwUtq w`tZ nte| cġz

i vRcW AvZ 9jz`Dv`G RvZxq Lvevi teik cQ` Kti |

gvQ i Pvl I e`e`vcbv



- G gvtQi Kuġg cRbb Kiv tek mnR | wZb gvtmi gta` evRvi RvZ Kiv hvq |



uPġ 65 t AvndKvb gv, i

**ckġi ubePb I cŰwZ**

th tKvb AvqZtbi ckġi G gvQ Pvl Kiv hvq | Zte tQvU AvKvtii ckġi G gvtQi Pvl mnR | 5 kZvsk t\_ġK 50 kZvsk AvKvtii ckġi ntj fvj nq | ckġi MfxiZv 1.5 ugUvi ntj metPtq fvj | tmġPi gva`tg ckġi i`wKtq tdj tZ nte | ckġi iKvġbv m`e bv ntj 30 tm.ug. MfxiZvq cŰZ kZvstġk 30-35 Mġg tivtUbb cŰqvm Kiġj ckġi i AemĶZ gvQ I Rj R cŰYx aġsm nte | Gi ci kZvsk cŰZ 1 tKwR nrti Pġ cŰqvm KiġZ nte | Pġ cŰqvtMi mivw b cti cŰZ kZvstġk 5-7 tKwR tMvei ev gġmMi weŃv mvi ckġi wQvUtg w`tZ nq | iKbv ckġi mvi cŰqvtMi ci ciB cmb mieivn KiġZ nte | Gfite mvi cŰqvtMi 5-6 w`b ci tcvbv gRġ KiġZ nte |

**tcvbv gRġ**

5-6 tm.ug. AvKvtii tcvbv ckġi gRġ KiġZ nq | AvKvtii ZviZg` ntj eo AvKvtii tcvbv, tjv tQvU AvKvtii tcvbv tLtg tdj tZ cvti | mavi Y e`e`vcbvq cŰZ kZvstġk 100-125 wU AvndKvb gv, ġii tcvbv gRġ Kiv hvq | Zte e`e`vcbvi mġeav ewx Kti tcvbv gRġZi nvi evovtġv thġZ cvti |

mavi Y e`e`vcbvq cŰZ kZvstġk 100-125 wU AvndKvb gv, ġii tcvbv gRġ Kiv hvq |

**cvi PhP**

**m`uġi-K Lv`**

m`uġi-K Lv` gv, ġii Rb` Acwi nvhP tcvbv gRġZi ciw`b t\_ġKB ckġi m`uġi-K Lv` cŰqvm KiġZ nte | Lv` ASZ 36-40% cŰYR Lv` \_vKv cŰqvRb | G Avngl KmivBLvbn t\_ġK mSMġnZ Mew` ci-cvLi i<sup>3</sup> I bmo-fmo, kvġġ, wSbġ BZ`w` t\_ġK cvlqv thġZ cvti | m`uġiZ KtqKwU temiKwi cŰZŃvb mġg m`uġi-K Lv` `Zwi KiġQ | Zte mviwY-1 Abġyqx wevfbaDcv`vbmġr GKĶ Kti m`uġi-K Lv` `Zwi Kiv hvq |

mviwY 1 t m`uġi-K Lv` `Zwi i wevfbaDcv`vġbi wġkġYi nvi |

Dcv`vġbi big	wġkġYi nvi
Mew` ci-cvLi i <sup>3</sup> I cŰYR Avngl	40%
Mġgi fvl	20%
Pvġj i Kġv	15%
wZj / mvi lvi `Lj	25%

10 ր՝ b ci ci Rvj  
tUtԹ ԽKQygvQ aԹi  
ZvԹ i IRԹbi Mo tei  
KԹi LvԹ i cwi gvY  
Խbi ԳY KiԹZ nԹe|



gvQ Qrovi c՛՛gր ԹK Թ Թni IRԹbi 8-10% nԹi Lvevi Թ Թv i i yKiԹZ nԹe Ges gvQ eo  
nI qvi mԹ Թ mԹ Թ LvevԹi i cwi gvY AvbԳvԽZK nԹi KugԹq Խ ԹZ nԹe (3-4%)| 10 ր՝ b ci ci  
Rvj tUtԹ ԽKQygvQ aԹi ZvԹ i IRԹbi Mo tei KԹi LvԹ i cwi gvY Խbi ԳY KiԹZ nԹe|  
ԽԽK mԹ Թ ԹK LvԹ i AԹaR ԽeԹKԹj c՛՛qԽM KiԹZ nԹe| Lvevi GK RvqMvq br Խ Թq GKԽaK  
RvqMvq Խ ԹZ nԹe| hԹԹZ me gvQ H Lvevi ԹLԹZ cԹi |

**AbԳj b (Activity) t aԿ,** Avcbvi GKԽU cԹԹ AvԹQ hvi AvԳZb 30 kZisk, GԹZ AvԽb  
AԽԽKԽb gv Թi i 5 ԹԽԽUgUvi AvKԹi i 3000 ԹcԽbr ԹQԹԹQb| H cԹԹi 10 ԹKԽR mԹ Թ ԹK  
LvԹ i c՛՛qԽRb nԹj Mew Թi cԽLi i 3 I cԽYR Avngl, MԹgi ԹԽ, PԹԹi KԽv,  
ԽZj /mԽi lvi ԹԹj ԽgԽKZ KԹi mԹ Թ ԹK LvԹ i ԽԽi KiԹZ ԹKԽԽU Kx cwi gvY ԽgԽԹZ nԹe Zvi  
GKԽU mԽi ԽY ԽԽi KiԹj|

**gvԹi Թ Թ cԽԹԽKiY**

c՛՛Z mԽԹn GԿevi Rvj tUtԹ gvԹi Թ Թ cԽԹԽ KiԹZ nq| th ԹKԽb aԹԹi Թi ԽM evj vԽ Թ Lv  
Խ Թj Zvi c՛՛ZKԹi i e Թ v KiԹZ nԹe|

**Ab Թ cԽi PhԹ**

AԽԽKԽb gv Թi i gvQ Թ eaԹԽj | G cԹԽZi gvQ LvԹ ԽԹq ԽԹRԹ i ԳԹa c՛՛ZԹԽԽZv KԹi |  
ԹԹj AԹ Խ ԹԹi e ԹaԹԹb GԹ i AvKԹi Zvi ZԳ nԹZ cԹi | cԹԹi gvQ Lvevi LvԹ Q ԽK br Zvi  
c՛՛Z ԽԹ i vLԹZ nԹe| GRb Թ Lvevi GKԽU cԹԹi ԳԹa mԽei Խn KiԹZ nԹe| PԽi cԽR NԽUv ci  
cԹԹԽU ZԹj Թ LԹZ nԹe| hԽ cԹԹi ԹKԽb LvԹ RԳv ԽԹK ZԹe LvevԹi i cwi gvY KugԹq Խ ԹZ  
nԹe| G gvQ tek k 3 cԹԽZi | Z Խc Խeifc cԽi ԹeԹk GԹ i ԹUԹԹv, ԹԹKԽԽ, ԹZ Թi ԽM  
BZ Խ Թi ԹMi c՛՛ ԳԹe NUԹZ cԹi | ZvB cԹԹi memԳq cԽi Թvi cԽi ԹԹaԹ vLԹZ nԹe|

AԽԽKԽb gv Թi i vԹԹԽ  
Թ ԹԹei | ZvB G gvQ ex  
Rj vԽq e ԽZ ԹKԽԽԹԳ  
ԳԹ Rj vԽԹq PԽl Kiv ev  
AegԹ Kiv DԽPZ nԹe  
br|

**mZKԹv**

G cԹԽZi gvQ Թ Թk bZԽ Avbr nԹԹԹQ| mԹZiv Թ Թk cԹԽZi Dci Gi Kx cԹԽe cԹe Zvi  
cԽԹԽv Խbi ԹԽv GLbl mԹ Թ ԹcԽԽb| ZvQrov gvQԽU i vԹԹԽ Թ ԹԹei | ZvB G gvQ ex Rj vԽq  
e ԽZ ԹKԽԽԹԳ ԳԹ Rj vԽԹq PԽl Kiv ev AegԹ Kiv DԽPZ nԹe br| G e ԹcԹi grm  
PԽl Թ Թk Aek Թ mRԽM vKԹZ nԹe|

**gvQ AniY**

mԽvi YZ 100-120 Խ ԹԹi PԹl c՛՛ZԽU gvԹi Mo IRb c՛՛q 300-500 M՛g nԹZ cԹi | ZԹe  
60-70 Խ Թ b ci Թ ԹK c՛՛Z mԽԹn gvԹi IRb 300 M՛g Gi ԹeԽ nԹj ԹԽ Թj v ԽeԽԽ KԹi  
Թ ԹvԽ Թj | teo Rvj tUtԹ G gvQ aiv hԹq| ZԹe c՛՛Zevi cԽb i ԽKԹq mԹ Թ ԹgvQ aԹi ԽԹZ  
nԹe| GK ԽeNv cԹԹi e ԽYԹ c Խ ԽZԹZ PԽl KiԹj c՛՛Zevi PԹl (3-4 gvԹm) c՛՛q 800-1000  
ԹKԽR gvQ DrcԽ Z nԹZ cԹi | ZԹe e Թ ԹcԽbr mԽeav DbԹ Kiv nԹj DrcԽ b AvԹiv eԽ Kiv  
mԹe|

**ԹZj ԽcԽv PԽl**

ԹZj ԽcԽv ԽeԹ k Թ ԹK AvԳ ԽbKZ.GKԽU Թ Թ ԽԽbi gvQ| gvQԽU 1970 mԹj vԽj v՛U Թ ԹK  
GԹ Թk Avbr nԹԹԹQ| eԽj Թ Թki Avenl qԻq ԹQvU ԹԽvev ev cԹԹi ԹZj ԽcԽv PԽl Kiv mԹe|

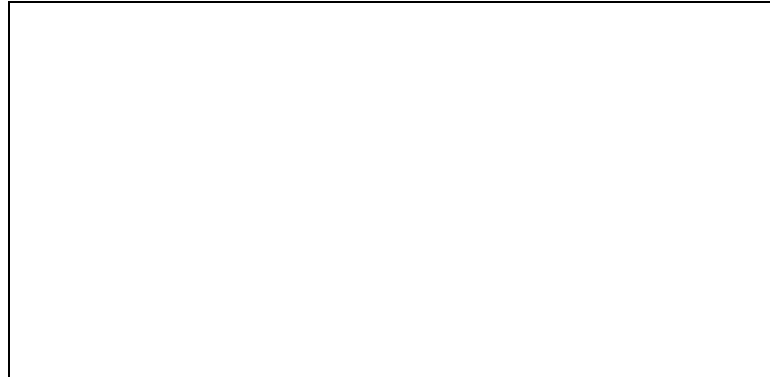
**ԹZj ԽcԽv PԹl i mԽeav**

- ԹZj ԽcԽv tek k 3 MoԹbi gvQ|
- GԽU AԽaK dj bԽj I mԽԹ y

ԹZj ԽcԽv ԽeԹ k Թ ԹK  
AvԳ ԽbKZ.GKԽU Թ Թ y  
ԽԽbi gvQ| gvQԽU 1970  
mԹj vԽj v՛U Թ ԹK  
GԹ Թk Avbr nԹԹԹQ|  
eԽj Թ Թki Avenl qԻq  
ԹQvU ԹԽvev ev cԹԹi  
ԹZj ԽcԽv PԽl Kiv



- Zj bvgj-Kfite Aí mgta `f e`ta mntRB AnaK cwi gvtY G gvQ Pvl Kiv hvq|



uPÍ 66 t tZj mcqv

**ckz bepb I cÜwZ**

th tKvb AvqZtbi ckzi G gvQ Pvl Kiv hvq| Zte ckzi i AvqZb 10-20 kZvsk ntj fij nq| G gvQ Pvl i Rb` ckzi i Mfxi Zv t`o ugUvi ntj fij nq| tZj mcqv 3-4 gvtmi gta` evRvi RvZ Kiv hvq| ZvB G gvQ Pvl i Rb` 5 gym cwb \_vtK Ggb ckz bepb Kiv DvPZ|

tmtpi gva`tg ckz i iKtq ivfzm gvQ mvi tq tdj tZ nte| Zte i Kvfbv mæe bv ntj Rvj tUtb mivtZ nte| cÜZ kZvstk 30 tm.ug. cwb tZ 30-35 Mlg nvti tivUbb cÜqvm Kij mKj gvQ, Rj R cÜx aYsm nte| ivfzm gvQ mivtbi ci cÜZ kZvstk GK tKvR nvti Pz cÜqvm Kitz nte| cv\_tj Pz (Kwl. Pz CaCO<sub>3</sub>) cwb tZ , tj ckzi uQuUtg w tZ nte| Pzbi gvTiv gvUj , Yv, tYi I ci wfvE Kti Kg tewk ntZ cvti |

Pz ctqvMti GK mBvn cti `Re A%Re mvi cÜqvm Kitz nte| cÜZ kZvstk 3-4 tKvR nvti tMvei mvi, BDwiqv 35 Mlg I uU Gm uc 65 Mlg fij fite gvUtZ uguktq w tZ nte| Gi ci ckz cwb w tq cY`Kitz nte| ckzi cwb \_vKtj Dij - uLZ cwi gvY mvi cwb tZ , tj uQuUtg cÜqvm Kitz nte| mvi ctqvMti 2-3 w tbi gta` cwb i is nvj Kv meR eY`ntj tZj mcqv Qvovi Dchj mgq nq| Gi cti I cÜKvZK Lv` i NvUvZ t`Lv w tj cÜZ kZvstk 50 Mlg BDwiqv I 100 Mlg uUGmuc uQuUtg cÜqvm Kitz nte|

**tcvbr gRj**

5-7 tm.ug. AvKvti i tcvbr cÜZ kZvstk 80 t`K 100 uU nvti gRj Kitz nte|

**cvi Ph**

tZj mcqv GK uU mefK gvQ| Zte Pvtj i Kzv, Mtgi fvl, mvi lvi `Lj PY`Kti mæú`K Lv` %Zwi Kti Lv` wntmte w tZ nte| ckzi th cwi gvY gvQ AvtQ Zvt` i kixti i IRtbi kZKiv 4-6 fivM nvti mæú`K Lv` `fivM Kti mKvtj I wefKtj uQuUtg w tZ nte| cÜZ mBvtn Rvj tUtb gvQ ati Zvt` i IRtbi Mo Kti Lv` i cwi gvY wbañ Y Kitz nte|

Kul. I cju Dbq b ˘z

**gvfQi ˘r cixŋKiy**

gvfm ASZ ctŋ ˘ŋevi Rvj tUtb gvQi ˘r cixŋv KitZ nte| tKubi/c tivM evj vB ˘Lv  
w˘ tj cŋZKvfi i e˘v ˘vbtZ nte|

**AniY**

Pvi ˘tK cvB gvftmi gta˘ G gvQ evRviRvZ Kiv hvq| teo Rvj w˘tq G gvQ mn†RB aiv  
hvq| Zte me gvQ aivi Rb˘ cKZ i˘Ktq tdtZ nte| GKevfi Pr†l G gvftQi Drcv˘b  
˘vavq weNv cŋZ 250-300 tKwR| Zte e˘vcbv Dbz Kti Drcv˘b Avi l evx Kiv m˘e|

Pvi ˘tK cvB gvftmi  
gta˘ tZj mcqv gvQ  
evRviRvZ Kivi  
Dc†hMx nq|

**cKzi wRIj gvftQi Pvl**

cKzi wRIj gvftQi Pvl ˘tK gvftQi Drcv˘b evx GKw beZg Dt˘wM| iB, KvZjv, g†Mj  
gvftQi m†R Pvl thgb- A\_Rix, tZgwbvte cKzi wRIj gvftQi Pvl Mŋg AA†j GKw  
jvFRBK e˘emv n†Z cv†i|

**wRIj gvQ (Air breathing fishes)**

wks, gv, i l KB Avgt˘i ˘tKi AwZ cwiwPZ gvQ| mvariYZ Gme gvQ†K wRIj gvQ ejv  
nq| Rxe†Ae˘vq Gme gvQ evRv†i Pov ˘vtg wev nq| wRIj gvQ c†Kv Ki gvQ| Gme gvftQ  
kix†i Dc†hMx tjSn tewk Av†Q| tm c˘v\_©Kg, mn†R nRg nq| tmRb˘ i˘vı Zıv tivM  
†fv†mi c†i G ait†i gvftQi c˘v DcKvix| Avevi tZj gmjvhŋ Gme gvftQi ivb˘mK†j i  
Kv†Q AwZ wcb†|

wks, gv, i l KB gvQ†K  
mvariYZ wRIj gvQ ejv  
nq|

**wRIj gvftQi ˘ewkó˘**

wRIj gvftQi AwZwi˘ ˘ klmZŋ;Av†Q| wRIj gvQ evZım ˘tKl k†mb KitZ cv†i| wRIj gvQ  
mvariY gv†vi Aw†Rb ˘tK A†bK Kg Aw†Rb hŋ cwb†Z ev††Z cv†i| wRIj gvQ AZ˘†  
mnbkxj gvQ| Avgt˘i ˘tK K†wi cvb†Z AveZ A†bK wej cıZZ Ae˘vq Av†Q, ˘fveZB G  
ait†i we†j cwb†Z Aw†Rb AZ˘† Kg Ges Kve†w†B-A˘vBW tewk ˘v†K| G ait†i  
cwb†Z iB, KvZjv RvZıv gvQ wUK†Z cv†i bv, wKŋ GiKg Rjv†q†l wRIj gvQ ˘v†K|  
Kv†RB wRIj gvQ ˘tKi me iKg cKzi Pvl Kiv m˘e| we†kl Kti thme cKZ tKub iKg  
A\_ŋwZK Kv†R Av†m bv, tm mg˘- cKZ†l wRIj gvQ Pr†li Avl Zıv G†b gvftQi Drcv˘b  
evov†bv m˘e|

**wRIj gvftQi Lv˘v†v†m**

wRIj gvQ mvariYZ Avngl RvZıv Lv˘ M†hY Kti c†KwZK cwi†ek ˘tK| cıZZ Rjv†q e†  
KıUcZ½ Rjv†q†i Zj††k ˘v†K| G mg˘l KıUcZ½ Qvov†l Dıw†† i cvZv, Ab˘v˘ AveR†v  
BZ˘w˘ R†veK w†ky Avac†v Ae˘vq Zj††k Rgv ˘v†K| wRIj gvQ G me t†tq eo nq|  
wRIj gvQ cKzi Pvl Kivi mgq ev††i ˘tK cwi†ekb Kiv Lv˘ M†hY Kti| cKzi cwi†ekb  
Kiv Lv˘ M†hY Gme gvftQi ˘ewkó˘|

wRIj gvQ cKzi Pvl  
Kivi mgq ev††i ˘tK  
cwi†ekb Kiv Lv˘ M†hY  
Kti|

**cKzi wRIj gvftQi Pvl (Culture of air breathing fishes in pond)**

cKzi †Kej gv, i gvQ ev wks gvQ ev KB gvQ GKK Pvl ev gv, i l wks gvftQi w†k†Pvl Kiv  
hv†e| iB, KvZjv, g†Mj gvftQi m†½ gv, i l wks Pvl Kiv hv†e|

**ckzi bePb**

tQvU eo me ckzi B gv, i I mks Prl Kiv hrte| 5 kZvsk cwi gvY AvqZtbi ckzi t`tK 30 kZvsk AvqZtbi ckzi G gvQi Prl fuj nte| Zte Mitgi mgq ckzi A`Z 60-70 tm.ug. cwb \_vKv`iKvi| ckzi ms`v`ti Rb` LiP KitZ nte br Zte ckzi i eva fivR \_vKtj tQvU LvU tgiugZ Kti tbqv fuj| ckzi i cmbi Dcwi fivM KPzi cvbr Qvov AveZ \_vKtj KPzi cvbr DvWtq tdjtZ nte| ckzi gv, i ev mks gvQi tcvbr tcvbr Qvovi AvfM cteP gvQ Rvj w`tq Ztj tdjtZ nte| cteP gvQ mebrk Kivi Rb` ti vUbb cUqM Kti me gvQ tgti tdj v hvq|

**gv, i gvQi tcvbr Qvovi nvi**

gv, i gvQi tcvbr cUz kZvsk 200uU intmte Qvov nq| GK tKvRtZ 100-125 uU nq G i Kg tcvbr ckzi Qvov hrte| tcvbr, tjj thb vbtivM nq Ges`N`8-12 tm.ug. Gi KvQvKvQ nq| elP cti ckzi gv, i gvQi tcvbr Qvov nq| i agvI mks gvQi tcvbr Qvovtj D<sup>3</sup> msL`v nte cUz kZvsk 300-400uU| GK tKvRtZ Gi Kg gvQi tcvbr cUq 150-200uU nq|

**ckzi Lv` cwi tekB**

gv, i gvQi tcvbr ckzi Qvovi ci Lv` cwi tekB KitZ nte| gv, i gvQ Avngl vcbi gvQ| i Kbr gvQi, av hr vdkugj bvtg cwi PZ A`ev Kg`v`gi i Kbr gvQ G RvZxq gvQi fuj Lv`| vdkugj ev i Kbr gvQi e`tj tikgti uU Lv` intmte t`qv hrte| avbi Kzv, vdkugj ev i Kbr gvQi mtz mgkY Kiv nq| v`fivM vdkugj GK fivM avbi Kzv GB`tqi mgkY nte gv, i gvQi Lv`| Lv` w`tb`jevi w`tZ nte| mKvtj 1/2 fivM, mU`vq evKx Lv`| Lv` ckzi i cmbi Dcwi fivM Qvovtq t`qv hrte A`ev Lv`, tjj cmbtZ vngkta tQvU tQvU tMvjv Kti ckzi i tKvYvq evtki Svo i gta` cmbi vFZti i vLv hrte| gv, i gvQi ckzi th Lv` cwi tekB Kiv ntqtQ Zv cwi Z gvQ Lvq vK br Zv j`v` i vLtz nte| gv, i gvQi Lv` intmte vdkugj, i Kbr gvQ, avbi Kzv Qvov mvi lvi`Lj, ev`vg`Lj, b`o ntq hvl qv Pvj, Mtgi, av KvR j vMvbr hrte| Zte vdkugj ev i Kbr gvQ Lv` intmte cwi tekB Kitj G gvQ`Z evto|

gv, i gvQi Lv` intmte vdkugj, i Kbr gvQ, avbi Kzv Qvov mvi lvi`Lj, ev`vg`Lj, b`o ntq hvl qv Pvj, Mtgi, av KvR j vMvbr hrte|

**Lv` i cwi gvY**

cwi tekB Kiv Lv` i cwi gvY ckzi Qvov tcvbr gvQi tgvU IRtbi Dci vbfP Kti vK Kiv hvq| Gfite ckzi hZ tcvbr Qvov nq, Zvi IRtbi kZKiv 4 fivM t`tK 5 fivMi gZ cUg gvQmi Lv` i cwi gvY| gvQi IRb mgtaqi mtz evote, Lv` i cwi gvY tmfite evovtZ nte|

**hZad cwi PhP**

ckzi cwi Z gv, i gvQtk hZakti eo KitZ nte| ckzi ti vR Lv` w`tq gvQ evotQ vK br t`Ltz nte| cUz gvM ckzi Rvj w`tq gvQ Ztj gvQ cix`v Kiv`iKvi| gvQi IRb evotj Lv` i cwi gvY evovtZ nte| thgb- Qvovi mgq cUz uU gvQ`k Mlg vQj, GKgvM cti 20 Mlg ntqtQ| ZLb Lv` vU, Y nte| G fite cUz gvM gvQ cix`v Kti Lv` i cwi gvY vK Kiv ntq`vK|

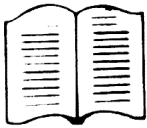
gv, i gvQ ckzi Prl Kivi mgq cUz t`tK Qq gvM| KvRb GB mgq ati Lv` cwi tekB KitZ nq| tkli GK gvM Lv` evovei`iKvi nq br| maviYZ kvZKvtj Ab`vb` gvQi gZ evx Kg nq, vKŠ Mitgi mgq gvP`gvM t`tK`Z evx nq| cUz w`tb`cUq 1 Mlg evx cvq|

Kul. I cj ▯ Dbqb ˘z

Mitgi mgta gvtQi cKzi me<sup>o</sup>v j 91 ivLtz nte| gvtQi tKvbl Am<sup>o</sup>av gtb ntj Lv<sup>o</sup> i  
cwi gvY KgtZ nte| cu<sup>o</sup> gvtm gv<sub>3</sub> i evRvti <sup>o</sup>u<sup>o</sup> Dch<sup>o</sup> nte| 10-11 gvtm 1 tKvR ˘vavq|  
cKzi gv<sub>3</sub> i gvtQi Pvl Kvj xb 91z Kg| G c<sup>o</sup>xvZtz cu<sup>o</sup> Avnk FvM gvQ vU<sup>o</sup>K \_vtK|

**gvQ AniY**

cKzi eo gv<sub>3</sub> i gvQ tLc<sup>o</sup>v Rvj, Uvbr Rvj v<sup>o</sup>taq aiv hvte| gvQ m<sup>o</sup>uY<sup>o</sup>fc ntj cKzi<sup>o</sup>U  
cvt<sup>o</sup>u<sup>o</sup> m<sup>o</sup>v<sup>o</sup>th<sup>o</sup> iKvtZ nte| cKz<sub>3</sub> t<sup>o</sup>v cu<sup>o</sup>B tQvU GRb<sup>o</sup> cv<sup>o</sup>u<sup>o</sup> j vM<sup>o</sup>taq el<sup>o</sup> Av<sup>o</sup>M K<sup>o</sup>taK  
N<sup>o</sup>Uvi gta<sup>o</sup> iKbr Ki<sup>o</sup>tz Am<sup>o</sup>av tbB| Gf<sup>o</sup>ite gvQ aivi LiP, Rvj v<sup>o</sup>taq gvQ aivi LiP t<sup>o</sup>tk  
Kg ntZ cv<sup>o</sup>ti| P<sup>o</sup>tl i cKz<sub>3</sub> t<sup>o</sup>tk gv<sub>3</sub> i gvQ AniY tKvbl mgm<sup>o</sup>vi KvR bq| 25 kZvsk  
AvqZ<sup>o</sup>bi GKvU cKzi 400 tKvR gvQ Drcv<sup>o</sup> b ntZ cv<sup>o</sup>ti| t<sup>o</sup> kx gv<sub>3</sub> tii Pvl c<sup>o</sup>xvZ Av<sup>o</sup>Yi Y  
K<sup>o</sup>ti c<sup>o</sup>zK c<sup>o</sup>zKf<sup>o</sup>ite ev GK m<sup>o</sup>t<sup>o</sup> vks I KB gvQ Pvl Kiv hvq|



**mvi gg<sup>o</sup>** \_vB mic<sup>o</sup>U ev ivRc<sup>o</sup>U GKvU ˘zeab<sup>o</sup>Kvj m<sup>o</sup>Y<sup>o</sup> ygvQ| tQvU eo me i Ktgi tW<sup>o</sup>ev,  
cKz<sub>3</sub> v<sup>o</sup>W I cwi Z<sup>o</sup>v<sup>o</sup> Rj v<sup>o</sup>ktq G gvQ Pvl Kiv m<sup>o</sup>e<sup>o</sup>| cu<sup>o</sup>z kZvst<sup>o</sup>ki cKzi 5-7 tm.ig.  
AvKvt<sup>o</sup>ii 70-80vU \_vB mic<sup>o</sup>U i tcvbr gR<sup>o</sup>z Kiv hvq| 5-6 gvm mg<sup>o</sup>taqi gta<sup>o</sup> cu<sup>o</sup>ZvU ivRc<sup>o</sup>U  
150-200 M<sup>o</sup>g IR<sup>o</sup>ti nq| Av<sup>o</sup>dkvb gv<sub>3</sub> i me<sup>o</sup>PK gvQ| GvU ˘zeab<sup>o</sup>Kvj Ges ˘f RvM<sup>o</sup>q  
Av<sup>o</sup>ak msL<sup>o</sup>K Pvl Kiv hvq| m<sup>o</sup>vavi Y e<sup>o</sup>ve<sup>o</sup> v<sup>o</sup>cbvq cu<sup>o</sup>z kZvst<sup>o</sup>k 5-6 tm.ig. AvKvt<sup>o</sup>ii 100-  
125vU tcvbr gR<sup>o</sup>z Kiv hvq| Av<sup>o</sup>dkvb gv<sub>3</sub> tii Lv<sup>o</sup> ASZ 36-40% cu<sup>o</sup>YR Av<sup>o</sup>gl \_vKv  
cu<sup>o</sup>qvRb| m<sup>o</sup>vavi YZ 100-120 v<sup>o</sup>ti P<sup>o</sup>tl G gvtQi Mo IRb cu<sup>o</sup>q 300-500 M<sup>o</sup>g nq|  
evs<sup>o</sup>jt<sup>o</sup> t<sup>o</sup>ki Av<sup>o</sup>evl qvq tQvU tW<sup>o</sup>ev ev cKzi tZj v<sup>o</sup>cvq Pvl Kiv m<sup>o</sup>e<sup>o</sup>| 4-5 gvtmi gta<sup>o</sup> G gvQ  
evRvi RvZ Kiv hvq| vks, gv<sub>3</sub> i I KB gvQ<sup>o</sup>K vR<sup>o</sup>Ij gvQ ejv nq| G<sup>o</sup>ti t<sup>o</sup> tn t<sup>o</sup> m c<sup>o</sup>v<sup>o</sup> Kg  
\_vtK Ges m<sup>o</sup>nt<sup>o</sup>R nRg nq| vR<sup>o</sup>Ij gvQ cv<sup>o</sup>Ki| vR<sup>o</sup>Ij gvtQi Av<sup>o</sup>Zv<sup>o</sup> k<sup>o</sup>vmZ<sup>o</sup>š; v<sup>o</sup> v<sup>o</sup>gvb|  
A<sup>o</sup>tc 91vKZ. t<sup>o</sup>vk Nb<sup>o</sup>z; vR<sup>o</sup>Ij gvQ Pvl Kiv m<sup>o</sup>e<sup>o</sup>|



### cvfVvEi gj`vqb 8.1

mWk DEti i cvk UK Pý (✓) w b|

1/ cZ kZvst`k \_vB mi cvw ev i vRcvwi tcvbv KZwU Qvov DvPZ?

- K) 170-180 wU
- L) 70-80 wU
- M) 7-10 wU
- N) 700-800 wU

2/ ivqzm gvQ ev Ab`vb` AemAZ cVx gvivi Rb` cZ kZvst`k Kx cwi gvY tivfUbb cVqM Ki tZ nte?

- K) 30-35 Mlg
- L) 15 20 Mlg
- M) 5-10 Mlg
- N) 75-80 Mlg

3/ tKvbw AvvdKvb gv, i Pvl i Rb` Amjeavi mwp Ki tZ cvti?

- K) Lv`i Afve ntj eo gv, i tQvU gv, i tK tLtg tdtj
- L) Avngl tfrRx
- M) tek msL`K wlg avi Y Kti
- N) t`L tZ tZgb my i bq|

4/ tKvbw wRI j gvQ bq?

- K) gv, i
- L) wks
- M) KB
- N) Kizjv

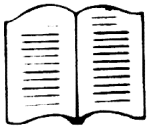
**cW 8.2 tctb gvQ Pvl I e'e'vcbr, Bij k gvQ Dbaqb I e'e'vcbr**



**G cW tkłI Avcib –**

- tcb ֆZwi i cXWZ eYԹv KiłZ cvi teb|
- tctb gvQ Pvl I Kx Kx Ki Yxq Zv e'vL'v KiłZ cvi teb|
- Bij k gvłQi cRbb I ԵPi Y tՊłłI eYԹv ԵłZ cvi teb|
- Bij k gvłQi e'e'vcbr Kxfıte Kiv thłZ cvi Zv Avłj vPbv KiłZ cvi teb|

**tctb gvQ Pvl I e'e'vcbr**



evsj vֆ tkı cłq me AAłj B ԵԵԲԵԸKvłıı AmsL' DbaԳ Ges AveX Rjvkq iłqłQ| thgb-  
 tmP cKı, iv'lıi cvk, ԳLvj, tQvU eo b`x, eb'v cmeZ ԵԵԸRjvfıg, nvl o, evl o BZ'w`  
 thLvtb mıgıqKfıte A\_ev ֆıqfıte cımb ֆłK| G mg'ıRjvkłq ֆÁvıbK Dcvłq gvQ Pvl  
 Kłı Drcı' b evıvıbv mæe| ԵKŠ' Gme Rjvkq ԵԵԲԵԸAmıeavi KviłY ԵԵeo gvQ Pvl I  
 Avl Zıq Avıv mæe nq br| thgb Gme Rjvkłqi Pvl ԵłKi cvo gReZ ֆłK br| Aveıı tKıv  
 tKıv mgq cıo ֆłK br| Zıv G ֆj vłZ gvQ I gvłQi cıı tekłK ԵԵqŠı'ı vLıv hıq br| Zıv G  
 tՊłł Rjvkłq tctb gvQ Pvl Kiv thłZ cvi | tctb gvQ Pvl cԵԵԸ teık Եłbi bq| Rvcıtb  
 cłg G cԵԵԸ cԵԵԸ j vıf Kłı | Gıci ԵԵıj cıBb, Bֆ' vıbıkqv, ֆBj ֆvU, Pıb I gvj tıqıkqv G  
 cԵԵԸ e'enıı KiłQ|

Rvcıtb cłg ֆctb gvQ  
 Pvl cԵԵԸ cԵԵԸ j vıf  
 Kłı |

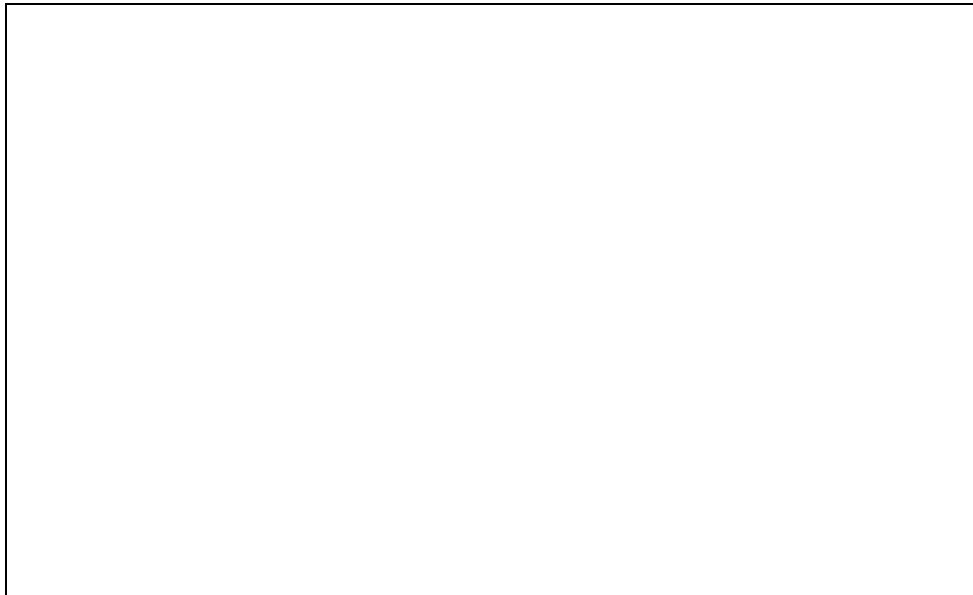
**ֆԵ ԵԵԸԵԸ**

thme epr Rjvkq mıvıı Yfıte ԵԵeo Pvl I Avl Zıq Avıv mæe bq tmme RjvkqłK tctb gvQ  
 Pvl I Rb' ԵԵԸԵԸ Kiv cłqvRb|

**tcb ֆZwi**

evk, MıłQi Wıj BZ'w` bıbv DcKiY Եłq %Zwi teov ԵKsev Rıj Եłq tcb ֆZwi Kiv nq|  
 Rjvkłqi cł'Kg nłj Dnıı GK cvk t\_łK AvııK cvk chŠ'AvııAmıofıte Lıı cłZ teov  
 Եłq mıłRB tcb ֆZwi Kiv hıq| Rıj Եłq teov t'qıı mgq j Պ'ı vLłZ nte hıvZ Rıłj i Ni  
 1 tmıUıgUıı Gi teık br nq| KW'ev cıj Ե\_b Rıj e'enıı Kiv DııPZ|

evk, MıłQi Wıj BZ'w`  
 bıbv DcKiY Եłq %Zwi  
 teov ԵKsev Rıj Եłq tcb  
 ֆZwi Kiv nq|



¶P 67 t tctb gvQ Pvl

**iv¶jzn er AewAZ gvQ`gb**

tcb`Zwi i ci Rivj tUt b hZ`i mæe iv¶jzn gvQ thgb- tkvj, tevqj, MRvi, AvBi, UmK, dij BZ`w` Ges tetj, `vomKbv, Pwncjv, Pw`v BZ`w` AewAZ gvQ mwi tq tdjvi e`e`v Ki tZ nte|

**tcbvi AvKvi I msL`v**

tctb weifbecRwzi gvQ QvotZ nte thb cwbi mKj`t`ii Lvefii mWk e`envi nq I hvt`i tcbv mnRj f` Ges hvt`i Af mg tq Pvl Kti evRvti weµq Kiv hq| iB, KvZjv, g¶Mj, wj fvi Kvc`ivRcy BZ`w` cRwzi gvQ tctb Pvl Kiv mæe| AwK dj tbi Rb` mÿ` mej tcbv wv`θ nvti gRz` ivLv DvPZ| tcbvi AvKvi tKvb µtgB 4 BwAi Kg thb br nq| KviY tQvU tcbv tctbi teov er Rvtji duk w`tq tei ntq hvlqvi mæebv`vtK| ZvQvov iv¶jzn gvQ AtbK mgq mæu`Ypfc mwi tq tdjv AtbK mgq mæe bvl ntZ cvti| ZvB 4 BwAi tQvU tcbv tL tq tdjvi mæebv`vtK| cwbi`Yv`tYi Dci wfiE Kti tñzi cAZ 17500wU t`tK 25000wU tcbv Qvov thtZ cvti| iB, KvZjv, g¶Mj, wj fvi Kvc`I KwncP h`vµtg 30t 20 t 10 t 10 t 30 nvti gRz` Ki tZ nte|

**tctb Lv`mieiv**

gRz`KZ.gvtQi tgvU IRtbi 1% nvti gvtQi mnRj f` Lv` h`v`Lj, Kæv, fvl BZ`w` c¶qvM Kiv thtZ cvti|

**gvQ aiv**

tctb 6/7 gvtmi gta`B evRvti i Pwv`vgZ weµqthwM` gvQ Drcw`Z nq| Uvov Rivj w`tq tcb t`tK gvQ aiv thtZ cvti|

**Bij k gvQ Dbqb I e`e`vcbv**

ersj vt`tki RivZiq gvQ Bij k| GKK cRwz wntmte Bij k me`epr Ges mev`c¶v`i`zcy` grm` mæu`| t`tki tgvU grm` Drcv`tbi kZKiv c¶q 20-25 fvl Bij k gvtQi Ae`vb|

iB, KvZjv, g¶Mj, wj fvi Kvc`ivRcy BZ`w` cRwzi gvQ tctb Pvl Kiv mæe| tcbvi AvKvi tKvb µtgB 4 BwAi Kg thb br nq|

tctb 6/7 gvtmi gta`B evRvti i Pwv`vgZ weµqthwM` gvQ Drcw`Z nq|





**cRbb I wKtkvi Bij tki wePiY tjt**

thtnZzBij k GKwU AwfcqvbKvix gvQ (Migratory fish) ZvB mWKFvte Gi cRbb tjt  
wbYq Kiv tek KwWb| wefbrZt`i wfiEtZ ersj vt`tki wefbrb`-b`x I tgvnbvq wbrj wLZ  
`vbmgn cRbb tjt I wKtkvi Bij tki wePiY tjt wntmte wPvYZ Kiv nq|

**1) cUv AeeumKv**

eIptgSmtg cUv b`xi AwvPv, tMqvj>`, cvKuk, tMv`vMvov, gyvMA I tj snRs Astk cPz  
cwi gvY cwi c° Bij k gvQ cvlqv hvq| cUv b`xi gyvMA t`tk iiyKti tMqvj>-AwvPv  
Astk Rvbgvix ntZ tg gvm chSP2 t`tk 12 tm.ug. AvKvtii wKtkvi Bij k (RvUKv) cPz  
cwi gvY aiv cto|

**2) tgNbv AeeumKv**

tgNbv b`xi NvUbj ntZ Pvucj Ges Pvucj ntZ nvrXgviv bxj Kgj Astk cUq mivv eQiB  
cwi c° Bij k gvQ aiv cto| gvP°Gucj gvtm tgNbv b`xi tgvnbvq, Pvucj, bxj Kgj Astk  
mwaK RvUKv aiv cto|

**3) wvY AAjt i b`x I b`xi tgvnbv**

hZ`f-mae Rvbr hvq Bij k gvQ mgj`wWg Qvto bv| cUqvLvj xi KqvKvUv mgj`mKZ ntZ  
Ljvbi `vj vi Pi chSPmgj`Zxi eZr°Gj vKvK RvUKv Bij tki wePiY tjt wntmte wPvYZ Kiv  
ntqtQ| G Gj vKvq RvUKv aivi mgq Kvj btf` t`tk tdeyvi x chSP| GQvov epEi ewi kvj  
tRjvi weLvj x, cvqiv, bqvfisMj x I Bij k b`x Ges wvRj v, gjv` I tgvn`vMA DctRj vi  
ga`w`tg cUvntZ tgNbv kvLv b`xmgfn e`vcK nvti RvUKv aZ ntq`vtK|

cUqvLvj xi KqvKvUv mgj`  
`mKZ ntZ Ljvbi `vj vi  
Pi chSPmgj`Zxi eZr°  
Gj vKvK RvUKv Bij tki  
wePiY tjt wntmte wPvYZ  
Kiv ntqtQ|

**Bij tki Lv`**

Bij k gvQ gj-Z cUvUbtfvRx| Giv cwbZt we`gvb jt`jt` AvYv`vK Rxe thgb Dv`c  
cUvUbtv gta` bxj I meR tkIjv, WvqvUgm&Ges RycUvUbtv gta` KwctcW, K`vWv`miv,  
tinvUtdiv, tcvUvRvqv BZ`w` tLtg`vtK|

**Bij k gvQ i ÷K ev RvZ wbYq**

Bij k gvQ i `RveK e`e`vcvvi Rb` RvZ ev ÷K wbYq AZxe `iZcY°KvR| AvyUvb ev  
chfejtYi gva`tg chS- Bij k gvQ i `Uv ÷K kvv³ Kiv ntqtQ| Zb#a` GKwU b`xi  
÷K/tim Ges AcivU mgj`i ÷K/tim|

**Bij k gvQ i e`e`vcv**

Dctii Avtj vPbv ntZ t`Lv hvq`Q th, Bij k GKwU AwfcqvbKvix gvQ| Giv Lv`i AtsttY  
Ges wWg Qvovi Rb` mgj`ntZ b`xtZ Awfcqvb Kti Ges t`tki wefbrb`-b`xtZ Lv` MhY  
Kti | wKtkvi Bij k 5-6 gvm eqm chSPwefbrb`-b`x I tgvnbvq Ae`vbi ci cyivq mgj`  
Awfcqvb Kti | mgj`ntZ b`xtZ AwfcqvbKvj xb mgtq, cRbbKvj xb mgtq Ges wKtkvi  
Bij tki (RvUKvi) Pvi YKvj xb mgtq ersj vt`tk Bij k I RvUKv aiv nq|

G tcvjtZ Bij k gvQ i mgz`RveK e`e`vcvvi Rb` wbrwZ c`tjt MhY Kiv GKvš  
Aciv nvh°

**(K) Awfcqvb c\_ gY ivLv**

evsj vt`tk Bij k gvQ aivi mgq newfbabBij tki gY cwi agY c\_ eU Kiv nq ev etavi mpoKiv nta \_vtK| th mg`l cšiq Bij k gvtQi cwi agY c\_ gY ivLv thtZ cti Zvi gta` ewYZ c×wZ cāvb|

**(L) b`xtZ AvovAwofite ˘wcZ eta Rvj evMvov Rvj ibqšYKiY**

MteI Yiq t`Lv tMtQ th, eQti i newfbamgtq newfbabGj vKiv, wekI fite i`® tgšmšg ewi kvj tRjvi tgnw`MÄ, wRjv I gjw`\_vbi newfbab`-b`xtZ, cUv b`xi gvI qv, fvm`Kž, Avni Pv GjvKiv Ges elP tgšmšg tbiqvLvj x tRjvi ivgMwZ, Kwij MÄ GjvKiv Ges j`¶xcy tRjvi nvrXiviv GjvKiv w`tq cēwvZ tgnbv b`xtZ GKcšl nta Acic šl chšP AvovAwo evka I Rvtj i teo w`tq eta Rvj evsMvov Rvj w`tq Bij k aiv nq| Dctiv<sup>3</sup> Dcvtaq aivi dtj Bij tki Awfcqvb c\_ cšq eU nta hvq| dtj chvB cwi gvtY Bij k b`xi Dcti i Astk Avni tYi cwi gvY w`b w`b Ktg hv`Q| Bij k gvtQi mōze`e`vcbvi Rb` mg`lcKvi eva Rvj ev Mvov Rvj w`tq Bij k aiv eU Kiv Avek`K|

**(M) DcKj xq GjvKiv gvQ aivi Rvj I tšKvi msL`v ibqšYKiY**

t`tki newfbab`-b`xi bre`Zv nwm cvl qvi dtj Bij k gvtQi Ae`vb b`-b`xi Dcti i Ask nta tgnbv Ges DcKtj w`b w`b mti hv`Q| dtj AwKvsk tRtj b`xi tgnbv I DcKj xq GjvKiv gvQ aivi Rb` Ae`vb ibt`Q| G tč¶¶tZ b`xi tgnbv I DcKj xq GjvKiv gvQ aivi tšKvi AwZ `z ewx cvt`Q| Duj mLZ GjvKiv wekI Kti RjvB nta A±vei gvtm cšZ 5-7 wglvi Ašl Ašl tRtj iv Rvj tctZ \_vtK| DcKj xq GjvKiv AwKvsk Bij k gvQ aivi tšKvi hšPwv Z Ges Rvtj i `N® I cš`LgB tenk| D<sup>3</sup> GjvKiv mnbkxj gvIvi tPtaq AtbK tenk Rvj tdjvi dtj Bij k gvtQi cwi agY c\_ gY ivLvi Rb` DcKj xq GjvKiv gvQ aivi tšKvi msL`v I Rvtj i cwi gvY ibqšY Kiv Avek`K|

**(N) DcKj xq GjvKiv I t`tki Afšti e`eüZ Rvtj i dñ ibqšYKiY**

DcKj xq GjvKiv I newfbab`-b`xtZ 30-47 tm.wg. AvKviti i gvQ mvari YZ tenk aiv cto| D<sup>3</sup> AvKvzi (`tN¶) gvQ aivi Rb` 9-10.2 tm.wg. dñmi Rvj cšqvRb nq| G tč¶¶tZ 9 tm.wg. Gi wbaclñmi Rvj Bij k gvQ aivi wbgte`e`envi mgMöt`tk wbol x Kiv Avek`K|

**(O) t`tki newfbab`-b`xi bre`Zv ibqšYKiY**

fvi tZi Mzv b`xi Dci diviv`v bvgK ˘vte evtai dtj cUv b`x I Gi newfbacKvLvi bre`Zv euj vstK nwm tctqtQ| GQvov Ab`vb` b`-b`xl DRvb nta cēwvZ cuj Rtg b`x, tjv w`b w`b bre`Zv nvi vt`Q| dtj Bij k gvtQi AtbK cRbb t¶¶I bó nta Ges wePi Y t¶¶I w`b w`b cwi ewZ nta| Bij k gvQ mvari YZ cēj tmtZ I Mfxi b`-b`xtZ Awfcqvb Kti \_vtK| Gfite t`tki newfbab`-b`x μgvMZ fivU nta \_vKtj Ges cimb cēv nwm tctZ \_vKtj Bij k gvtQi cwi agY c\_ I w`b w`b tQvU nta \_vKte| Rvbr hvq Bij k gvQ GKmgq b`-b`xi tgnbv nta myi- 1300 wK.wg. `ieZxMzv b`xi AvMš Ges w`j w` chšP Ges e`cy b`xi tZRcy (evsj vt`k eW¶ nta 306 wK.wg.) chšP Awfcqvb KiZ| ZvB Bij k gvtQi gY cwi agY c\_ eU nta GKw`tk thgb Gi Drcv`b nwm cvl qvi maveb AvtQ Ab`w`tk AwKZi bre` Astk (thgb fvi Z ev gvqvogvti i newfbab`-b`xtZ) G gvtQi Awfcqvtbi maveb AvtQ etj msik- ó weAvbx`i avi Yv| ZvB Bij k gvtQi Drcv`b A¶¶wv vLv Z\_v ewx i j t¶¶ evsj vt`tki newfbab`-b`xi bre`Zv ibqšY Kiv AZxe Rv j |

Bij k gvQ mvari YZ cēj tmtZ I Mfxi b`-b`xtZ Awfcqvb Kti \_vtK| Gfite t`tki newfbab`-b`x μgvMZ fivU nta \_vKtj Ges cimb cēv nwm tctZ \_vKtj Bij k gvtQi cwi agY c\_ I w`b w`b tQvU nta \_vKte|





### **cuVvEi gj'iqb 8.2**

**mWk DEti i cuK Wk wPy (✓) w b/**

- 1/ tctb gvQ Prl ej tZ Wk eSvq?
  - K) tQvU cKzi gvQ Prl
  - L) gi v b`xtZ gvQ Prl
  - M) Lvij gvQ Prl
  - N) epr Rj vktq teov w`tq tNi v RvqMvq gvQ Prl
  
- 2/ tctb Kgct¶¶ tKvb&AvKvti i tcvbr Qvov DvPZ?
  - K) 5 tm.wg.
  - L) 10 tm.wg.
  - M) 7 tm.wg.
  - N) 8 tm.wg.
  
- 3/ RvUKv Bvjj tki AbZg epr wPvY t¶¶¶ tKvbuU?
  - K) cvvZb e<sup>2</sup>cŷ b`
  - L) kvZj ¶¶v b`x
  - M) tgNbr b`x
  - N) Ksk b`x
  
- 4/ GKvU Bvjj k gvQ m¶¶¶ KZvU wWg w`tZ cvti?
  - K) 20-30 j ¶¶
  - L) 20-30 nvRvi
  - M) 20-30 tKvU
  - N) 40-50 j ¶¶

## e`enwiK

### cW 8.3 cKzi i AvqZb Ablyqx tcvbri cwi gvY I AvbzwZK nvi ubaY



G cW tkfI Avcb -

- cKzi i AvqZb Ablyqx tcvbri cwi gvY I AvbzwZK nvi ubaY KiZ cwi teb|



ckæ 1| hir` cZ kZvsfk 70-80u \_vB mi cwi tcvbri Qvor nq| Zvntj GK tn+i AvqZtbi GKiu cKzi KZiu tcvbri Qvor hvte?

#### mgvaib t

247 kZvsfk 1 tn+i

mzi vs 247 x 70 - 80u tcvbri

A\_# 17,290 - 19,760 u tcvbri Qvor hvte|

GKB hvte Avgiv tZj mcqv I gv\_ i gvQi tcvbri Qvori nvi nmve KiZ cwi |



**Ablyj b (Activity) t** tctb cZ tn+i 17,500 - 25,000u tcvbri Qvor thZ cwi thLvrb i B, KvZj v, gMj, mj fvi Kvc<sup>Q</sup> Kwic<sup>P</sup> gvQi AbzvZ nte h\_vutg 30:20:10:10:30| 2 tn+i AvqZb wekó GKiu tctb Dvj - uLZ gvQmgfni tKvbwi KZiu QvoZ nte Zv nmte Kti LvZvq ij wce x Ki y Ges mgqgZ Avcbri uDUi tK t`uLq` rji vbb|

**Povšgjiqb 8**



**mswB I i Pbigj-K ckae**

- 1| cki \_vB micv ev i vRcyi Pvl cxiZi eYv w`b|
- 2| cki tZj wvcqv Kxfite Pvl Kiteb eYv Kily|
- 3| AvcdKvb gv, i Pvl i mjev, tj v wj Lj|
- 4| wRj gvQi `ewko, tj v wj Lj|
- 5| Kxfite wRj gvQi Pvl Kiteb eYv Kily|
- 6| tctb gvQ Pvl i Kj v-ikSkj eYv Kily|
- 7| Bwj k gvQi RxebPμ eYv Kily|
- 8| Bwj k gvQi e`rcbv cxiZi eYv w`b|



**DĒi gji v**

**cW 8.1**

- 1| L                      2| K                      3| K                      4| N

**cW 8.2**

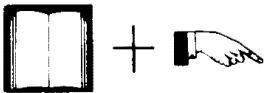
- 1| N                      2| L                      3| M                      4| K

## BDibU 9 grm" cRbb

cRbb GKIU "RieK cLmuqv hvi gva"tg Rxe wejß nI qv t\_#K i ¶Iv cvl qvi Rb" GKB ai#bi eskai "Zwi Kti | gvtQi t¶t¶I Gi e"iZµg bq | gvQ thsb c×iZtZ cRbb Kti \_vtK | mdj fite gvQ Pvl Kivi Rb" gvtQi cRbb m=utK"mgyúo avi Yv \_vKv c¶qvRb | grm" cRbb m=utK"mgyúo avi Yv \_vKtj mWVK mgtg KwOLZ cRmZi KwLZ AvKvti i tcvb c¶B ev mSMh Kiv mnRZi nq | AwAKvti KwOLZ AvKvti i KwOLZ cRmZi tcvb cvl qvi Rb" gvtQi c¶Yw Z cRbb NUitbv c¶qvRb | n"vPmi "vcb Kti gvtQi c¶Yw Z cRbb Kiv ntq \_vtK | c¶Yw Z cRbb m=uv`#bi Rb" cRbb¶I g gvQ ubeiPb, Gt`i jvj b cvj b c×iZ, ucUBUvix Mš' mSMh, msi ¶Y, ni#gvb BtRKkb "Zwi I c¶qm c×iZ Ges wWg dlt#bvi cLmuqv m=utK"Avb \_vKv Avek`K | GQvovl tcvb c"mKs I cwi ent#Yi AvapK chnyß m=utU avi Yv \_vKv c¶qvRb |

G BDibU grm" cRbb Kx, cRbtbi cKvitf` Ges Zvi c¶qvRbxZv, cRbb¶I g gvQ gRZ Kivi wbgvejx, ucUBUvix Mš' mSMh, msi ¶Y Ges ni#gvb BtRKkb "Zwi I c¶qm c×iZ, wWg dlt#bvi cLmuqv, dlt#bvi c¶veKmgR Ges dlt#bvi weifbrcvt¶I e"envi, c¶KwZK Dm t\_#K tcvb mSMhni c×iZ, tcvb tUKmBKiy c"mKs cwi enY Ges AvapK chnyß i c¶qm BZ"iw m=utK"ek` fite Avtj vPbv Kiv ntq¶Q |

### cW 9.1 grm" cRbb Kx? cRbtbi cKvitf` Ges Zvi c¶qvRbxZv



G cW tk¶I Avicb –

- grm" cRbb Kx Zv RvtZ cvi#eb |
- c¶KwZK cwi#etk gvQ Kxfite cRbb Kti Zv eYDv Kitz cvi#eb |
- c¶Yw Z cRbtbi msAv wj LtZ cvi#eb |
- c¶Yw Z cRbtbi KjtKškj eYDv Kitz cvi#eb |



#### grm" cRbb Kx?

cRbb GKIU "RieK cLmuqv hvi gva"tg Rxe wejß nI qv t\_#K i ¶Iv cvl qvi Rb" GKB ai#bi Rxe ev eskai "Zwi Kti | gvQ thsb c×iZtZ cRbb Kti \_vtK | c¶Ziu gvQ GKIU wv"ß cRbb Pµ Abvii Y Kti Ges Abvye Kti |

cRbb GKIU "RieK cLmuqv hvi gva"tg Rxe wejß nI qv t\_#K i ¶Iv cvl qvi Rb" GKB ai#bi Rxe ev eskai "Zwi Kti |

mvariYZ gvtQi gta" cjy I "x`yß wj ½ we`"vgvb | cRbb tgšmšg cmbtZ "x gvQ wWg Ges cjy gvQ i µvYgyß Kti | dtj gvtQi wWg emw`Kfite (t`tni evBti) wvwl<sup>3</sup> nq | tenki fivM gvQ eQti GKevi cRbb Kti \_vtK | Zte wKQymKQygvQ AvtQ thgb KwvcP I tZj wvcqv, eQti GKwaKevi cRbb Kti \_vtK | gvP¶\_#K i iyKti AvM÷ gim chšicRbbKij we`Z | Zte tg, Rly I RjvB gim evsj vt`#ki gvtQi c¶vb cRbb mgq | cmbi Zvcgv¶v, Avtj vi ZxeZv I Kij (w`#bi "N), tmZ BZ"iw c¶veKmgR gvtQi cRbb wqšy Kti |

#### cRbtbi cKvitf`

gvtQi cRbbtK c¶vbZ`yß fivM fivM Kiv hvq | h\_v -

- 1 | c¶KwZK cRbb (Natural breeding)
- 2 | c¶Yw Z cRbb (Induced breeding)

Kul. I cij Dbqb ˘z

**1| gvtQi cKuzK cRbb**

iB, KvZjv I gMj gvtQi cKuzK cRbb

**K) b`xZ gvtQi cRbb**

iB, KvZjv I gMj gvtQi cAvb cKuzK Dm b`x t`K cKzi Pvl Kievi Rb` tcvb mslpxZ nq| elRvtj b`xZ iB, KvZjv, gMj gvQ cRbb Kti \_vtK, gvP@gvm t`K cUq tmfP=† gvm chSf b`x t`K tcvb mslpxZ nq|

**cRbtbi cKuzK KviYmgp**

b`xZ cRbb tKvb wetkl cKuzK KviYi Dci wbfP Kti Zv mWk fite Rvbv hqvub| Zte bvbvi Kg `eAmbK mgv†v t`K Absvib Kiv nq th el† mgq b`xZ hLb Rj Uuz nq Ges ZLb b`x t`K Rvj w`q ti Yytcvbr teik mslpxZ nq| wetkl Kti b`xi cmb hLb KgtZ \_vtK ZLb ti Yytcvbr teik aiv cto| el† mgq b`xi Rj tNvjv nq, Nb Nb el† dtj b`xi cmbi imvqubK cwi eZB nq| cmbi Zvcg†v, `exfZ Av† tRtbi cwi gyV BZ`w i cwi eZB nq| elvP mgq we`yr PgKv†v, evRcov Lp NbNb nq| Gme cKuzK NUBvi mgvtek cRbtbi mnvqK nZ cv†i | GQovv th mg`l gvtQi cKuzK cRbtbi Rb` tm†Zi `i Kvi nq elvRvtj b`xZ tm†Zi teM teto hvq| AZGe b`xZ elRvtjxb th cKuzK cwi eZB `vfwefite nq, tm Avenl qv I cwi tek iB, KvZjv, gMj gvtQi cRbtbi Rb` Abkj- nq|

b`xZ elRvtjxb th  
cKuzK cwi eZB  
`vfwefite nq, tm  
Avenl qv I cwi tek iB,  
KvZjv, gMj gvtQi  
cRbtbi Rb` Abkj- nq|

**L) etda cRbb**

`vfwefite etda iB, KvZjv, gMj gvtQi cRbb Kiv†v hvq

**mviveQi cwb \_vtK GiKg eva**

G iKg etda Av†M t`K cRbb DcthvMx iB, KvZjv, gMj gvQ cvj b Kiv nq| elvP mgq we`Z.DPzRvqMv t`K Xj bvtg| etda cwb c†etki Ges cwb wvkv†bi Rb` gy \_vtK| el† mgq etdai w†Zi cwb Rtg eva cmb†Z fuz`n†q hvq| evowZ cwb wvkv† Kti t`qv nq| cRbtbi mgq gylU etdki teor w`q AvUv†v†v \_vtK| etdai AMfxi Astk cRbb n†q \_vtK|

**iKtbr eva**

iKtbr etda elvP cmbi Xj bvtg| exwU cwb cY`ntj cRbb DcthvMx iB, KvZjv, gMj BZ`w gvQ Qovv nq| G iKg etda el† cmb Rgv n† qvi ci cRbb nq| mvavi YZ me etdab cKziUi tg†Si weivU MZ`Pvi cv†k,†A†bKuv RvqMv \_vtK| gvtQi cRbb GiKg AMfxi RvqMvq nq| eo etda cRbb cKuzK fite nq| etda Qvoevi ci el† mgq iB, KvZjv, gMj gvQ tR†i cmb Av†`v†j Z Kti | `xgvQ I c†y gvQ tQvUvQ† Kti I ci`uti i KvQvKwQ n†q RovRwo Kti | Z†`i c†j D†ERbv t`Lv hvq| gvQ†`i thSbμqv A†bK†Y a†i P†j | Gme cRwZi `xgv†Qi t†Ui wWg thSbμqvqv cmb†Z tei n†q Av†m| c†y gv†Qi iμ I cmb†Z wBMZ nq Ges wWg, †jv cmb†ZB iμ θviv w†w ³ nq|

**2| gvtQi cYw Z cRbb**

iB, KvZjv, gMj gvQ ex Rj vktq wWg Q†to bv, hw` I elvRvtj `xgv†Qi D`i wWgcY`\_vtK| c†y gv†Qi iμvbnq, wKŠ` GB cwi tek cRbb nq bv| gvtQi wUBUvix Mōš† w†h†m ev ni†gvb cRbb DcthvMx `x I c†y gv†K B†RKkb t`evi c†i `x gvQ wWg Q†to I c†y



gvtQi wUBUvix Mšiši  
ubhfm ev ni tgvb cRbb  
DcthmX`x I cjtj  
gvQtK BbtRkKb t`eri  
cti`x gvQ wlg Qvto I  
cjtj gvQ i muYybtjlc  
Kti wlg,tjv ubw<sup>3</sup>  
Kti | G fite ni tgvb  
BbtRkKb w`tq th cRbb  
Kiv nq ZvtK cYw`Z  
cRbb etj |

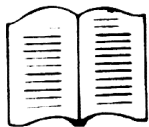
gvQ i muYybtjlc Kti wlg,tjv ubw<sup>3</sup> Kti | Gfite ni tgvb BbtRkKb w`tq th cRbb Kiv  
nq ZvtK cYw`Z cRbb etj |

ni tgvb BbtRkKb mrvth` Avgt`i t`tk mePB GLb iB, KvZjv, gMj gvtQi Kwlg  
cRbb NUvtrv nq| we`kx KvcRvZiq gvtQi gta` Kwcp gvQ (Cyprinus carpio) ex  
Rjvktq eskwe`-vi KitZ cvti | tmRb` G gvtQi cYw`Z cRbtbi cQvRb nq bv| wKŠ  
mj fvi KvcRl Mhm KvtpP eskwe`-vi m`uYvte cYw`Z cRbb cxwzi Ici wbfPkj |  
eZgvtb wRlj gvQ we`kl Kti gv,i gvQ Pttli cthvi Y NtUtQ| GtjtTl cYw`Z cRbtbi  
KjvtKškj cQvM Kti tcvb Drcv`b Kiv nt`Q| cKwZK cwitetki evBti cYw`Z cRbb  
m`e |

**cRbtbi cQvRbxZv**

- cRbb GKwU`RweK cLqv| cZwU Rvte b`vq gvQl esk i`lv Kivi Rb``rfweK  
wbqtg cRbb Kti`vtK |
- gvQ Pvl KitZ ntj cKzi cQvRbxq cwi gvtY tcvb gRy KitZ nq| Avgt`i t`tki  
iB KvZjv RvZiq gvQ tkej gvT tmZkxj b`xZ cRbb Kti`vtK | Gme gvQ Pvl  
KitZ ntj b`x t`tk tcvb mslMh KitZ nq| wefbaKviY KvcRvZiq Gme gvtQi  
cRbb tjt webó nt`Q| dtj cKwZKfite tcvb Drcv`b AtbK Ktg tmTQ| chfB  
cwi gvtY tcvb tctZ ntj iB-KvZjv RvZiq gvQtK ZvB cYw`Z cRbb KivZ nq |
- b`x t`tk mslMpxZ tcvb Amberh`KviYB wK<sup>a</sup> cRwzi ntq`vtK, AtbK mgq tKvb  
tKvb AemAZ we`kl Kti ivjtm gvtQi tcvb GKb mvt` aiv cto th,tjv gvQ Pttl  
jwZKi cFve tdtj | tmRb` KwOŁZ cRwzi tcvb tctZ ntj Aek`B cYw`Z  
cRbtbi cQvRb itqtQ |
- iB-KvZjv gvQ hZ eob tnvK bv tKb ex cKzi cRbb Kti bv| cRbbjlg gvQ cKzi  
gRy titL cRbb tgsmtg th tKvb mgtg cQvRb gmdK tcvb cvl qvi Rb` cYw`Z  
cRbb cQvRb |
- b`x t`tk mslMpxZ tcvb cQkKb wK<sup>a</sup> AvKvti ntq`vtK | gvQ Pttl AwK mglj tctZ  
ntj tKvb ubw` cKzi GKb AvKvti tcvb Qvov DvPZ | GKb eqtmi I GKb  
AvKvti tcvb cvl qvi Rb`I cYw`Z cRbb`i Kvi |
- wks, gv,i, KB, cve`v BZ`w` AZ`šl mYr`ygvQ Pvl GLb jvFRbK wntmte wetewPZ |  
wKŠ`Gme gvtQi tcvb cKwZtZ Lg KGB cvl qv hvq | KvtrB G RvZiq AZ`šl i`zcy<sup>o</sup>  
gvQ Pttl cthvi NUvZ ntj Aek`B cYw`Z cRbb cQvRb |
- gby` mP I Ab`vb` wefbaKviY`ewi cwitetki Rb` AvtbK gvQ wejB nl qvi ct`  
thgb- gvtkij gvQ | gvtQi wejB niZ ntZ i`lv Kivi Rb` cRbb cQvRb |

KwLZ cRwzi GKB  
AvKvti i, GKB eqtmi  
Dbzgvbtbi tcvb mgqgZ  
cvl qvi Rb` cYw`Z  
cRbb cQvRb |



**mvigg<sup>o</sup>** cRbb GKwU`RweK cLqv hvi gva`tg Rxe wejB nl qv t`tk i`lv cvl qvi Rb`  
GKB aibtbi Rxe ev eskai`Zwi Kti | gvtQi cRbb`gaitbi h\_v- cKwZK cRbb I  
cYw`Z cRbb | gvtQi wUBUvix Mšiši ubhfm ev ni tgvb cRbb DcthmX`x I cjtj gvQtK  
BbtRkKb t`qvi cti`x gvQ wlg Qvto I cjtj gvQ i muYybtjlc Kti wlg,tjv ubw<sup>3</sup>  
Kti | Gfite ni tgvb BbtRkKb w`tq th cRbb Kiv nq ZvtK cYw`Z cRbb etj | KwLZ  
cRwzi, GKB AvKvi I GKb eqtmi cQvRbxq cwi gvtY Dbzgvbtbi tcvb h\_vmgtg cvl qvi  
Rb` cYw`Z cRbb cQvRb |

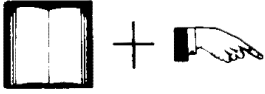


**cvĽVĚi gj'iqb 9.1**

**mĽK DĚti i cvĽK ĽK ĽPý (✓) Ľ b |**

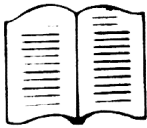
- 1/ cĽYĽ Z cĽRbĽbi mĽeav tKĽbĽU?
  - K) mĽiv eQi cĽRbb KĽvĽbv Ľvq
  - L) th tKĽb gvĽQi mĽĽ\_ th tKĽb gvĽQi cĽRbb KĽvĽbv Ľvq
  - M) ĽĽĽeK eĽm ĽĽbi eĽBĽi cĽQ`gZ gvĽQi cĽRbb KĽvĽbv Ľvq
  - N) thŠb AcĽi c° gvĽQi cĽRbb KĽvĽbv Ľvq
  
- 2/ cĽYĽ Z cĽRbb KĽv nq tKĽbĽU Ővi v?
  - K) ĽcĽBĽUvi x MĽŠi ĽbĽĽm
  - L) BbĽmj b
  - M) ĽcĽbĽmĽj b
  - N) \_vBi ĽqW MĽŠ'
  
- 3/ cĽYĽ Z cĽRbb tKŠkj `i KĽi nq bv tKĽb&gvĽQi tĽĽĽĽ?
  - K) KĽZj v
  - L) Ľmj fvi KĽc°
  - M) KĽĽcP
  - N) gv\_ i
  
- 4/ iĽ, KĽZj v gvĽQi tĽĽĽĽ tKĽbĽU mĽK?
  - K) cĽĽĽi mĽavi YZ ĽĽg Ľ ĽZ cvĽi
  - L) cĽĽĽi ĽĽg t`q bv KĽi Y thŠb cĽi c° Zv j vF KĽi bv
  - M) AĽaK eĽĽcvZ nĽj cĽĽĽi ĽĽg t`q
  - N) ni Ľgvb BbĽRKkb cĽqĽM KĽi Ľj ĽĽg Ľ ĽZ cvĽi

### cW 9.2 cRbbŋlg gvQ gRZ Kivi wbgvej x



#### G cW tkłI Avcwb –

- cRbbŋlg gvQ i Rb` Kxfvte cKz wberPb Kiv nq Zv Avtj vPbv Ki tZ cvi teb|
- cRbbŋlg gvQ Kxfvte wberPb Kiv nq tm m`u`K`e`vL`v Ki tZ cvi teb|
- cRbbŋlg gvQ i cKzi Kxfvte mvi cŋqM Kiv nq Zv RvbtZ cvi teb|
- cKzi i cwb Kxfvte i ŋYvteŋY Kiv nq eYv Ki tZ cvi teb|
- cRbbŋlg gvQ tK Kxfvte m`u`i-K Lv` t`qv nq Zv e`vL`v Ki tZ cvi teb|
- cRbbŋlg gvQ i cwi c`Zv Kxfvte Zj wS`Z Kiv hvq eYv Ki tZ cvi teb|



#### cRbbŋlg gvQ gRZ Kivi wbgvej x

th tKvb gvQ wekI Kti Kvc`RvZxq gvQ cRbtbi Rb` chw msL`K cRbbŋlg ev eY gvQ gRZ Kiv AZ`vek`K| Dbz Dcutq gvQ Pvl Kiv Kwl`g cRbtbi KgmP ev`evqtbi ceRZ` mWVK ev fij vte Pvl Kiti eY gvQ Atc`ŋVKZ.AvtMB thsb cwi c`Zv jvf Kti, cRbbKvj`xN`vqx nq Ges AtbK mg`q GKB cRbb FZ`z GKwaKevi cRbb Kiv`bv hvq| mWVK e`e`vcbv MhY Kiti t`kv Ges PvBubR KvtcP wKQyMkQygvQ Zuvor cwi c`Zv jvf Kti Ges tdeYvix NgvP`gv`mB cRbb Kiv`bv hvq | H GKB gvQ tK 2N2.5 gym ci tgNR`b Ges 3q evi AvM`-Ntm`b`v`i cRbb Kiv`bv m`e| eY gvQ e`e`vcbv ej tZ w`v`ij wLZ Kiv`v`j xi mgw` eSvq |

th tKvb gvQ wekI Kti  
Kvc`RvZxq gvQ cRbtbi  
Rb` chw msL`K  
cRbbŋlg ev eY gvQ  
gRZ Kiv AZ`vek`K|

- 1| cKz wberPb I cŋZKiY
- 2| gvQ i cRwZ wberPb, gRZKiY I i ŋYvteŋY
- 3| mvi cŋqM
- 4| m`u`i-K Lv` cŋqM
- 5| ni tgvb Bb`Rkktbi gva`tg cwi c`Zv Zj wS`ZKiY
- 6| cRbtb e`e`vZ gvQ cvj b|

#### cKz wberPb

ga`g AvKv`i i cKz (0.5-1.0 tn±i ) hvi Mfxi Zv 1.5-2.0 wgvUvi Ges AvqZvKvi Ges hvi cvo mg-Xvj z`v m`ube(2:1/3:2) cRbbKvix gvQ gRZ Kivi Rb` fij | cKzi i Zj t`ki gvU GtUj ev t`vAvk Ges Kv`vi cwi gvY 10-15 tm.wg. nI qv DvPZ| cKz tK m`u`Y`f`c i`Kv`bvi Rb` Dbz cvBwcs e`e`v`v`KtZ nte| cKzi AS`Mv`x I ein:Mv`x cvBtci e`e`v`v`KtZ nte hv`Z cKzi cwb t`qv hvq Ges cŋqvRtb Kgv`bv hvq| cKz eb`v I Liv t`tK i`ŋv cvl qvi e`e`v`v`KtZ nte| cKz Ggb RvqMvq nZ nte thLv`b chw Avtjv evZv`mi e`e`v`v`KtZ nte| cKzi i cwb i Zvcgv`v` 27-32`tm. ntj fij nq| Dcti`vtj wLZ kZm`gn`ci-Y Ki tZ cvi tj gvQ i thsbv`v`i ev`x Zj wS`Z nq|

eY gvQ i cKzi i cwb i  
Zvcgv`v` 27-32`tm.  
ntj fij nq|

#### eY gvQ wberPb, gRZ I i ŋYvteŋY

2-4 eQi eq`mi 1-5 tKwR I R`b i m`y`v`m`ube`l wbtivM i`B, KvZjv, gtMj, wnj fvi Kvc` Ges Mm` Kvc`m`vavi YZ eY gvQ wntmte wberPb Kiv nq| Zte KvZjvi t`ŋt`l 3-4 eQi eq`mi`x gvQ Ges 2-3 eQi eq`mi c`jy gvQ wberPb Kiti fij dj cvl qv hvq| c`jy Ges`x gvQ wfbw`v`b`e`Dr`mi nI qv DEg| m`vavi YZ At`v`e`i gv`m eY gvQ gRZ` i`i`ynq| wj 1/2 c`K Kiv m`e` ntj gRZ`KZ.gvQ`x I c`jy gvQ i Av`v`v`Z 1t1 nI qv DvPZ| c`jy I`x gvQ tK wfb`e`

cRbbŋlg`x I c`jy  
gvQ tK eY gvQ etj |



Wgl qjv gvtQi cKzi cZw b mbqgZ myg Lvevi w`Z nte| Lvevti wbr` e cwi gvY Dwm`c I cYx tcUub, KvevBtWU I PveRvZxq Dcv`vb \_vKtZ nte|

**m=úíK Lv` cÓqM (Supplemental feeding)**

Wgl qjv gvtQi cKzi cZw b mbqgZ myg Lvevi w`Z nte| Lvevti wbr` e cwi gvY Dwm`c I cYx tcUub, KvevBtWU I PveRvZxq Dcv`vb \_vKtZ nte| iB, KvZjv I gMj gvtQi cKzi Avav Kt=úv÷ Lvevi hvZ AaMx Pij I KjvB (1t1) 50%, %Lj -20%, tMvei - 20% I gvtQi \_ov ev tikg tcvKvi KxU A\_ev KmvBLvbi Dm`Qó- 10% w`Z nte| Wg Qvovi cti gym t`K t`ni IRtbi 3-4% Lvevi w`Z nte Ges Wg Qvovi GK gym ce`ntZ 1-2% nvti Lvevi w`Z nte| Zte cRbb Kivtvi GK mBvn AvtM t`K Lvevi t`qv eU Kti w`Z nte| Mm KvcPK Dm`i t`ni IRtbi 1.5-2 \_b ZvRv RjR Dm`c thgb nBmWjv, f`vuj m`bwcqv, bvrvm BZ`w` A\_ev t`bwcqv Nvm Lvevi wntmte w`Z nte| Wg Qvovi cieZP gym t`K Avevi Wg t`qvi GK mBvn ce`chS Lvevi w`Z nte| dvBtUvcwUub thgb w`úiybv, Avmtj Uviqv I tKt`ijv Pvl Kti wnj fvi KvcPK t`qv thZ cvti | Wg Qvovi cieZP gym ntZ cUg w`K D`P nvti Lvevi t`qv nq hvZ gvQ `Z nvi t`v `f` wdti cvq Ges tMbvW ewx jvf Kitz \_vtK | tMbvWvi cwi c`Zvi mvt\_ mvt\_ gvtQi Lvevti cZ AvMh Ktg hvq ZvB tk`li w`K Kg cwi gvY Lvevi w`Z nq | Wg Qvovi GK mBvn AvtM t`K Lvevi mieiv eU Kti t`qv nq kixti i PveKgvbvi Rb` hvZ gvQ KwlG cRb`b fvj fite mvov t`q | AvZwi`<sup>3</sup> Pve`Afz`j kb ev Wg gY ntZ cZvEUKZvi m`v Kitz cvti | mvi lvi `Lj ev avtbi Kavi PvBtZ Zjvi wevPi \_ovi m`vZ wUvngb B thvM Kti Lvl qvtj tMbvWvi cwi c`Zv fiv nq | Kvii Kvii gZ KvZjv gvQ`K i`ayavtbi Kav Lvl qvtj nitgvb BbtRKKtbi cZ fvj mvov t`q | Zte myg Lvevi w`tj me mgqB fvj dj cvl qv hvq |

**eY gvtQi cwi c`Zv ZjvS`Z KiY**

Y eW gvtQi tMbvWvi cwi c`Zv ZjvS`Z KiY Rb` w`R. A\_ev GBP, w`R (H.C.G.) `eb mgq mgq BbtRKKb t`qv nq |

Y eY gvtQi tMbvWvi cwi c`Zv ZjvS`Z Kivi Rb` w`R. A\_ev GBP, w`R (Human Chorionic Gonadotropin) `eY mgq mgq BbtRKKb t`qv nq | cwi c`Zv NUvtvbi Rb` KvZjv gvQ`K 3-4 wg. Mh/tKwR, iB, gMj I Mm KvtcP Rb` 2-3 wg. Mh/tKwR wntmte w`R. Wt`m`f, Rvsvix I tdeyix gvtm GKevi Kti BbtRKKb t`qv nq | GBP, w`R, KvZjv gvtQi Rb` 5 wg. Mh/tKwR Ges iB I gMj i Rb` 4 wgvj Mh/tKwR wntmte Wt`m`f, Rvsvix I tdeiaqvix gvtmi cUg mBvtn GKevi Kti BbtRKKb t`qv nq | Zte wnj fvi KvtcP cUwZ ev cwi c`Zv NUvtvbi Rb` tKvb BbtRKKb t`qvi cUqvRb tbB | nitgvb cUqvMKZ. gvQ webv BbtRKKb` cwi Z gvtQi tPtq AtbK AvtMB cwi c`Zv jvf Kti | D`j - LthvM` msL`K eY gvQ tdeyix gvtmi tk`li mBvn ntZ gvP`gvtmi gvSigvS chS- mgtqi gta` cwi c`Zv jvf Kti | ZvB cUg e`vPi cRbb G mgtq Kivtvi thZ cvti |



**Ablyj b (Activity) t aily,** Avcbvi GKwU n`vPmi AvtQ thLv`b 4 tKwR IRtbi 5wU KvZjv I 3 tKwR IRtbi 4wU iB Gi Y eY gvQ AvtQ | Gt`i tMbvWvi cwi c`Zvi Rb` tKvb` a`tbi nitgvb Kx cwi gvY e`envi Kiteb Zv hv` mnKvti wj Lly |



**mvi gg`** th me cyjy I Y gvQ cRbb Kitz mYlg Zv` i`K cRbbYlg ev eY gvQ ejv nq | cRbbYlg gvQ cRbb Kvtj i AvtMB gRZ I jvj b cvj b Kitz nq | eY gvQ e`ve`vcbvi t`Yt` cKz wevPb I cU`ZKiY, gvtQi cRwZ wevPb, gRZKiY I iYvteY, mvi cUqM, m=úíK Lv` cÓqM BZ`w` Kvh`ejx m=úv` b Kitz nq |



## cuVvEi gj'iqb 9.2

mMK DEti i cuK MK Py (✓) w b|

1/ cRbb7lg gvQ gRz cKzi i Mfxi Zv KZ nI qv DWPZ?

K) 0.5-0.75 ug.

L) 1.5-2 ug.

M) 3.5-4 ug.

N) 5- 10 ug.

2/ gRz cKzi tn±i cZ Kx cwi gvY eW gvQ gRz Kiv DWPZ?

K) 3000-4000 tKwR

L) 4000-5000 tKwR

M) 1500-2000 tKwR

N) 500-1000 tKwR

3/ cRbb7lg gvQoi cKzi gvQ Qvovi cte°cZ tn±ti Kx cwi gvY tMvei mvi w tZ nte?

K) 20000 tKwR

L) 15000 tKwR

M) 10000 tKwR

N) 5000 tKwR

4/ Kwi g cRbtbi ev wWg Qvovi KZw b AvtM gRz cKzi m±ui-K Lveri t`qv eU Kiv nq?

K) 2 w`b

L) 7 w`b

M) 15 w`b

N) 21 w`b

5/ KvZjv gvQoi cwi c°Zv Zi wSZ Kivi Rb` cRbb mgtqi wZb gvm AvtM cZ gvtm KZUKzic.wR. BbtRKkb w tZ nq?

K) 1-2 ug. Mg/ tKwR

L) 5-6 ug. Mg/ tKwR

M) 7-8 ug. Mg/ tKwR

N) 3-4 ug. Mg/ tKwR







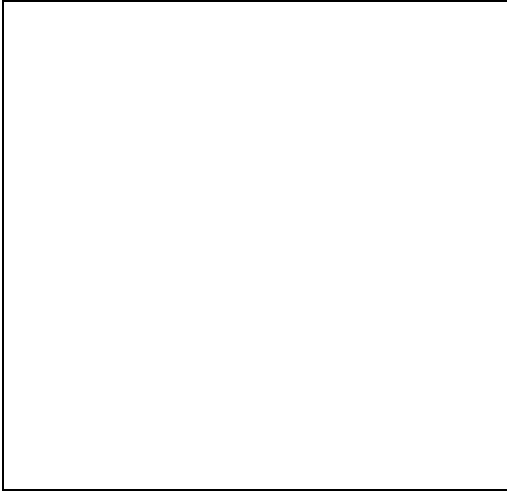
**(M) Խ.Ռ.Օի Drm (Source of pituitary gland)**

cjyA\_ev չ th tKvb gvQ t\_ձKB Խ.Ռ. mslMh Kiv hvq| th gvQ Խ.Ռ. e`envi Kiv nte H GKB cRvzi gvQ t\_ձK mslMpxZ Խ.Ռ. tewk KvhRix| GKB cRvzi bv ntj l mgMvixq th tKvb gvQ t\_ձKl Խ.Ռ. mslMh Kiv thZ cvti GgbwK gvQ Qvovl Ab`vb` kxZj i<sup>3</sup> mewkó c0Yxi Խ.Ռ. l gvQ cRbibi Rb` e`envi Kiv thZ cvti | K`vUwdk ev gv\_i RvZiq gvQi Խ.Ռ. KvcRvZiq gvQi cRbibi e`envi Kiv thZ cvti Avevi Zvi necixZfiteI m`e| `i m`uRixq gvQ t\_ձK mslMpxZ Խ.Ռ. i BbtRkkibi tWvR ev gvIv GKUzemoq w` tZ nq|

cjyA\_ev չ th tKvb gvQ t\_ձKB Խ.Ռ. mslMh Kiv hvq| th gvQ Խ.Ռ. e`envi Kiv nte H GKB cRvzi gvQ t\_ձK mslMpxZ Խ.Ռ. tewk KvhRix| GKB cRvzi bv ntj l mgMvixq th tKvb gvQ t\_ձKl Խ.Ռ. mslMh Kiv thZ cvti GgbwK gvQ Qvovl Ab`vb` kxZj i<sup>3</sup> mewkó c0Yxi Խ.Ռ. l gvQ cRbibi Rb` e`envi Kiv thZ cvti | K`vUwdk ev gv\_i RvZiq gvQi Խ.Ռ. KvcRvZiq gvQi cRbibi e`envi Kiv thZ cvti Avevi Zvi necixZfiteI m`e| `i m`uRixq gvQ t\_ձK mslMpxZ Խ.Ռ. i BbtRkkibi tWvR ev gvIv GKUzemoq w` tZ nq|

**gv\_vi Lvj AcmiY Kti Խ.Ռ.mslMh**

gv\_vi Lvj i ԽKQyAsk Dci t\_ձK niv KivZ w` tq tKtU tdj tZ nte (ԽՒ-68) | tQvU gvQi t`qjT nvo KivUvi (bone cutter) w` tql Lvj Ztj tdjv hvq| Lvj Ztj tdj tZB gw`t`i Dci ami PveRvZiq c`v`ot`Lv hvte| Ztjv w` tq ami c`v`cwi`vi Ki tZ nte| BnvZ gw`t`i Dci c`p cwi`vi fite t`Lv hvte| gw`t`i mvgtbi w` tK Aew`Z Aj d`vKUix (bwmKv) brf` I AcuUK (P`jz brf`Pglv w` tq Խto tdj tZ nq| GLb gw`P`u tK DvMq ԽQtb i w` tK tdj w` tZ nte| Խ.Ռ. gw`t`i ԽtPi AcuUK KivRgvi ( ԽU P`jz qyGtK Acti i necixZ w` tK P`j hvq dtj Dnvi v GK RivMvq Խgij Z nq hvK AcuUK KivRgv etj ) ԽQtb Aew`Z|



ԽՒ 68 t gvQi gv\_v| gvQi gv\_vi Lvj i th Ask tKtU mwi tq tdj tZ nte Zv m`v ti Lvi gva`tg t` Lv tbi ntq tQ|

KvcRvZiq gvQi t`qjT Խ.Ռ. GKvU cvZj v c`P 0vi v gw`P` t\_ձK c`K \_vK|

tKvb tKvb gvQi t`qjT Խ.Ռ. gw`t`i mvt\_ tj tM \_vK dtj gw`P` DVtbi mgq teBtbi mvt\_ Խ.Ռ. l Dtv Avtm| Zte tewki fivM t`qjT B gw`P` DVtj Խ.Ռ. Dnvi Ae`v tB t\_ձK hvq| KvcRvZiq gvQi t`qjT Խ.Ռ. GKvU cvZj v c`P 0vi v gw`P` t\_ձK c`K \_vK| mveavZv Ae j`b Ki tZ nq hvZ gw`P` DVtbi mgq c`m n Խ.Ռ. teBtbi mvt\_ Խg tK bv hvq| ԽPglv w` tq c`m mveavb ԽQtb i w` tK mwi tq tdj tZ nte| Gi dtj Խ.Ռ. Dgy` nte (ԽՒ-69) | Խ.Ռ. ԽtK m` ԽPglv ev m`Pi mivth` Lg mveavb MZ` t\_ձK Ztj tKvb t`vUw`tK 100% B\_vbtj ivL tZ nte| Խ.Ռ. ԽtK A`jZ ti tL Dnvi Mvtq tj tM \_vKv gvsm tckx ev i<sup>3</sup> cwi`vi Ki tZ nte| ԳZc0B Խ.Ռ. 0i Kvh`qgZv nwm cvq|



Getmij DU A`ij tKvj uc. uR. tK cmb`ib` I Pwe`b` Kti | 100% wei x A`ij tKvj e`envi  
Ki tZ nte KivY nitgvb cmb tZ `eYxq| `xN`mg tqi Rb` uc. uR. msi qY Ki tZ tM tj  
A`ij tKvj gvtS gta` cwi eZB Kti bZb A`ij tKvj w` tZ nte|

**(L) Gim tUrb uc. uR. msi qY**

Gim tUrb uc. uR. msi qY Kiv t tZ cti Zte G tZ ti wdRv ti Uti i c`qvRb nh| ZvB thLv b  
ti wdRv ti Ui tbB tmLv b G c`xZ e`envi Kiv hvq br|

gvtQi gv\_v t\_ tK uc. uR. msl`ni mvt\_ mvt\_ B DnvtK wei x Gim tUrb ev eidkxZj Gim tUrb  
ivLv nq| fvqj t\_ tK Gi ci tKvb ti wdRv ti Uti 36-48 NvUv Rb` ivLv nq| m`uY`cwb  
i`b` I d`vU i`b` Kivi Rb` G mg tqi gta` 8-12 NvUv ci ci Gim tUrb cwi eZB Ki tZ nte|  
Gici uc. uR. tK fvqj t\_ tK tei Kti wd`evi KvM tR i`Kv tbr nq Ges I Rb Kti Ab` GK uU  
toivBj fvq tj Gim tUrb w` t q `vbr`li Kiv nq| fvqj u tK cti ti wdRv ti Uti e`envi ce`  
ch`msi qY Kiv hvq|

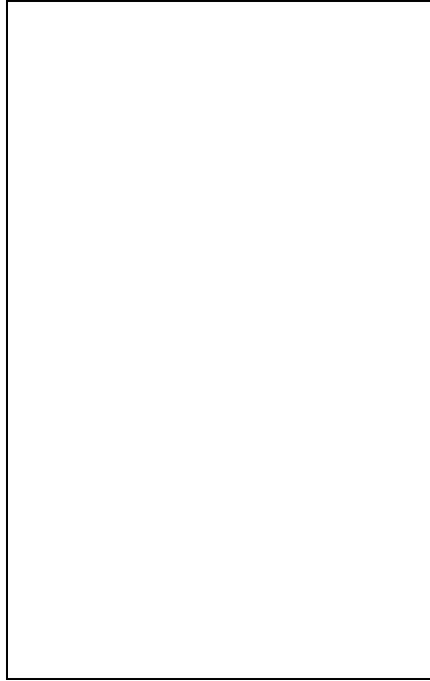
**(M) ZvR vcl`Rs Gi gva`tg uc. uR. msi qY**

m` msMpxZ uc. uR. mi vmi w/cwd tR msi qY Kiv t tZ cti |

**4| nitgvb Bb tRk kb `Zwi (Preparation of solution for injection)**

gvtQ Bb tRk kb t` qvi wK ce`gy tZ` uc. uR. n tZ nitgvb `eY `Zwi Ki tZ nq| c` t g eY  
gvtQi I Rb AbzvtZ wK cwi giv uc. uR. `iKvi nte Zv wmi e Ki tZ nte| c`qvRbxq  
cwi gvY/msL`K uc. uR. fvqj t\_ tK tei Kti GK uU wd`evi KvM tRi Dci 1-2 wgvU ivLv nq  
hv tZ A`ij tKvj i`K t q hvq| mvgv` cwiZZ cwb ev 0.3 % mvari Y j eY `eYmn uc. uR. tK  
GK uU wUmy tnvgtRbvBRv ti tbqv nq| Zte Gim tUrb msi qY uc. uR. mi vmi fvqj t\_ tK  
wUmy tnvgtRbvBRv ti `vbr`li Kiv nq (wP t -70)|

gvtQ Bb tRk kb t` qvi  
wK ce`gy tZ` uc. uR. n tZ  
nitgvb `eY `Zwi Ki tZ  
nq|

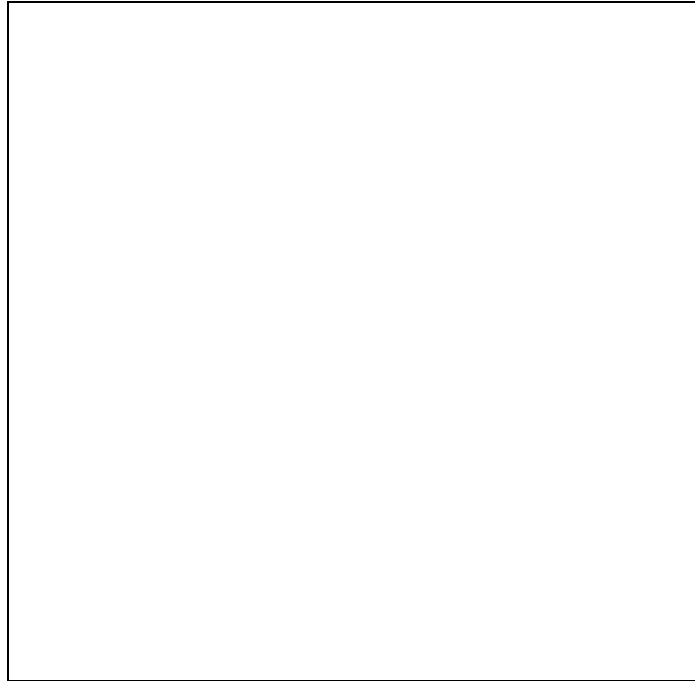


¶ 70 t UmytnvgnRbvBRvi

cwi®vi b`x ev cKzi i cwb hvi uc. GBP ubDUtj (7) Zv gva`g intmte e`envi Kiv thtZ cvti | UmytnvgnRbvBRvi uc.¶R.¶K GKU `tUi mnvth` tciY Kiv nq hvntZ uc.¶R. hZUKzm=e e`euZ gva`g wgtk hvq| tclbKZ. uc.¶R.¶Z c¶qvRbxq NbZj cvl qvi Rb` `iKvi ntj Avil cwb/`eY thvM Ki¶Z ntZ cvti | Kx cwi gY gv¶K Bb¶RkKb t`qv nte Zvi DciB wbf¶ Ki¶e KZUKz`teK e`envi Ki¶Z nte| gtb ivL¶Z nte `eY thb L¶B Nb ev L¶B cvZj v br nq|

mvaviYZ 2-3 ug. M¶g uc.¶R. 0.1 ugij `e¶Y `exfZ Kiv nq| A\_¶ c¶Z ugij `e¶Y 20-30 ug: M¶g uc.¶R. i `eY `Zvi Kiv nq| G gv¶v c¶qvRtb Kgv¶v ev evov¶v thtZ cvti | gv¶Qi AvKv¶i i I ci wbf¶ K¶i mte¶P 1 ugij Ges me¶æ 0.1 ugij `eY Bb¶RkKb t`qv thtZ cvti | D`vniY`¶c GKU c¶RbbKvix gv¶K 45 ugij M¶g uc.¶R. Bb¶RkKb w`¶Z nte| hv` c¶Z 0.1 ugij wj Uv¶i 3 ugij M¶g uc.¶R. `exfZ Kiv nq Zvntj 45 ugij uc.¶R. i Rb` 1.5 ugij `te¶Ki c¶qvRb nte | ¶Kš' th¶nZzc¶e¶ejv nt¶Q th GKU gv¶Qi Rb` mte¶P 1 ug. wj. M¶g `eY e`envi Kiv DvPZ tm¶¶¶¶ c¶Z 0.1 ugij -G 5 ugij M¶g uc.¶R. i `eY `Zvi Ki¶Z nte| dj `¶c tgvU ni tgvb `e¶Yi cwi gY nte 0.9 ugij |

uc.¶R.¶i mmtcbmb tnvgnRbvBRvi t\_¶K GKU tm¶UtdDR tgv¶tbi uJDte `vbs¶i Kiv nq| Xjvi c¶e¶tnvgnRbvBRvi fij v¶te t¶K wbtZ nte hv¶Z K¶i t\_Zv¶v M¶SKYv fij v¶te `e¶Y wgtk thtZ cvti | Gici `eYmn uJDev GKU n`¶v¶j Z A\_¶ ev we`y Pw¶j Z tm¶UtdDR tgv¶tbi `vcb Kiv nq (¶¶-71) | tgv¶tbi Pj bv Ki¶j A`eYxq Kbv uJDte i Zj vq Rgv nte Ges cwi®vi `eY Dvvi Dc¶i Ae`v¶ Ki¶e| Bb¶RkKb t`qvi Rb` GKU cwi®vi m¶vi ¶¶i mnvth` uJDte i Dvvi v¶¶Mi `¶Q `eY tm¶UtdDR uJDe ntZ Z¶j tbqv nq|



117 71 t n` Pwj Z tmwUtdDR tgnkb

**11.11. BbtRKKtbi t1WR ev gv1v**

11.11. `etYi m1WK t1WR 1ba1Y Kiv Ku1g c1Rbtbi Rb` L9B , i9cY9 `f gv1v tKvb tKvb mgq Avt`S KvhRix bv ntZ c1ti Avevi AwaK gv1v Ac03 11Wg QvotZ eva` Kti hvi dtj 11Wg cwi 01t1bi AbgvZ Dj - LthvM` n1ti Ktg hvq| ni9v1bi gv1v 1ba1bx th me Ab1YUK me`gvb Zvi gta` gv1Qi eqm, AvKvi Ges thSb cwi c`Zvi Ae`v me1Ptq te1k , i9cY9 GuU m1WKfite 1ba1Y Kiv L9B Ku1b KviY A1bK mgq t`Lv hvq th GKB c1RwZi, GKB eq1mi Ges GKB AvKv1i gv1Qi gta`I thSb cwi c`Zvi Zvi Zg` cwi j11Z nq| Avevi th mg`11c.11. e`envi Kiv nte tm,tjvi KvhRixZvi gta`I cv`R` \_vKtZ c1ti ev\_vKvB `f1meK|

th c1RbbKvix gv1Q1K BbtRKKb t`qv nte Zvi IRtbi Dci w11E KtiB BbtRKKtbi/ 11.11.0i cwi gvY 1ntme Kiv nq| A1bK mgq thSb cwi c`Zvi gta` Zvi Zg` tnZzGKB AvKv1i gv1Q1K GKB cwi gvY BbtRKKb w`tj I dj vdtj i gta` cv`R` t`Lv hvq|

11Wg hw` cwi c` bv nq A\_ev 11Wg hw` 11W^1j tZ wgtk hvl qvi Ae`vq tcStQ Zvntj AwaK gv1vq BbtRKKb w`tj I fij dj cvl qv hvq bv ev gvQ Avt`S 11Wg Qvto bv| AwfAZvi Avtj v1K e1YgvQ 1be1pb Kti GK1U 1b1r 0 gv1vq BbtRKKb w`tj 60-70% t11t1 gvQ c1Rbb Kti \_v1K| t`Lv t1tQ th hw` c0\_1gK ch1q GK1U `f gv1vi BbtRKKb Ges 4-6 N1Uv ci A1c11vKZ.AwaK gv1vi BbtRKKb w`tj fij dj cvl qv hvq| i agv1 `x gv1Q 21U BbtRKKb t`qv nq| Zte c1jy gv1Q Zj tctU Pvc w`tj hw` fij wge` (i1vY)bv tei nq Zvntj c1j1 i t11t1 21U BbtRKKb w`tZ nte| mvi wY-1 G KtqK1U , i9cY9gv1Qi 11.11. BbtRKKtbi gv1v c0E ntj v|

gv1Qi Pvl I e`e`vcbv

ni9v1bi gv1v 1ba1bx th me Ab1YUK me`gvb Zvi gta` gv1Qi eqm, AvKvi Ges thSb cwi c`Zvi Ae`v me1Ptq te1k , i9cY9

A1bK mgq thSb cwi c`Zvi gta` Zvi Zg` tnZzGKB AvKv1i gv1Q1K GKB cwi gvY BbtRKKb w`tj I dj vdtj i gta` cv`R` t`Lv hvq|

mvavi YZ t KtqKuU , iZcygvtQi uc.ՊR. BbtRkktbi gvTiv|

gvTQi bvg	uc.ՊR. i cwi gvY (cՉZ tKwR gvTQ)		tgU
	cՉg BbtRkktb	ՊZԻq BbtRkktb	
KvZjv	2-4 ւցւյj Mճg	7-8 ւցւյj Mճg	9-12 ւցւյj Mճg
iԹ I gTmj	2-3 ւցւյj Mճg	5-6 ւցւյj Mճg	7-9 ւցւյj Mճg
ււյj fvi Kvc©	2-4 ւցւյj Mճg	8-10 ւցւյj Mճg	10-14 ւցւյj Mճg
Mճm Kvc©	2-4 ւցւյj Mճg	7-9 ւցւյj Mճg	9-13 ւցւյj Mճg

hԻ՝ uc.ՊR. IRb Kivi Rb՝ tKvb յԵԼԻ e՛ւտյ՛Y bv յտK Zւտյj msL՛v ւււմտել uc.ՊR. BbtRkktb t՛qv thtZ cւտի | Gt՛Պt՛T GKB cՔււՅi GKB AvKւտի i cււi c՞ gvQ t՛տK msMքւZ 1-3ւU uc.ՊR. GKtRւոյ eՄ gvQտK BbtRkktb t՛qv nq|



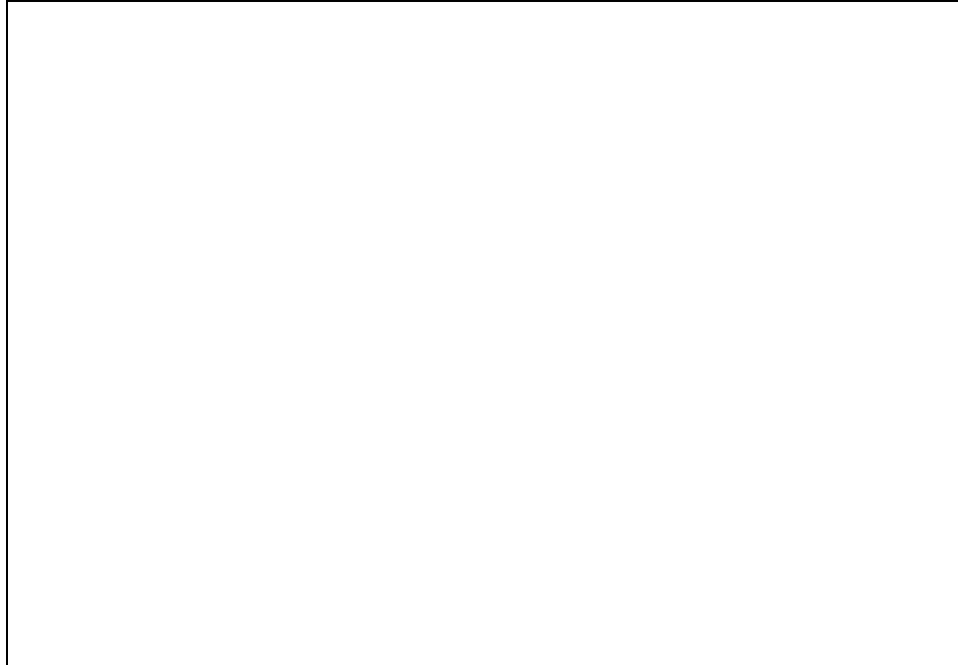
**Ablyj b (Activity) t aily,** Avcbvi GKU n՛ւPււi tZ 4 tKwR IRtbi 10ւU KvZjv, 4 tKwR IRtbi 5ւU iԹ I 3 tKwR IRtbi 5ւU gTmj gvQ AvtQ| 1g I 2q BbtRkktb cՉqտMi t՛Պt՛T KvZjv, iԹ I gTmj gvTQi Rb՝ Kx cwi gvY uc.ՊR. i cՉqRb hԻ՝ mnKւտի ւյ LԵ|

**niտgv BbtRkktb cՉqM cxւZ (Method of hormone injection)**

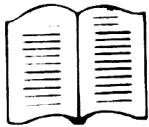
mvavi YZ Aճtցւստճckւզ (intramuscular) BbtRkktb ծւււ niտgv eՄ gvTQ cՉqM Kiv nq| GQւոյ AճtMնեւիզ (intraperitoneal) BbtRkktbi gvա՛տI niտgv cՉqM Kiv thtZ cւտի | Bւտճcււi tUmbqւյ BbtRkktb tկտբ cւLbv ev eՊ cւLbvի tMւոյոզ t՛qv nq| Zte G cxւZtZ gvTQi Af՛ճիւY AճtMi ՊւՅi mթեւ յտK| յեճI Kտի hLb ֆgvTQi ււՅթկզ AւՅւի՞ cւi c՞ ււՅg արտի Rb՝ քաճ nq| GQւոյ ci ci cՉqMՄKZ. Bւտճcււi tUmbqւյ BbtRkktb յեճI Kտի hLb uc.ՊR. ՛եY ՕւԿւ nq bv, ՊւՅKի c՛ււե տճtZ cւտի |

mvavi YZ  
Aճtցւստճckւզ  
(Intramuscular)  
BbtRkktb ծւււ niտgv  
eՄ gvTQ cՉqM Kiv  
nq|

Ab՛ւր tK BbUտցւմKտի BbtRkktb cՉqM cxւZ մնRZi I տեւ KւհՔիւ | G BbtRkktb mvavi YZ tյ tRi AԱճtj A\_ev cճ. cւLbvի ւտP Ges cւկթի Lvi Dcտի i Aճt cՉqM Kiv nq| ՛յւ BbtRkktbi t՛Պt՛T DfqcւտկՔւU Kտի t՛qv nq| BbUտցւմKտի BbtRkktbi Rb՝ GKU AvBտի ւտP cՉg t՛տնի մցւճիւտյ Ges cտի 45՞ tKւտY mP cՉեկ Kիւտbv nq (ւՔT-72) | 2 ււ.ււ. gvտci նւBտcւււոցՔ ււււi Ա niտgv BbtRkktb t՛qvi Rb՝ մնRZi/DcտիւՄ | B.D.H. (eՄJk WՄM նւDm) mP bs 22 ծւււ 1-3 tKwR IRtbi gvQտK, tQւ AvKւտի i gvQտK 19 bs mP ւ՛տզ մնտRB BbtRkktb t՛qv thtZ cւտի |



¶PÎ 72 t gvtQi tj tRi AÂtj Aštgvsmtckiq BbtRkKb c×wZ t` Lvtbv nt`Q|



**mvigg** cYw` Z cRbtbi Rb` ucUBUvix Mš` msMh Kiv Avek`K| ucUBUvix Mš` gvtQi gw`i`i btP Aew`Z GKw , iZcY`Ašt`iv Mš`| uc.¶R. Gm†Uvb ev A`ij tKvntj msi¶Y Kiv nq| uc.¶R. ¶Umytnvtg¶Rb¶Rvi Øviv tcl†Yi ci `èY `Zwi Kti cØqvRbxq gv¶vq Avštgvsmtckiq BbtRkKb Øviv cØqvM Kiv nq|



### cuVvEi gj'iqb 9.3

mW/K DEti i cuK W/K WPy (✓)w b/

1/ ucUBUvi x Mš' ej tZ Kx eSvq?

- K) GK ai tbi ein: qiv Mš'
- L) gw-t®i GKw Ask
- M) GKw AwZ , iZcYAsť qiv (bij xrx) Mš'
- N) GbRvBg Drcv`bKvix Mš'

2/ Kx ai tbi gvQ t-tK uc.wR. msMh Kiv DvPZ?

- K) gZ Ges cPb m-ubantqfQ Ggb
- L) thšb cwi c° gvQ
- M) GKB cRwZi th tKvb gvQ
- N) mgtMvI xq th tKvb gvQ

3/ uc.wR. msi qfY e-üZ mefPtq DEg i vmvqubK `e" tKvbuU?

- K) GumtUvb
- L) Getmvij DU B\_vbj
- M) di gvij b
- N) mvj wcdDwi K GumW

4. ucUBUvi x Mš' tKv\_vq Aew`Z?

- K) gw-t®i wbP
- L) gw-t®i Dcťi
- M) gw-t®i m-šyFvM
- N) gw-t®i wfZťi

5/ cŰZ vgvij vj Uvi `etY Kx cwi gvY uc.wR. `exfZ Kiv DvPZ?

- K) 5-10 vgvij MŃg
- L) 10-12 vgvij MŃg
- M) 15-18 vgvij MŃg
- N) 20-30 vgvij MŃg



### cW 9.4 Wlg dltbvi cjuqv, dltbvi cveK mgr- Ges dltbvi wefbæ cfti e`envi



#### G cW tkI Avicb -

- Wlg dltbvi Kj vtKskj e`vL`v KiZ cvi teb|
- Wlg dltbvi cveK mgr-m`utK`Avtj vPbv KiZ cvi teb|
- Wlg dltbvi wefbæKskj /cfti e`envi Kxfite KiZ nq Zv eYv KiZ cvi teb|

#### Wlg dltbvi cjuqv



#### cRbb cKvô t`tk Wlg msl` I cwi ùltb cKvô `vbsi

Wtgi wfZi aY hLb tgvPovtbr wePj b (twisting movement) i iyKti ZLbB WgtK dltbvi cKvô `vbsi i Rb` msl` Kiv DvZ Kvi Y G mgq Wlg tewk k<sup>3</sup> nq hvi dtj ZjbvgyKfite tewk aKj mn` KiZ cfti | cRbb nvcv t`tk Wlg msl` Kivi Rb` cùtg nvcvi Zj t`tki evab Ltj Ltj t`tk Avj v`v Kti Avt`- Avt`- Dcti DvZ nq hvZ Wlg, tjv nvcvi tLj vgtL Ptj hvq| cRbbKvix gvQtk Wlg msl`ni cti nvcv t`tk mi vtbv nq| tmRb` Ah\_v bivPvov Kti WgtK Qvotq bv w`tq mveatb gvZvvcZv gvQtk Ab` `v b mi vtbvi Rb` cùbwi Z Kiv nq| GLb WgtK GKv Kvc, tcqvj v ev weKviti i mrvth` nvcv t`tk Zj tbqv nq Ges GKv evj wZz WKQycvb w`tq tmLvb ivLv nq|

cRbbKvix gvQtk Wlg msl`ni cti nvcv t`tk mi vtbv nq|

#### Wtgi , Yv, Y I cwi gvY vbaY

Wlg, tj vtK AvqZvKvi gkwi i Rij A\_ev big qz` dtk m`ubæKvcto tbqv nq| GgZve`vq `Rb tj vK KvcvutK `Bv tK niv w`tq cwbz at i ivLz nte| KvcvU Gi ci Avt`Avt` DvZKiZ nte hvZ Kti mg`cwb i wKtq hvq| AZ:ci Wlg, tj vtK GKv weKvi, Kvc ev gtM vbtq AvqZb tqt vbtq dltbvi cKvô ev nvcv `vbsi KiZ nte|

bglvq msl`v Wtgi AvqZb I msl`vi mrvth` AvZ mn`RB Wtgi tgvU AvqZb I msl`v wmvve Kiv hvq| tewk vbfj wmvthi Rb` wZbvU bglv msl` Kiv nq| wZbvU bglv Wtgi MvmsL`v cùZ weKviti Wtgi Mo msl`v vbt`R Kti | vbt`Pi m`F Avyvti Ly mn`RB tgvU Wtgi msl`v wmvve Kiv hvq|

tgvU Wtgi msl`v = cùZvU weKviti Wtgi MvmsL`v × tgvU weKviti msl`v | Wtgi tgvU msl`v Rivvi m`\_ m`\_ Wlg vbw t<sup>3</sup> i I cwi ùltbvi nvi vbtai m`F Avyvti tei Kiv hvq|

$$\text{Wlg vbw t}^3 \text{ i kZKiv nvi} = \frac{\text{vbw}^3 \text{ Wtgi msl`v}}{\text{GKv bglvq Wtgi msl`v}}$$

#### Wlg dltbvi cveKmgr-

Wlg dltbvi cixq`Yi dj vdj Atb, tjv cveK vrv vbcvšZ nq| thgb t

#### Wtgi cwi`Zv

Wlg c`jvcyi cwi` bv ntj cwi ùltbvi nvi Kg nte | nitgvb BbtRkKb w`tq KvlG cRbtbi mgq nitgvbi gvIv Avak ntj AtbK Acwi` Wlg wegy nq - tm, tjv d`v bv|

Kul. I cju Dbqbb`z

**cmbtZ`exfZ Aw tRb**

th cmbtZ wlg dltvbi Rb` ivLv nq, tmLvtb chfB Aw tRb`\_vKv c@qvRb| thtnZzGKwU  
cvfT` ev nvcvq AfbK wlg GKmvf`\_ ivLv nq tmRb` Aw tRtbi c@qvRb nq| Aw tRtbi  
cwi givY Kg ntj AfbK wlg gvi v hvq| Avevi gZ wlg cBtbi dtj cmbtZ Aw tRtbi cwi givY  
Avfiv Ktg hvq|

wlg dltvbi Rb`  
cmbtZ chfB Aw tRb`  
\_vKv`iKvi|

**cubi Ab`ib` tfSZ I ivmqubK` Yv`Y**

th cKzi nvcv`\_vcb Kiv nq, A`\_er th cub wlg dltvbi wvfbocvT` e`envi Kiv nq, Dnvi  
tfSZ I ivmqubK` Yv`Y thgb uc.GBP, `exfZ Kwv c`v`\_© bviBU`BU, Gtgvbqv BZ`w  
cwi wqZ Ae`vq`\_vKv DvPZ |

**ZvcgvT`v**

wlg dltvbi t`qT` ZvcgvT`v Ab`Zg c`veK| ZvcgvT`v Kg ntj wltgi mBZvi Kvj`\_wvqZ nq,  
Avi teik ntj mBZvi Kvj`\_wvqZ Ktg hvq| Zte Gi GKwU mn`mxgv i`qtQ|

**cubi cEvn**

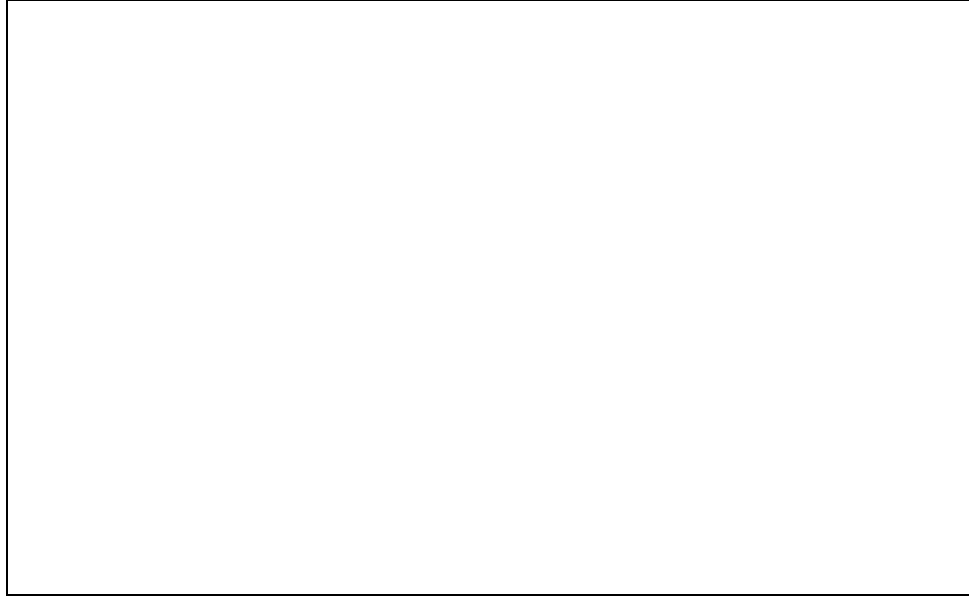
e`vKvi n`vPvvtZ fij fite wlg dltvbi Rb` Aveivg cubi cEvn eRvq ivLtz nq| Zv bv  
ntj wlg gvi v hvte|

**wlg dltvbi Rb` wvfbocvT`/hšcwZi e`envi**

**n`wPs nvcv**

ti Yyfcvbi tdlvvevi nvcv ev n`wPsnvcv cRbb nvcvi gZ cvZjv gwKb` Kvcv tmj vB Kti`\_Zwi  
Kiv nq| cRbb nvcvi gZ Dcti Kvcvtoi XivKbv`\_vKv bv | wKs`GLvtb`\_wv nvcv`\_vKv, GKUv  
evBtii nvcv AvKvi 2x1x1 Nb wqUvi gwKb` Kvcvtoi tmj vB Kti`\_Zwi Kiv| Aci GKwU  
wvZtii nvcv AvKvi 1.5 wq. x 75 tm.wq. x 75 tm.wq. (wP`-73)| Kvcvtoi`\_Zwi wvZtii  
nvcvUv evBtii nvcvi gta`\_wvZvi mivvth`\_teta ivLv nq | cRbb nvcvi gZ n`wPs nvcv  
cKzi i cmbtZ Ges b`x I Lvjt i wKbvfi Pvi w`\_tK evk w`\_tq LvUvfv nq| wvZtii nvcvZ 2-  
3 wj Uvi (c@q 40,000-75,000wU) wlg fij fite Rti gta`\_Qwotq ivLv nq| nvcvZ  
ivLevi 10/12 NÈv cti wltgi tLvj m`\_tj v wvZtii nvcvZ AvU`K`\_vKv | wvZtii nvcv Lvjt mivv`\_tq  
ivLv nq| evBtii nvcvZ ti Yyfcvbi wZb w`\_b chS`i ivLv nq| ti Yyfcvbi Kzgy`\_wv (yolk  
sac) t`\_tK Lv`\_cvq| Ab`\_tKv Lv`\_G mgq c@qvRb nq bv| wltgcvb`\_k wgvj wj Uvi  
AvqZtbi Kvc ev Ab`\_tQv cvfT` tgc Abgvb Kiv nq KZ wlg tcvb Drcv`\_b ntj v Ges  
wlg t`\_tK ti Yyfcvbi chvq AvvtZ KZ mgq j wltj v|

cRbb nvcvi gZ  
n`wPsnvcv cKzi i cmbtZ  
Ges b`x I Lvjt i wKbvfi  
Pvi w`\_tK evk w`\_tq LvUvfv  
nq|



IPĪ 73 t n`mPs nrcv

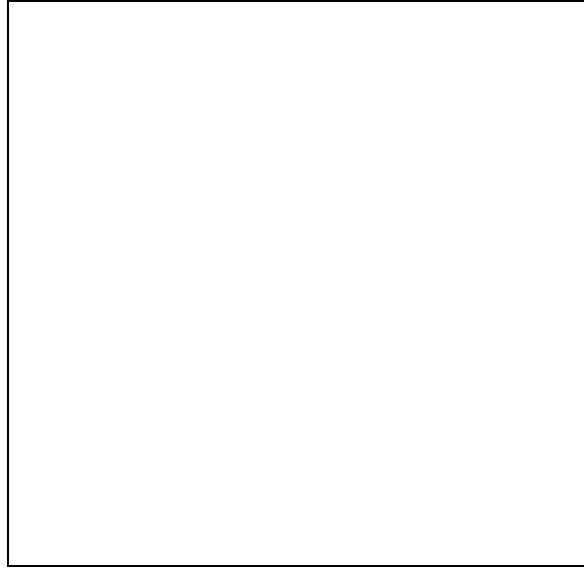
**MamRvi n`Pwi**

MamRvi n`Pwi tZ wWg cĀŁŁtbi KvR cte`ewWZ KvcĀoi n`mPs nrcv t\_ĤK AĤbK DbZ cwi tēk fij fivte m`ubakiv hvq |

G n`Pwi i cĀvb Ask wmwte \_vKte (1) cwb mieivĤni Rb` cĤZ ev fzMF` cwb DtĒvj tbi Rb` wDe I tġj c`vú mn (2) DĒZ `mcZ Rjvavi (water reservoir) (AvqZb 5500 wj Uvi) (3) cĀRbb cĤZ ev Rjvavi (breeding unit) (4) KvĤPi `Zwi wWg cĀŁŁtbi Rvi (incubation and hatching jars) (cĀZwU 6.35 wj Uvi) | KvĤPi Rvi \_wj t`LĤZ DtĒvĤbv tevZtj i gZ, Dcti i Ask tġvUv, wĤPi Ask μgk: miy (5) ti Yytcvbr mĀq ivLevi Rjvavi (spawnery) (IPĪ-74) | 50,000 gvĤQi wWg cĀZ KvĤPi RvĤi ivLv nq | KvĤPi RvĤi i gĤa` cwb bĤj i mivĤh` wĤPi gĤy w` tġ cĒvnnZ Kiv nq | cĀZ wġvĤU 600-1000 wġwġ . cwb GB Rvi \_tj tZ cĒvnnZ Kiv nq | wġj fvi Kvc` (silver carp) gvĤQi wWg \_tj vi Rb` cwb cĒvn wġvĤU 800-1000 wġ: wġ : cĀqvRb nq | wWg cĀŁŁtbi cĤi RĤj i cĒvn mġvĤb` ewx KĤi m` RvZ ti Yytcvbr KvĤPi RvĤi Dcti i tLjv gĤy w` tġ GKwU tLjv bĤj i mivĤh` cwb i mĤ½ RjvavĤi cĒvnnZ Kiv nq | bó wWg I eR` Ask RvĤi i gĤa` \_vĤK | KvĤPi Rvi n`Pwi tZ wWg t\_ĤK ti Yytcvbr tZ wWg cĀqvRb nq 15 NĒvi gZ | ti Yytcvbr mĀq Kivi RjvavĤi i Dci SvSwi i mivĤh` cwb eI` Kiv nġ \_vĤK | ti Yytcvbr wZbv` b RjvavĤi mĀZ ivLevi cĤi bvmĤi cĤZi `vbršwi Z Kiv nq | Gi Kg 40wU KvĤPi Rvi hġ n`Pwi tZ cte`wġ wLZ Ab`vb` miĀvg I e`e`w` mn cĀq 20 j` | ti Yytcvbr GKevĤi Drcv` b m`e |

KvĤPi Rvi n`Pwi tZ wWg t\_ĤK ti Yytcvbr tZ wWg cĀqvRb nq 15 NĒvi gZ | ti Yytcvbr wZbv` b RjvavĤi mĀZ ivLevi cĤi bvmĤi cĤZi `vbršwi Z Kiv nq |





uP1 75 t eEivKvi n`vPwi

c0q`kj q Wlg c0Z  
NbwgUvi Rjvavti c0Uzb  
Kiv hvq/

Wlg c0Uzb Rjvavi eEivKvi, GKtKw`K (concentric), Dfq Ask h9 | Rjvavi BU I  
umtgbUi `Zwi, wfZti e`m 3-4 ugvvi, Mfxi Zv 1 ugvvi | Rjvavti cwb c0vvnZ Kievi  
bj`tjv Zjt`tkl cik`tk msh9 Kiv nq, hvfZ cwb eEct` umtgbUi `Zwi Rjvavti  
wbiweirQbeFvte c0vvnZ nq | c0q`kj q Wlg c0Z NbwgUvi Rjvavti c0Uzb Kiv hvq | Wlg  
c0Uzb eEivKvi Rjvavti wfZti tjvvi cvfZi `Zwi eEivKvi Kq `wcz nq Ges tjvvi  
KqWU bBj`bi `Zwi c`P0viv AveZ Kti | GBfvte GKB Rjvavti gta` Avi GKU AŠR q  
(inner chamber) ivLv nq | cwb Mfxi Zv eRvq ivLevi Rb` cwb w:mi`Yi btji e`v  
\_vtK/

GB n`vPwi tZ cwi Kí bv Kti gvtQi cRbb I wbi`0 cwi gvY ti Yytcvrv Drcv`b mae/

**n`vPwi i c0j`b m9amgn-**

gvtQi `rfmeK cRbb elA I ci wbfPkj | wKŠ`AvaybK n`vPwi tZ wbuqšZ cwi tetk ni`gvb  
(hormone) c0qvM elA cteB c0Yw`Z cRbb mntR m`ub0Kiv hvq | wDetqtji  
(tubewell) kxZj Rtj c0Yw`Z cRbb gvP`t`K c0q tmtp`st chS` `wQq gym chS`  
we`Z. wef`kx gvQ wj fvi Kvc, M0m Kvc`Avi I ce`t`K cRbb KivR mdj ntqtQ etj  
Djt - L AvtQ/

cte`Djt wLZ ntqtQ c0vj Z e`v`vq Wlg bó ntZv, dtj ti Yytcvrv Drcv`bi msL`vi Kg  
ntZv | wKŠ`AvaybK n`vPwi tZ Wlg t`K ti Yytcvrv DEitYi wmvve c0q kZKiv 75-80% |  
n`vPwi c0Z`bi dtj cwi Kí bv Kti gvtQi ti Yytcvrv Drcv`b mae nte/



**mvusk t** cRbbKvix gvQžK wWg msMžni cži nvcv t\_žK mivžbv nq| wWg džižbvi Rb“  
cmbžZ chžš Aw žRb \_vKv cžqvRb| wWg džižbvi Rb“ wWgžK wewfbžaitžbi cvĭ thgb-  
n“wPs nvcv, MwmRvi n“vPwi, eživKvi n“vPwi, BZ“w`žZ `vbišli Kiv nq| wWgži cwic°Zv,  
cmbžZ `žxfZ Aw žRb, Zvcgvĭv, cmbi cžvn Gme cživeK žviv wWg džižbvi cžqv  
cživemšZ nq| gvžQi žřimeK cRbb elž Ici wbfžkij| AvayžK n“vPwi žZ wqivšZ  
cwi žžk ni žgib cžqvžM elž cžB cžYw`Z cRbb mžúbaKiv mže|



### **cuVvEi gj`iqb 9.4**

**mWk DEti i cuK Wk iPy (✓) i b|**

1| n`iPs nvcvZ e`eüZ evBti i nvcvUj AvKvi mvavi YZ KZ?

- K)  $2 \times 1 \times 1$  Nb ugUvi
- L)  $2 \times 2 \times 2$  Nb ugUvi
- M)  $2 \times 1 \times 3$  Nb ugUvi
- N)  $4 \times 2 \times 2$  Nb ugUvi

2| KvPi Rvi n`iPwi tZ Wvg t`tK ti Yjtcvrv weKvk tZ mvavi YZ KZ mgq j vtM?

- K) 25 NbUv
- L) 15 NbUv
- M) 30 NbUv
- N) 10 NbUv

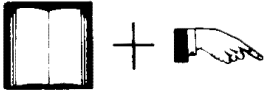
3| eEvKvi n`iPwi i Mfxi Zv KZ?

- K) 4 ugUvi
- L) 2 ugUvi
- M) 5 ugUvi
- N) 1 ugUvi

4| MmRvi n`iPwi i cÜZiU (AvbgnvbK 6.35 ij Uvi) Rvti KqW Wvg i vLv thZ cvti?

- K) 50000 uJ
- L) 5000 uJ
- M) 105000 uJ
- N) 150000 uJ

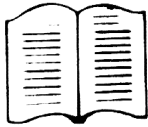
**cW 9.5 cǔKwZK Dm t\_ǰK tcvb mSMh c×vZ, tcvb tUKmBKiy, c`wks, cni enb Ges AvajK chj cǔqM**



**G cW tǰI Avajb –**

- tcvbi cǔKwZK Dm m=utK eYv KiǰZ cvi teb|
- cǔKwZK Dm t\_ǰK Kxfite ǰi Yjtcvbr mSMh Kiv hvq Zv RvǰZ cvi teb|
- tcvb tUKmBKiyi msAv w`ǰZ cvi teb|
- Kxfite tcvb c`wks Kiv nq Zv eYv KiǰZ cvi teb|
- tcvb c`wks Gi ǰKǰkj eYv KiǰZ cvi teb|
- Dbz c×vZǰZ Kxfite tcvb `i-`hǰšmi ei v n Kiv nq Zvi c×vZ eYv KiǰZ cvi teb|

**tcvbi cǔKwZK Dm**



Kiv`RvZiq gvQ Z\_v i ǰ, KvZjv, gǰMj BZ`w` gvQ, ǰjv cǰǰi Pvl Kievi Rb` mgqgZ tcvb mSMh Kiv nq| ǰKbbv Gme gvQ cǰǰi ex cmbǰZ wWg t`qbr| mǰZivs Gme gǰQi tcvb cǔKwZKfite t`qv wbr ǰ `vb t\_ǰK mSMh Kiv nq|

tcvbi mSMhni Rb` PÆMǰgi KYǰǰx b`xi Dcb`x nij`v Ges hgjv b`xi big wǰkl fite Dǰj - LǰhvM`|

Avjv`i t`ǰk b`xi ǰhme `vǰb gǰQi wWg I ǰi Yjtcvbr cǔKwZKfite cvl qv hvq ǰm, ǰjvi cǰvb KǰqKwUj big wǰǰ=ǰcǰ È nǰjv t

**nij`v b`xt PÆMǰg, g`vbNvU, mivNvUvi ivg`vm nvl I bqvi nvl|**

**hgjv b`xt isǰǰi dǰzevox Nvl, gmbKMǰǰi Avvi PivNvU, e, ori mmi qvKiv`x, ǰmvbZjv Ges hgjvi cvkǰZǰǰ evnir`jvev` Nvl, dǰQw Nvl, wmi vRMǰ Nvl I Zrmsj MǰGj vKv|**

**eǰcǰb` t gqgbmsn knǰi i cvkǰZǰcǰjvZb eǰcǰb`|**

**cǰvb`xt ivRkvx ǰRjvi ǰMv`vMvox Nvl, dmi`cǰj ǰRjvi w Gb we Nvl, cvebvi cvKkv Nvl, Kǰqv i vqUv Nvl, PrcvBbeveMǰǰi wKvU`cǰv|**

**MovB b`xt Kǰqv I Kǰvi Lvj x|**

**gajvZ b`xt dmi`cǰj i Kǰvi Lvj x I hǰkvǰi i kǰcǰj I ǰjv`vcvov|**

**Avajqj Lvcb`xt dmi`cǰj i KieviRcǰj, gmbKMǰ ǰRjvi Ziv Nvl t\_ǰK ǰkL Nvl chš msj MǰGj vKv|**

**eoij b`xt eoij b`x thLvǰb cǰvi mǰ\_ wjv Z nǰqǰQ ǰmLvǰ t\_ǰK ivRkvx ǰRjvi Piv Nvl \_vbi AšMǰ Avovx ǰj ǰ=kb chš|**



dwi`ctji tUtKi nvtUi nbKU` Kzvi b`xtZI tcvbvgvQ aiv ntq \_vtK| gqgbwmstni DEti te, bevox tij t=kctbi cvk@ZrGjvKv t\_tK i iyKti `wjtj Kuj xi evRvi tij t=kctbi cvk@ZrGjvKvq avbx tcvbv cvl qv hvq| GQovov wZ`i, Ksm, tmvtgkji x, Kvj xMsMv, Kzvi Luj x b`xl tcvbv c@Bsi Rb` i zcyq

**tcubv mslm c xwz**

b`xgvZK.evsj vt`tki b`x, tjvB Kvc RvZxq gvQi ti Yytcubvri c@vb Drm| el@Kvtj (tg-AvM=) t`tki c@vb c@vb b`x, tjv t\_tK tKwU tKwU ti Yytcubvri aiv nq| b`x t\_tK ti Yy tcubvri aivi KvR KtqKRb tRtj wgtj GKwU `j Mvb Kti \_vtK| tcvbv aivi Rb` metkl GK ai@bi Rvj e`envi Kiv nq hvK mrvvi Rvj etj | Rvtji `N°300-360 tm.wg., Rvtji gly t\_tK tkl c@sl chsl c@q 240-300 tm.wg., tktli tLjv gjt 15-22 tm.wg. Gi gZ tMjvKvi A½jv \_vtK Ges metktl 75-90 tmwUngUvi gvci GKwU MvgQv \_vtK| `wjtj evtku Lwjtj mivvth` Rvj LvUvtbv nq| wQtb `wjtj evtki Lwjtj \_vtK| MvgQvi tkl Astk `wjtj evtku Lwjtj \_vtK| Rvtji eo gly tm@Zi w`tk \_vtK| cwbi tm@Zi mvt\_ wWgtcvbv Rvtji gta` Avtm, cwib tewitq hvq, ti Yytcubvri Ave x nq| Rvtji tktli w`tk tQvU tMjvKvi tLjv gly \_vtK, ZvtZ evtki ev tetZi `Zwi GKwU tMjv ai@bi A½jv \_vtK Ges ti Yytcubvri aivi LvLevi Rb` MvgQwU PZ`vY Kti mivRvtbv nq hvZ A½jv i ga` w`tg ti Yytcubvri Gtm MvgQvq Rgv nq Ges tetP \_vtK| MvgQv Dwtq gvS gvS ti Yytcubvri tZjv nq Ges GKwU evtki `Zwi QvKubi Dci Xjv nq| GtZ ti Yytcubvri mvt\_ hv` Ab`vb` tQvU gvQ ev gqj v \_vtK Zv QvKub w`tg ev` t`qv hvq| Zvici Rxeštji Yytcubvri nvcitZ mvgwqKfite Rgv Kiv nq|

b`xi wKvti i w`tk thLvtb ti Yytcubvri aivi coevi m@tebv tevk tmLvtb Gi Kg A@bK Rvj cici LvUvtbv nq Ges ti Yytcubvri mslm x nq| eU tRtj mvgwqKfite b`x t\_tK ti Yytcubvri aivi KvR Kti RweKv ube@n Kti \_vtK|

**tcubv cwienb**

gvQ Pvl tcvbv cwienb L@B i zcyq fvgKv cvj b Kti | Kvi Y GKgvI mY I mej tcvbv gvQPvl mdj Zv AvbtZ cvti | ZvB tcvbv cwienb e`vcvti i zj t`qv c@qvRb| tcvbv cwienb mgq `jlv wRvtli c@Z j q` i vLtz nte Av tRtbi Afite tcvbv thb cwbi Dcti tftm bv Dtv Ges cwienb mgq thb tcvbv AvNvZ c@B bv nq|

tcubv cwienb c@e@wKQvKQvmbqgvej x tgtb Pj v DvPZ| tKbbv `i` i`stl tcvbv cwienb GKwU Kómva` KvR| Kvi b tcvbv Pjv t`qvi mgq av°vaw°, hibeivtbi Amjev, nimo tft½ hvl qv, cwib e`tj i Amjev cfvz. Kvi tY eU tcvbv gviv hvq| ZvB tcvbv cwienb Kvtj ht\_ó mveavbZv Ae j @b Kivi c@qvRbqvZv itqtQ| GRb` tcvbv cwienb c@e@tcubvtK KivKubs ev tUKmB Kitz nte|

**tcubv tUKmBK i Y (Conditioning of fry)**

tcubv cwienb mgq hvZ gviv bv hvq A\_er Kg gviv hvq tmRb` tcvbv tUKmB Kti wbtZ nq| cwienb mgqUv hv` L@ Kg nq A\_@ KvQvKwQ tKub `v@b cwienb Kitz nq Zintj Rvtji gta` tcvbv titL Pvi w`K t\_tK cwbi c@v w`tz nq| GtZ tcvbv Av RvqMvq \_vKtZ Af`Inte Avi cwbi c@v Av tRtbi mieivn nI qvi mvt\_ mvt\_ tcvbv fq tctq ZvovZmo gj gF Z`vM Kti I emg Kti tCu tek Ljv x Kti tdj te| GtZ cwienb Kvtj tcvbv gj gF Z`vM Kti cwib b@ Kite bv|

b`xgvZK.evsj vt`tki b`x, tjvB Kvc RvZxq gvQi ti Yytcubvri c@vb Drm|

b`xi wKvti i w`tk thLvtb ti Yytcubvri aivi coevi m@tebv tevk tmLvtb A@bK mrvvi Rvj cici LvUvtbv nq Ges ti Yytcubvri mslm nq|

tcubv cwienb mgq `jlv wRvtli c@Z j q` i vLtz nte Av tRtbi Afite tcvbv thb cwbi Dcti tftm bv Dtv Ges cwienb mgq thb tcvbv AvNvZ c@B bv nq|

tcubv cwienb mgq hvZ gviv bv hvq A\_er Kg gviv hvq tmRb` tcvbv tUKmB Kti wbtZ nq|



**tcvrv cwi entbi Dbz (AvanbK) cxiZ**

G cxiZtZ tcvrv cij u\_b e`vM Av tRb w`tq cwi enb Kiv nq| G cxiZ LyB ubivc` I Srtgj vgy| Gfite tcvrv cZ`šl AAtj cwi enb Kiv mae| AvanbK cxiZtZ tcvrv cwi entbi Rb`ub`mj uLZ mi Avtgi cDqvRb nq

- 1| cmóK ev cij u\_b e`vM
- 2| Av tRb umij Úvi
- 3| ivertii bj
- 4| tevW`KvMR
- 5| nij Kv KvtVi ev , Pti \_tj BZ`w` |

AvanbK cxiZtZ cij u\_b e`vM Av tRb w`tq tcvrv cwi enb Kiv nq|



**Ablyj b (Activity) t aily**, Avcub Avcbvi cktzi 2 nvrvi tcvrv Qvoteb| D<sup>3</sup> tcvrv `fi i tKvb n`vPwi t`tk Kxfite cwi enY Kti Avbteb Zv hy<sup>3</sup>mnKvti wj Lly|

**tcvrv c`wKs**

1| mvari YZ cDZuU c`vtKtUi Rb `wD Kti cij u\_b e`vM e`envi Kiv DvPZ Kvi Y``eµtg hvr GKwU e`vM uQ``antq hvq Zvntj uDZxquU cwb I Av tRb mn tcvrvtK i qv Ki tZ m`lg nte|

2| mgvb AvKvtii `gu cij u\_tbi e`vM GKwU AvtiKuUi wFZi XwKtq w`tq GKwU e`vM cwi bZ Ki tZ nte Ges ubtPi Ask KZwKtq w`tq k<sup>3</sup> Kti iwk w`tq evatZ nte hvfZ cij u\_tbi tRvov uQto wltq cwb cto bv hvq| cij u\_tbi e`vM wevfbaeAvKvtii ntZ cti | cwi entbi mjev Ablyvqx GuU `Zwi Kiv thtZ cvti |

3| c`wKs cte<sup>3</sup>tcvrv th cwb tZ ivLv nq mvari YZ t tmB cwb tZ tcvrv cwi enb Kiv DvPZ| ZvB GKB Dm ntZ GKB Zvcgrvvi cwb Geri cij u\_b e`vM XKvtZ nte Ges e`vMi 1/3 Ask cwb tZ fivZ<sup>3</sup>Ki tZ nte|

4| cwb fivZ<sup>3</sup>Kivi ci e`vMi Dcwi fvM nVZ w`tq gDvotq GK nvtZ ai tZ nte Gs ubtPi Ask Avti K nVZ w`tq ati e`vM uD tK Dv`etq I Nvj tq t`L tZ nte tKvb uQ``a c`\_ cwb tewi tq hvq wKbv| uQ``h<sup>3</sup> e`vM cwi nvi Ki tZ nte|

5| cwb fivZ<sup>3</sup>e`vM tcvrv fitZ nte| KZ\_tjv tcvrv GKwU e`vM fitZ nte Zv ct\_i `tZi Ges eM<sup>3</sup>tcvrv AvKvtii Dci wbfP Kti | 36x24 BwA AvKvtii e`vM `D w`tbi hvvq 1/2 t`tk 2 BwA AvKvtii h\_vµtg 3000 t`tk 1000 tcvrv cwi enb Kiv Pti | cwi enb `tZi tewk ntj tcvrv msL`v Kgte Ges `tZi Kg ntj tcvrv msL`v tewk nte|

cwi enb `tZi tewk ntj e`vM tcvrv msL`v Kg nte Ges `tZi Kg ntj tcvrv msL`v tewk nte|

6| cij u\_b e`vM tcvrv XKvtbvi ci Av tRb umij Úvi t`tk btj i mivvth` mZKZvi mvt\_ e`vM Av tRb XKvtZ nte Ges e`vMi 2/3 Ask Av tRb w`tq cY<sup>3</sup>Ki tZ nte| Av tRb t`qvi mvt\_ mvt\_ e`vMi gly k<sup>3</sup> Kti teta w`tZ nte hvfZ Av tRb tewi tq bv hvq| GLvth Dti - L` th, Av tRb mi ei vtni AvtM e`vMi glyu Avj tZv fite gDvotq wbtZ nte (wP`-76)|





76 t tcvbr cwi enb | (1) Lwj Ub (2) Aw tRb wmwj Uvi (3) Aw tRb Mvimi bj (4) cwb I tcvbrmn cij w\_b e'vM (5) Ub eU Kievi XvKbv |

**7 | Pti e'vM I Kuv e'envi**

tcvbrmn tevPKv evav cij w\_b e'vMU cwi entbi myavt\_Pti e'vM, Ub A\_ev KUVbi wFZi XvKtq wbtZ nte | Pti e'vM A\_ev KUVbi cij w\_b e'vMUtK wivc' i vLtz mnvqZv Kti | Pti e'vM e'envi Kij Dnv gvtS gvtS cwb w tq wvRtq w tq e'vMi cwi ZvcgvTv ev tiva Kiv hvq | Gtz tcvbr fij \_vK (76) |

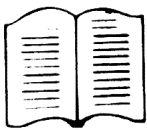
**mZKZv**

(1) hvZvqtZi mgq j 7 i vLtz nte hvZ tcvbr ev me mgq Qvqv Ges wivc' vtb \_vK | tKvfvte hvZ e'vM w'bv nq ev tdtU bv hvq tmv tK wvkl w' i vLtz nte |

(2) MSe'v b tctQ ev ev Pti \_tj t\_tK e'vMU Lj cktzi i cwbZ wgvBU cvtPK tdtj ti tL e'vMi gly Lj tdj tZ nte |

(3) e'vMi gly tLjvi mgq AwZ mZKZvi mnZ axi axi Lj tdj tZ nte | Kvi Y Aw tRbi Pvc axi axi bv Kvgtq nVv Kti gly Lj tdj tj cwi tetki AvKwSK cwi eZbi Rb tcvbr 7wZ nI qvi m'vbr \_vK |

e'vMi gly tLjvi mgq AwZ mZKZvi mnZ axi axi Lj tdj tZ nte |



**mvusk t** c'KwZK Dm t\_tK cRbb Kvtj wvfbv'x t\_tK mvvvi Rvj bvgK GK ai tYi wvkl Rvj Oviv tcvbr mSMh Kiv nq | tcvbr cwi enYKvtj hvZ gviv bv hvq tmRb' tcvbr tUKmBKiy Kitz nq | c'wZb c'wZtZ nmoZ Ges AvvK c'wZtZ Aw tRb c'wZtZ w\_b e'vM tcvbr cwi enY Kiv nq |



### cuVvEi gj`iqb 9.5

mW/K DEti i cuK uJK iPy (✓)w b|

1/ tKv\_v t\_tK iB, KvZjv l gMti i tiYjcvbv msMh Kiv nq bv?

- K) PAMtgi nvj`v b`x
- L) gqgbwstni cijvZb epcy`b`
- M) Ki tZvqv b`x
- N) hgbr b`x

2/ tKvbW nmo tZ tcvbv cwi entbi mgm`v bq?

- K) cmb tZ O<sub>2</sub> `f Zv t`Lv t`q
- L) cmb tZ CO<sub>2</sub> Gi cwi gvY tefo hvq
- M) cmbi uc GBP Ktg hvq
- N) Lv`i Afve cwi j wZ nq

3/ mrvri Rvtj i `N`mvavi YZ KZ tmwUngUvi ?

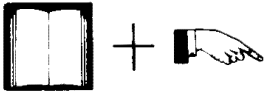
- K) 300-360 tmwUngUvi
- L) 130-260 tmwUngUvi
- M) 120-240 tmwUngUvi
- N) 100-150 tmwUngUvi

4/ cij w\_b e`vM tcvbv cwi entbi Rb` cij w\_b e`vMi KZ Ask cmb tZ fivZ`Ki tZ nq?

- K) 2/3 Ask
- L) 1/3 Ask
- M) 3/4 Ask
- N) 1/2 Ask



### cw 9.7 tcvb/`iYyUKmBKiy, c`wks I cwi enb cxvZ tkLv



#### G cw tk`I Avcb –

- tcvb tUKmBKiy m`utK`e`enwi K Avb jvf Kitz cvi teb|
- tcvb c`wks I cwi enY m`utK`ej tZ I wj LtZ cvi teb|



#### tUKmBKiy

- 1| R`tj i gta` tcvb ti tL Pvi w`K t`\_tK cwi c`evn w` b|
- 2| tcvb tK c`kzi nvcvq ti tL A\_ev tP`sev`Piq Aí cwi c`evn tKvb Lvevi bv w` tQ GKw` b ivLy|
- 3| Dch`y cxvZ Avcbri e`enwi K LvZvq wj w`ce`x Kily Ges Avcbri tUDUi tK t`\_wL tQ t`\_v`ji wbb|

#### c`wks I cwi enb

- 1| m`y`avgZ AvKv`i i` wj cvj w`\_b e`vM GKwU Avi GKwUi w`fZi XwKtq w` b Ges wbtPi Ask K`v`wKtq w` tQ k`³ Kti i`wK w` tQ evaly|
- 2| tcvb th cwb tZ ivLv wQj tm GKB cwb w` tQ e`v`Mi 1/3 Ask c`Y`Kily |
- 3| ct`\_i t`\_ZjI tcvbri AvKvi Abjvqx w`w` 0 msL`K/cwi gvY tcvb e`v`M fivZ`Kily |
- 4| Av` tRb w`w`ij Uvi t`\_tK btj i` m`v`v`th` mZ`RZvi m`v`\_ e`v`M Av` tRb XwKtq e`v`Mi Lw`j 2/3 Ask c`Y`Kily Ges e`v`Mi g`ly k`³ Kti i`wK w` tQ evaly|
- 5| tcvb fivZ`C`w`j w`\_b e`v`M tKvb P`tUi e`v`M, KvU`y A\_ev w`Utbi ev`\_ t`\_vcb Kily |
- 6| cwi enYKv`tj tcvbri e`v`MwU Ovqvh`y t`\_v`tb ivLy| P`tUi e`v`M ntj Zv cwb w` tQ gv`S gv`S w`f`wRtq w` b|
- 7| Dch`y Kv`h`ej`x aviv`w`nKfite Av`y`i Y Kti e`enwi K LvZvq wj Lly Ges Avcbri wUDUi tK t`\_wL tQ t`\_v`ji wbb|



### Povšgji`iqb

#### msw`jB I iPbigj-K c`kæ

- 1| grm` cRbb Kx?
- 2| c`Yw` Z cRb`b Ki Yxq Kx Zv mst`jtc wj Lj|
- 3| cRbb`jg gvQ cij `bi Rb` Kxfite c`kz c`Z Ki`eb?
- 4| cRbb`jg gvQ wbe`p`bi `emkó` , tj v wj Lj?
- 5| cRbb`jg gvQi c`kzi m`ú`i-K Lv` c`qvm c`wZ eY`v Kij |
- 6| cRbb`jg gvQi cwi c` Zv Zij m`SZ Kivi Kji`K`Kj eY`v Kij |
- 7| w.c.wR. mSM`ni c`wZ eY`v Kij
- 8| Kxfite w.c.wR. msi`jY Kiv nq Ges Bb`R`Kkb `èY c`Z Kiv nq eY`v Kij |
- 9| gvQ Kxfite w.c.wR. `èY Bb`R`Kkb t`qv nq Zv wj Lj|
- 10| wWg d`zv`bvi c`fveKmg`ni eY`v w`b|
- 11| wWg d`zv`bvi w`fba`c`v`T`i msw`jB eY`v w`b|
- 12| c`Kw`Z`K Drm t`\_`tK Kxfite ti Yj`c`v`v mSM`h Kiv nq eY`v Kij |
- 13| evsj v` `tki t`Kv`b`&t`Kv`b` `vb t`\_`tK i`B, KvZjv I g`Mj gvQi t`c`v`v mSM`h Kiv nq Zv wj Lj|
- 14| Avay`bK c`wZ`Z Kxfite t`c`v`v cwi`enb Kiv nq Zv eY`v Kij |



### D`E`igjv

#### cW 9.1

- 1| M                      2| K                      3| M                      4| N

#### cW 9.2

- 1| L                      2| M                      3| K                      4| L                      5| N

#### cW 9.3

- 1| M                      2| L                      3| L                      4| K                      5| N

#### cW 9.4

- 1| K                      2| L                      3| N                      4| K

#### cW 9.5

- 1| M                      2| N                      3| K                      4| L





**G Avtbi cãb`enkó`mgn**

1. G Avtbi gvQ ej tZ mKj Kuvj Rbvm, tevbx wdk, cã, wk`ú, Ggwdieqvb, Ui UtqR, Uvi Uj m, μv÷vnmqvb, G`vntgjm, tgvjv`m Ges BKvBtbrWig©Gi RiebPtμi mKj avc`K eSvte|

2. G Avtbi wdkvni ej tZ mKj cKvi Rjvkq, cãKwZK ev Kuvlg, gS` ev Ave×, tmiZ`x ev w`i, thLvfb gvQ Drcv`b, msi`Y, cãkã, cãRbb, Avni Y BZ`w` KgRvU RwoZ; Zte Kuvlg AvKqvmi qvg D<sup>3</sup> Avtbi Avl Zvfz` nte br|

3. b`x-bvjv, Lvj -wetj``vqx`vcbvi gva`tg (wd· W BwAb) grm` Avni Y Kiv hvte br, Gifc t`q`I``vqx`vcbr mxR Acmi Y I evRqvB Kiv hvte|

4. Rj tmP, eb`v wqS`Y ev b`gvi Df`k` e`ZxZ b`x- bvjv, Lvj wetj` A`vqx ev`vqx, evel BZ`w` ev tKvb ifc AeKvWtgv wbg`Y Kiv hvte br|

5. Af`si`xY ev DcKj xq Rj vfiqtZ wet`vvi K, e`x` ev Zxi abk` e`envi Kti grm` Avni Y ev Avni tYi c``c` MhY Kiv hvte br|

6. Af`si`xY Rj vfiqtZ wcl` cãqvm, cj`ykb, emYw`K eR`ev Ab`nea Dcv`q gvQ a`sm ev a`stmi c``c` MhY Kiv hvte br|

7. Pvl i Df`k` e`ZxZ mvavi Yfvte b`x-bvjv, Lvj I wetj` msthvM AvtQ Gifc Rjvkq cãZ eQi 1jv Gucj` t`K 31 tk AvM÷ chS`mg`q tkvj, MRvi, UvK gvtQi tcvbri SxK ev``vuz gvQ aiv ev a`sm Kivi c``c` MhY Kiv hvte br|

8. Pvl i Df`k` aivi Rb`h\_vh\_ KZet`ji wku t`K (eZg`v msukw` tRjv grm` KgRZ) wba`i Z wdi` wvbg`q jvBtm`Y cãB br ntj` wvax` 27w b`x, Lvj BZ`w` tZ wba`i Z mg`q th tKvb AvKwZi iB, KvZjv, g`Mj, Kuvj evDm Ges Nibqv Avni Y ev Avni tYi c``c` MhY Kiv hvte br|

9. Pvl i Df`k` e`ZxZ tKvb e`r<sup>3</sup>  
K. cãZ eQi RjvB-wt`m` mg`q 23 tm.wg. Gi wbtPi AvKv`i i KvZjv, iB, g`Mj, Kuvj evDm, Nibqv;

L. cãZ eQi btf`-Gucj` mg`q 23 tm.wg. Gi wbtPi AvKv`i i Bvj k (hv RvUkv b`tg cvii`PZ)

M. cãZ eQi btf`-Gucj` mg`q 23 tm.wg. Gi wbtPi AvKv`i i cvsmvm

N. cãZ eQi tdeyvi`-Rly mg`q 30 tm.wg. Gi wbtPi AvKv`i i wks

O. cãZ eQi tdeyvi`-Rly mg`q 30 tm.wg. Gi wbtPi AvKv`i i tevqj

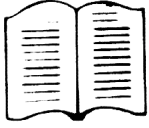
23 tm.wg. Gi wbtPi AvKv`i i Bvj k gvQ`K RvUkv etj |

23 tm.wg. Gi wbtPi AvKv`i i iB, KvZjv, g`Mj, Kuvj evDm, Nibqv, Bvj k, cvsmvm aiv AvBbZ`Übxq Aciva|





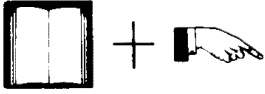




**mvigg** evsj vř`ki grm" mřúř`i Dbřb I mřVK e`enřii Rb" hřMvřthvř grm" AvBb  
 cřqb I ev`řvqb Kiv Avek`K| mřřřI RbK nři grm" AvniY Kiv řbqggřdK grm"  
 Drcv`b mřřbřKiv, gvQřK řejřZvi nřZ ř\_řK i řřv Kiv grm" AvBřbi DřřK`| G jřřB  
 1950 mřřj cřg grm" mři řřY AvBb cřqb Kiv nq| G AvBřbi DřřLřhvřM" řevkó` řjv  
 nřřv 23 řm.řg. Gi řbřPi AvKřii i řř, KvZjv, gřřMj, Křřj evDm, Nřřqv, Břř k, cvřMřm I  
 řřgI qřjv gvQ aiv, cři enb Kiv I řřř Kiv Ges 4-5 řm.řg. Gi řbřPi AvKřii dřř Rřj  
 (KřřřřU Rřj) Gi e`enři řbřř x|

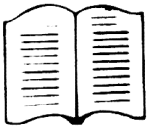


### cW 10.2 AvšR@ZK AvBb I Zvi c@qM vea, AvšR@ZK cwi m@gvbn I e`envti i bwiZgvj v



#### G cW tk`I Avci b –

- AvšR@ZK b`xi cwi e`envti i AvšR@ZK AvBbmg`eY@v Ki tZ cvi teb|
- DcKj xq i vt`of mg`m@gv vbaif`Y Kivi bwiZgvj v eY@v Ki tZ cvi teb|
- mg`t`K Kqiu m@gvbnq vPw`Y Z Kiv n`qt`Q Zv Rvb`Z cvi teb|
- evsj vt`tki mg`m@gv vbaif`t`Y mgm`v Kx Kx Zv D`t`j L Ki tZ cvi teb|



evsj vt`tk b`x I Lmo A`Aj (m`yi eb mn) tgvU RjvqZ`bi cwi gvY 10,31,563 tn`i thLvb t`tK 1.46 j`q tgvUK Ub gvQ Avni Y Kiv nq| G mg`l`b` b`xi A`bK` t`jvB (54uU) AvšR@ZK A`\_q`r` wngv q ceZ n`Z Drcb`nt`q fvi Z AvZ`m@g K`ti evsj vt`tk c`ek K`ti t`Q| DRv`t`bi t`k hv`Z w`m`v`i Avak cwi e`envi bv K`ti A`\_ev f`vU i t`tki cwi bwi w`m`v` e`nZ bv nq t`mRb` AvšR@ZK b`xi cwi e`envti Rb` AvBb c`q`b Kiv n`qt`Q| GK Zidv`f`te cwi D`t`E`j b K`i`j f`vU i t`tki th Kx` q`w`Z nq Zvi D`z`aj c`q`v n`t`Q div`v`v` eta| G evtai dtj evsj vt`tki b`xi grm` m`u`i`i Z`\_v t`tki cwi t`ek I m`te`cwi A`\_bwiZK th` q`w`Z m`v`v`v` n`qt`Q Zv G t`tki RbMY Ly` f`ij f`teB Dc`j`w` K`ti t`Q| ZvB AvšR@ZK b`xi cwi m`u` e`envti i AvšR@ZK bwiZgvj v ev AvBb GLv`b Avt`j vPbv Kiv n`qt`Q| GQvov DcKj xq t`tki mg`m@gv vbaif`Y vbaif`Y A`bK t`tkB b`v`v` R`w`j Zvi D`vni Y Avt`Q| mg`m@gv vbaif`Yx mg`AvB`t`bi K`\_v i GLv`b Avt`j vPbvq` v`b t`ct`q`Q|

#### AvšR@ZK b`xi cwi e`envti i AvBb

AvšR@ZK b`xi cwi b`x Aeew`nKvi iv`of`ng`f`ni m`v`v`i Y m`u`i`E, t`m Kvi`t`YB GB m`u`i`i Avakvi, eva`evaKZv Ges th`š`r`K e`e`v`c`vri` , i`z`i` Acwi m@g| G c`h`st`M AvšR@ZK AvB`t`bi , i`z`i` i` Acwi m@g|

c`P`xbKv`t`j AvšR@ZK cwi e`envti i` `q`v`v` Z`E`j c`P`v`j Z` w`Q`j | GKwU n`t`j v m@gv`v`xb f`L`U`M`Z m`v`e`f`f`g`Z`i (United territorial sovereignty); AcwU n`t`j v m@gv`v`xb f`L`U`M`Z m`snv`Z (United territorial integrity)| c`l`g Z`E`j`U Db`q`b K`ti`w`Q`j DRv`t`bi t`k Ges w`Z`x`q`w`U Db`q`b K`ti`w`Q`j f`vU i t`k| `q`v`v` Z`E`B GKZidv RvZxq` v`t`\_P` bwiZ t`t`K Drm`v`i Z hv AvR`t`Ki c`w`\_e`x`Z APj |

eZ`q`v`b Kv`t`j i Z`E`j`U ZvB `v`v`i` K` w`v`bg`q`l` bwiZi Dci w`b`f`P`k`j hv G`t`K Act`i i Avakvi I eva`evaKZv`t`K` t`Kvi K`ti t`bq| 1972 m`t`j i 15B-16B R`ly` ÷ K`t`n`v`t`g Ab`v`v`Z R`v`v`Zm`st`Ni gv`v`v`e`K cwi t`ek m`p`v`v`l`m`t`f`j` t`b GKw`a`K` `ea KZ`E`j` m`u`i`K`Z` mgm`v` v`b`u`i`E`i` j`t`q`v` m`z`v`i`k Kiv nq th` m`v`v`k` miKviMY GKw`a`K` `ea KZ`E`j`i cwi bwi m`u`i`i`i Rb` m`v`v`k` iv`t`of` g`ta` m`n`th`w`M`Z`v`i D`t`i`t`k` cwi Aeew`nKv` K`v`g`k`b (River basin commission) MV`t`bi K`\_v` w`e`teP`bv Ki`teb|

K) R`v`v`Zm`st`Ni m`b` Ab`v`v`q`x c`l`Z`K` t`k`t`K Zvi w`b`t`Ri m`u`i` Db`q`t`b` v`v`q` KZ`E`j`i w`e`l`t`q` c`Y`@` w`e`i`Y` c`K`v`k` Ki`t`Z` n`te|

L) iv`o`v` t`j`v`i` v`v`i`v` w`b`t`v`e` bwiZgvj v hLb c`h`v`R` n`l` qv D`v`P`Z –







μgvs̄tq DRzntq hrt"Q Ges bZb f wq Mvb KitQ | Avevi cPž tgšmgn epócvZ ašsmvZK NwšSo, mgv̄yK tX D cFwZ KviŷY DcKj xq fLÜ wqZ q̄wqòž dtj Gt̄tki DcKj AZ"šl AnbqwgZ I A"lqx hv ZUti Lv ubaŷŷYi t̄q̄t̄l RuUj Zvi m̄wó KtiQ |

evsj vt`k Zvi fZwZK Ae`tk meŷepbr Kti `k d`v`g mḡy`m̄tgvb̄wZ ti Lvtk wfiEti Lv inm̄te tNvl Yv Kti |

Dcwi D³ fZwZK KviŷY mḡy` AvBb Kbtfbk̄tbi m̄vaviY wfiE tiLv b̄wzi tKvbwUB evsj vt`tki wfiE tiLv ubaŷŷYi t̄q̄t̄l c̄hvR" bq | GRb" evsj vt`k Mfxi Zvi wfiE tZ wfiEti Lv ubaŷŷYi K\_v etj | 1982 m̄tj i mḡy` AvBb Kbtfbk̄tbi Mfxi Zvi c×wZtK "Kvi Kiv ntj I t̄m m̄ūtK̄m̄yúó e`vL`v t`qv nqub | Zte evsj vt`k Zvi fZwZK Ae`tk meŷepbr Kti `k d`v`g mḡy`m̄tgvb̄wZ ti Lvtk wfiEti Lv inm̄te tNvl Yv Kti | G wfiEti Lv evsj vt`tki DcKj ntZ `vb tft` 16 ntZ 30 b̄wUK`vj gvBj AMfxi mḡy` Aew`Z |

DcKj ti Lvtk hw` wfiEti Lv aiv ntZv Zte msj M̄eivómḡt̄ni m̄t\_ evsj vt`tki G m̄s̄m̄všl tKvb meŷivaB t`Lv w`Z br | tKbbv GtZ AvĀw̄j K mḡy` DcKj i Ly w̄bKt̄UB Ae`vb KitZv | w̄Kš' G Mfxi Zvi c×wZtZ (evsj vt`tki fZwZK ev`bZvi KviŷY) wfiEti Lv ubaŷŷY Kivq wfiEti Lvi ga`eZr̄GK meivU mḡy` AĀj G t`tki Af`šli xy c̄w̄b m̄u` etj meŷepZ ntZv Ges `fveZB AvĀw̄j K mḡy` i `jZl DcKj t`tk Āt̄bK `i chš̄e`Z. ntZv hv Gt̄tki f, ivRb̄wzi Rb" GKw̄ m̄ȳavRbK Ae`vb | G KviŷYB msj M̄eivó` mḡt̄ni m̄t\_ wfiEti Lv m̄s̄m̄všl G RuUj Zvi GKw̄ P̄e³ wfiEK mḡvaib c̄q̄vRb |

**AvĀw̄j K mḡy` I msj M̄eAĀj**

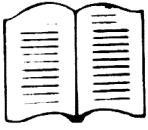
evsj vt`k wfiEti Lv ntZ 12 b̄wUK`vj gvBj AvĀw̄j K mḡy` b̄wzi mg`R Ges 1974 m̄vj ntZB evsj vt`k G b̄wz tḡt̄b Pj t̄Q | mḡy` AvBb Kbtfbk̄tbi c̄Z`K DcKj xq ivóK wfiEti Lv ntZ 24 b̄wUK`vj gvBj msj M̄eAĀj t̄fv̄t̄Mi AwaKvi c̄vb Kiv nq | w̄Kš' evsj vt`k AvĀw̄j K mḡy` ntZ Zvi msj M̄eAĀj 6 b̄wUK`vj gvBj āti cvk Kti | GtZ wfiEti Lv ntZ msj M̄eAĀj i `i-Zj`v̄w̄q 18 b̄wUK`vj gvBj |

**msi w̄Z A\_ w̄w̄ZK AĀj I gn̄t̄m̄cvb AĀj**

c̄Z`K DcKj xq ivt̄ōf m̄vavi YZ 200 b̄wUK`vj gvBj chš̄' m̄si w̄Z A\_ w̄w̄ZK AĀj Ges 200 b̄wUK`vj gvBj gn̄t̄m̄cvb AĀj e`en̄v̄ti i AwaKvi it̄qt̄Q | w̄Kš' ēt̄z̄vc̄m̄M̄ti i fZwĒK ev`bZvi KviŷY evsj vt`tki c̄t̄q̄ GKQ̄T̄ f̄ite G AwaKvi t̄f̄iM̄ Kiv m̄ē bq | evsj vt`tki msj M̄eivóq̄ f̄vi Z I gvq̄v̄ḡvi I hw` GKB m̄t\_ 200 b̄wUK`vj gvBj m̄si w̄Z A\_ w̄w̄ZK AĀj Ges gn̄t̄m̄cvb `vex Kti Zte Ziv̄ i `vexKZ.AĀj evsj vt`tki `vexKZ.AĀj i Dci Q̄w̄ic̄t̄q̄ hvq | gn̄t̄m̄cvb AĀj i w̄ef̄v̄R̄t̄bi t̄q̄t̄l c̄q̄ GKB āit̄Yi RuUj Zvi m̄wó nt̄qt̄Q |

c̄Z`K DcKj xq ivt̄ōf m̄vavi YZ 200 b̄wUK`vj gvBj chš̄' m̄si w̄Z A\_ w̄w̄ZK AĀj Ges 200 b̄wUK`vj gvBj gn̄t̄m̄cvb AĀj e`en̄v̄ti i AwaKvi it̄qt̄Q |

ēt̄z̄vc̄m̄M̄ti i t̄gvU AvqZb 879375 eM̄v̄Bj Ges Mo Mfxi Zvi 2586 w̄gUvi | G m̄v̄M̄ti i gn̄x̄v̄t̄j i c̄wi mḡw̄B Nt̄Ūt̄Q 3000 w̄gUvi Mfxi Zvq | mḡy` AvBb Kbtfbk̄tbi w̄eav̄b Ab̄t̄v̄q̄x t̄Kvb DcKj xq ivó wfiEti Lv ntZ m̄t̄ȳP̄P 350 b̄wUK`vj gvBj A\_ev 2500 w̄gUvi Mfij mḡy` Zj t`k ntZ 100 b̄wUK`vj gvBj chš̄' gn̄t̄m̄cvb t̄f̄iM̄ KitZ cvi te | GLb evsj vt`k hw` G Mfxi Zvi `i-Zj b̄wz Ab̄t̄v̄q̄x mḡy` Zvi gn̄v̄t`k̄x AĀj i t̄kl m̄x̄v̄ ubaŷŷY Kti Zte Zv nq̄t̄Zv ev ēt̄z̄vc̄m̄M̄i Q̄w̄ōt̄q̄ Av̄t̄iv `w̄q̄t̄Y AM̄h̄i n̄te | G KviŷY ēt̄z̄vc̄m̄M̄ti Mfxi Zvi `i-Z̄p̄w̄Z Acivci `v̄d̄ ivt̄ōf c̄t̄q̄l M̄h̄Y Kiv m̄ē n̄te br |



**mvi gg** AvšR̄ZK b`xi cwib b`x AeewwKvi ivómḡni m̄vavi Y m̄úw̄É| mgq AwZewwZ  
 nI qvi m̄t\_ m̄t\_ c̄w\_exi fLŪMZ m̄ú` w̄bt̄kl n̄Z Pj̄t̄Q| ZivB m̄ḡw̄K m̄ú` ḡvb̄j̄ i  
 Kiv̄Q AvKĪxq n̄q D̄t̄V̄t̄Q| d̄t̄j c̄ŪZ̄W ivóB GLb mḡj̄ i Dci Zvi AwKv̄t̄i i ēv̄c̄īt̄i  
 AZ̄š̄l m̄t̄PZb| mḡj̄ i wek̄ij Ḡj̄v̄Kv̄t̄K mḡj̄ ZŪt̄iLv, Av̄Āw̄j̄ K mḡj̄ AĀj, msj M̄em̄ḡj̄  
 AĀj, m̄siw̄j̄Z A\_ŵ̄w̄ZK AĀj, ḡn̄x̄t̄m̄v̄c̄v̄b Ges Dbk̄j̄ mḡj̄ AĀj w̄n̄t̄m̄te w̄P̄w̄j̄Z Kiv  
 n̄t̄q̄t̄Q| 1982 m̄t̄j̄ i mḡj̄ AvBb Kb̄t̄fbkb Ab̄j̄v̄q̄x ZŪt̄iLv t̄\_̄t̄K 12 b̄w̄UK̄`ij ḡv̄Bj ch̄š̄l  
 Av̄Āw̄j̄ K mḡj̄ AĀj, 24 b̄w̄UK̄`ij ḡv̄Bj ch̄š̄l msj M̄em̄ḡj̄ AĀj Ges 200 b̄w̄UK̄`ij ḡv̄Bj  
 ch̄š̄l m̄siw̄j̄Z A\_ŵ̄w̄ZK AĀj w̄b̄āj̄ Y Kiv n̄t̄q̄t̄Q|



**c#VvĒi gj'iqb 10.2**

**m#K DĒti i c#k #K #Pý (✓) # b |**

1/ ZUti Lv n#Z KZ b#K'ij gvBj chŠGj vK#K AvĀij K mgÿ#AĀj etj ?

- K) 14
- L) 12
- M) 16
- N) 20

2/ msi#Z A\_#ZK AĀj ZUti Lv t\_tK KZ`i-chŠ#e`Z?

- K) 100 b#K'ij gvBj
- L) 150 b#K'ij gvBj
- M) 200 b#K'ij gvBj
- N) 300 b#K'ij gvBj

3/ fZvĒK ev`éZvi Kvi tY wfiĒti Lv #ba#tY ersj v#ki c#ite #K #Qj ?

- K) 1 d'v`g mgÿ#m#gvb#Z ti Lv#K wfiĒ ti Lv aiv n#e
- L) 5 d'v`g mgÿ#m#gvb#Z ti Lv#K wfiĒ ti Lv aiv n#e
- M) 10 d'v`g mgÿ#m#gvb#Z ti Lv#K wfiĒ ti Lv aiv n#e
- N) 20 d'v`g mgÿ#m#gvb#Z ti Lv#K wfiĒ ti Lv aiv n#e

4/ et#vc#M#i i Mo Mf#i Zv tKv#U?

- K) 1525 #gUvi
- L) 2050 #gUvi
- M) 3165 #gUvi
- N) 2586 #gUvi



### Povšgji`vqb

#### msiŋB I iPbvji-K cĭke

- 1| grm` msi ŋY AvBb cĭq#bi D#i`k` , t j v ij Lly|
- 2| grm` msi ŋY AvBb 1950 Gi AvI Zvq ewYZ wena mg#ni `enkó` ij Lly|
- 3| AvŠR#ZK b`xi cmb e`enit i AvŠR#ZK bwiZgvj v eYŋv Ki ly|
- 4| DcKj xq i vtóŋ mgŋmŋv ubaŋ Y Kivi bwiZgvj v eYŋv Ki ly|
- 5| mgŋGj vKv#K KqW fv#M fM Kiv n#q#Q Dn#` i eYŋv w` b|
- 6| ersj vt`tki mgŋmŋv ubaŋ #Yi mgn`vej x eYŋv Ki ly|



### DĖi gvj v

#### cW 10.1

- 1| L                      2| K                      3| M                      4| N

#### cW 10.2

- 1| L                      2| M                      3| M                      4| N