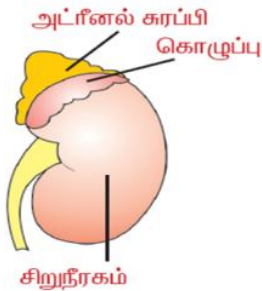


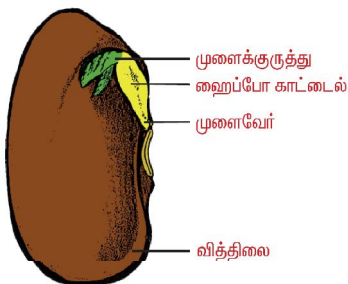
gj j hk; tFgG mwptay;
fhyhz Lj Nj uT tpi l fFwpgG

- 1) gl l h
2) Nehahsp gadgLj Jk; c l i kfs;
3) fi z ak;
4) tpi j
5) nghl l hrpak; mNahi l L
6) \$okf;fi ury;
7) \$okf;fi ury;
8) nj hq;fy;
9) fhuk;
10) rpi j TWj y; tpi d
11) Rop
12) , J tpyj uhRnfhz l mstpl ggLfwwJ.
13) 82-l tpi mj pfk;
14) kpd;dhwwy;
15) 4V
16) m) rpwppd capudq;fS f;fpi l Na c ss khWghL
M) Ngupdq;fS f;fpi l Na c ss khWghL
17) nel i l > Fl i l NghdW Gwj Nj hwwj j py; ntspggi l ahf nj upAk; gz Gfs; Gwj Nj hwwg;
gz Gfs; myyJ gNdhi l g; vdggLk; Gwj Nj hwwggz GfS f;Ff; fhuz khd FNuhNkhNrhk;
myyJ [l d; mi kgG [Ndhi l g; MFk;
18) ep/g; [l d; - i el u[i d epi yepWj Jj y;
tt - myylyfs;
c apurrrrgGfs; - c apur fz pgnghwppi s c Uthf;f
] nl knry; - khWghL mi l ahj nry; FOKk;
19) 1) Mj jkdj d; Nj hdwpaJ Mggppf;fh
2) 75000-10000 Mz l fS fF Kddu; j w;fhy N` hNkhnrpggad;fS; Nj hdwppdhu;fS;
20) 1) NkhNdhFNshdy; vj pugGgnghUl;fS; vdgi t Xupd nry; vj pugGg; nghUl;fshFK;
2) , i t i ` gupl NI hkh nj hopyEl gj j py; FNshdnry;fshy; c wgj j p nraaggLfwwJ.
3) , i t GwWNeha;fF vj puhf gadgLj j ggLfwwJ.
21) j dpahdJ khi yffz ; Neha; , J i t l l kpd; V Fi wghl l hy; tUfwwJ. kwwi t kugpay;
Neha;fS;
22) 1) i l ghaL - eppd; %yk; guTk; Neha;
2) epNkhdpah - fhwwpd; %yk; guTk; Neha;
3) val;] ; - ghypdj nj hl uG %yk; guTk; Neha;
4) fhrNeha; - fhwwpd; %yk; guTk; Neha;

23)



- 24) m) A kwWk; R rup A-f;F rupahd tpsf;fk;
25)

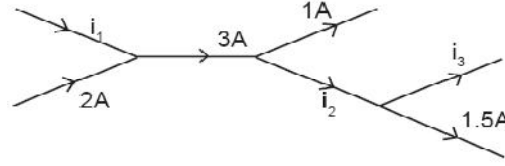


- 26) gpsj j y; - GNuhl NI hNrhthd;fS; - ghfBupahf;fS;
mUkGj y; - gpi uNahgpyyk; - <] l ;
Jz l hj y; -] i gNuhi fuh - j l i l gGO;fS;

- 27) m) MI NI hNfKp M) fU (nfhLf;fggl tpy; y)
- 28) m) fhugd;i l-Mfi rL M) fhuNghi ` lNul;
- 29) 1) nrkgUj j p - c wgg j pahsu;
2) i el NuhghfBupah - rpi j ggi t
3) ntlLf;fsp - Kj yepi y EfuNthu;
4) Xz hd; - , uz ;hk; epi y EfuNthu;
- 30) jhtu kj i t → tpyqF kj i t → rpwpa kb; → kb;nfhj j p
- 31) mNj ntggepi yapy; fi uf;f , ayhJ. fi uri y rwW RAl wwpdhy; NKYk; ruf;fi ui a fi uf;f KbAk;
fhuz k; ntggk; mj pfupf;FkNghJ fi unghUspd; fi uj pwDk; mj pfupf;fwJ.
- 32) m) fhugd;i l-Mfi rL
M) mj pf mOj j k; nfhLggj d; %yk; mj d; fi uj pwi d mj pfupf;fyhk;
- 33) m) RI; Rz z hkG epy; fi uj y; xU ntgg c kptpi d. nghJ thf ntgg c kptpi dapy; ntggk; m9j pfupf;FkNghJ fi uj pwi d; Fi wfwJ.
M) nghJ thf fi uryd; ntggk; mj pfkhdhy; %yf;\$Wfspd; , af;fk; mj pfupggj hy; fi uj pwDk; mj pfupf;Fk; ntggknfhs;tpi dapyk; , t;thNw ntggk; mj pfkhdhy; fi uj pwDk; mj pfupf;Fk;
- 34) m) 2 x Mtp ml uj j p = xgG %yf;\$W epi w.
M) mZ vdgJ j d; Nj h NrueNj h fhz ggLk;
- 35) pOH = $-\log_{10}[\text{OH}^-]$
= $-\log_{10}[0.001]$
= $-\log_{10}(10^{-3})$
= $-(-3) \log_{10}10$
pOH = 3
pH + pOH = 14
pH = 14 - pOH
pH = 14 - 3 = 11
- 36) ei lngWk; tpi d: Fe + CuSO₄ → FeSO₄ + Cu.
1. , UKG j hkuj i j tpi **tpi dj; j pwD; kpf;fJ.**
2. , t;tpi dapy; , UKG> j hkuj ryNgl bYss j hkuj i j , **l gngahrrp nraafpwJ.**
3. epyewkhf , Uej **j hkuj ryNgl;** gri r epw , **UKG ryNgl;** Mf khWfwJ.
- 37) m) mkpyj j pd; pH kj gg 7-l tpi Fi wthf , Uf;Fk;
M) fhwwi l ffggl ; ghdqfspy; fhughd;f; mkpyk; gadgLfwJ.
- 38) m. c e j k; = epi w x j pi r Ntfk; M. j ut ` byak;
- 39) m. xU epA;l;d; tpi r vdgJ xU **fNyhfpuhk;** epi wAss nghUspd; 1ms⁻² KLf;fj i j VwgLj ;k; tpi rapd; msi tf; Fw;f;Fk;
M. tpi dAk; vj pu; tpi dAk; vgNghJk; , **U NtWggil** nghUspd; k; nraygLk;
- 40) Neh> vj th;
- 41) m) rwej Mwwy; %yk; vdgJ Xh; myF epi wf;F **mj pf** mST Nti y nraaf;\$baJ.
M) gadgLj j f; \$ba tbt;py; c ss Mwwi y k; Lk; ehk; **gadgLj j KbahJ.**
- 42) m) α Mygh> β gl ;h
M) i) γ (fhkhfj thfs) ii) γ (fhkhfj thfs) iii) β (gl ;h) iv) α (Mygh)
- 43)

Nehkpd;tha;	fhhā mkpy Nrkfyd;	fhhā Mfi rL
vj thkpd;tha;	nyfyhOrp kpd;fyd;	Jj j ehfk;
- 44) m) rutpsf;Ffs; nj hl u; , i z ggpy; , i z ffggl Lssj hy;
$$\frac{\text{மொத்த அழுத்தம்}}{\text{மின் விளக்கின் எண்ணிக்கை}} = \frac{240}{12} = 20 \text{ V}$$
- M) rutpsf;Ffs; gff , i z ggpy; , i z ffggl ;hy; xt nthU kpd;tps fFk; fpi l f;Fk; kpd;Oj j NtWghL 240V

45)



$$i_1 + 2A = 3A \text{ vdgj hy;}$$

$$i_1 = 3A - 2A = 1A$$

$$3A = 1A + i_2 \text{ vdgj hy;}$$

$$i_2 = 3A - 1A = 2A$$

$$i_2 = i_3 + 1.5A \text{ vdgj hy;}$$

$$i_3 = i_2 - 1.5A$$

$$= 2A - 1.5A = 0.5A$$

$$\text{vdNt } i_1 = 1A \quad i_2 = 2A \quad i_3 = 0.5A$$

ngUtpdhffs;

46) **Nehaj j Lgghwwy;** : kdj clypy; NehafS fF vj pñhd Fwggpl i xU ti f Neha; fñUkp myyJ mj d; nghUs;fS fF vj pñhf ekJ clyhy; vLf;fggk; el tbf; fNa Nehaj; j Lgghwwhy; MFk; (2 kj pñgz ;)

Nehaj; j Lgghwwhy; ti ffs; (3 kj pñgz ;)

Neha; j Lgghwwy; ; U ti fggk;

1) , awi fahd Nehaj; j Lgghwwy; gwggy;UeNj ngwggLtJ.

2) ngwggL Nehaj; j Lgghwwy; gwe; gpd; ehk; ngWtJ.

, awi fahd Nehaj; j Lgghwwy;

, J , awi fahfNT gwggy;UeNj fhz ggk; j Lgghwwy;

kuGtopahf ehk; ngww j LgghwwYk> ntsi saZ f;fspd; %yk; ehk; ngWk; j LgghwwYk;

, j py; ml qFk;

ngwggL Nehaj; j Lgghwwy;

NehAwW gpd; ngwggLk; j Lgghwwy; ; JTk; ; uz L ti fggk;

1) nraykF ngwggL Nehaj j Lgghwwy;

2) kej khf ngwggL Nehaj j Lgghwwy;

nraykF ngwggL j Lgghwwy;

, J vj th; Nj hdw; Jhz Lj yhy; ngwggLtJ , U ti fggk;

1) Neha; fhuz khf , awi fahf ngwggLtJ. Nehapd; NghJ c Uthf;fggk; Mz bgbh eZ l fhyk; j q;f;Ue;J NehafS fF vj pñhf nraygLk; , J , awi fahd nraykF ngwggL j Lgghwwy;

2) fl LggLj j gL Nehaf;fñUkpfi s Neha; j Lgg; %yk; nrawi fahf nrYj j p mj d; fhuz khf clypy; VwgLk; Mdbghb eZ l fhyk; j q;f;Ue;J NehafS fF vj pñhf nraygLf;wJ. , J nrawi fahd nraykF ngwggL Nehaj j Lgghwwy; v.fh. Nghy;Nah j LgG;rp

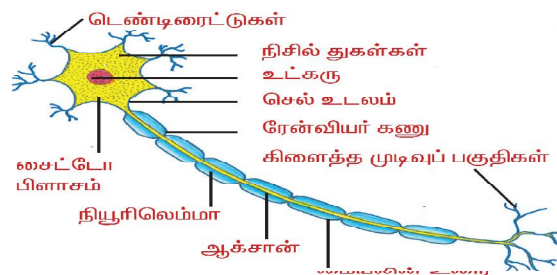
kej khf ngwggL j Lgghwwy;

NehafF vj pñhd vj pñghUl;fs; , awi fahd Ki way; myyJ nrawi fahd Ki way; ngwggLtJ. , U ti fggk;

1) j hpd; , ujj j py;Ue;J ngwggLk; Mdbghb fUTfF nry;tJk> j haggHy; %yk; Foej j fF nry;tJk; , awi fahd kej khf ngwggL j Lgghwwy;

2) Mdbghb nrawi fahf gpw c a;h;f;sp; k;Ue;J ngwggL nrYj j ggLtJ nrawi fahd kej khf ngwggL j Lgghwwy;

47)



(2 kj pñgz)

tpsf;fk; (3 kj gngz)

- 1) eukG kz ;lyj jpd; mbggi l mi kgG kwWk; nry; myFFs; eukG nry;fs; myyJ epauhd;fs;
- 2) eukGnry; %dW gFj pfi sf; nfhz ;J.
 - 1) nry; clyk;
 - 2) nlz ;i uLfs;
 - 3) Mf] hdfs;
- 3) nry; clyk; i rlihd; vdggLfjwJ. xOqfww tbt; nfhz ;J. i rlihgpshrk> erpy; Jfsfs; nry; Ez ;Z WgGfi sf; nfhz ;i t.
- 4) nry; clyj jpyUeJ mLj j j j fpi sjj yfSld; \$ba ell rpfNs nlz ;i ulLfs; , i t nry; cli y Nehf;fp kpd;Jz ;lyfi sf; flj ;J fpdwd.
- 5) Mf] hd; nry; clyj j pyUeJ cUthFk; , i ofsp; kpfTk; eL L fhz ggLtJ Mf] hd; , j d; Kbt; , i sj ;J fhz ggLk; Fkpo; Nghdw mi kggpy; KbfjwJ. , i t eukG nry; , i l ntspf; Fkpo; vdggLk; , i t eukG rkpf; fi s flj ;Jk; Ntj gngUshy; epuggglLssJ. Mf] hi dr; RoeJ i kaypd; ci wahy; cz ;lhf;ggLk; , i l ntsps; Nud;tpahfZ ffs; MFk;
- 6) nlz ;i ulfshy; kpd;Jz ;lyfs; ngwggL nry; clyk; kwWk; Mf] hd; topahf flj j ggL eukG nry; , i l ntspf;Fkpo; c ss Ntj ;g; nghUs; %ykhf mLj j Lj j eukG nry;Yf;Ff; flj j ggLfjpdwd.

48) g;fFk; jhtuqfs;py; ghy;pd; ngUf;fj jpd; , uz L epfo;Tfs; ei l ngWfjwJ.

1. **kfuej Nrhfi f** 2. **fUTWj y;** (1 kj gngz)

m) **Kj y; epfo;T kfuej Nrhfi f:** (2 kj gngz)

kfuej r; Nrhfi f vdgJ kfuej gi gay; c ss **kfuej j; Jfsfs; #y; %bi a mi l tj hFk;** kfuej rNrhfi f fhww> eh; kwWk; g; rpfshy; ei l ngWfjwJ. ti ffs; 1. **j d; kfuej rNrhfi f** 2. **may; kfuej r; Nrhfi f**

1. **j d; kfuej rNrhfi f** (MI NI h Nfk):-

j d; kfuej rNrhfi f vdgJ xU kyhd; kfuej J}; mNj **kyhd; c ss #yf Kbi a mi l tJ** myyJ mNj jhtuj j r; rhhej kwnwhU kyhd; #yfKbi a mi l Ak; epfor;rahFk; , j wF **MI NI hNfkp** vdWk; ngah;

2. **may; kfuej Nrhfi f** (myNyhNfk):-

may; kfuej Nrhfi f vdgJ xU kyhd; kfuej J}; mNj , dj j r; rhhej **kwnwhU jhtuj jpd; #y; Kbi a mi l tj hFk;** , j wF **myNyhNfkp** vdW ngah;

M) **j d; kfuej rNrhfi f:-** (2 kj gngz)

edi kfs;

1. , Ughy; kyhfs;py; jdkfuej rNrhfi f fl;hakhf ei l ngWk;
2. j d; kfuej Nrhfi ffF Gwf; fhuz pfs; Nj i tapyi y.
3. kfuej j; Jfsfs; tL htj ;yi y.

j j kfs;

1. Fi wej vz z pfi fapy; tpi j fs; cUthFk;
2. fUTz; kpf; Fi wthf , UfFk; vdNt tpi j fs; kpf eyptilej jhtuqfi sNa cUthfFk;
3. Gj ;ati fj; jhtuqfs; cUthfhJ. mj d; fhuz khfj; jhtuqfs; gbggbahf ki wa NeupLk;

may; kfuej Nrufi f:-

edi kfs;

1. may; kfuej r; Nrufi fapd; tpi sth cUthFk; tpi j fs> Ki sj ;J jpl khd jhtuqfshf tsUK; j d; ki ag; ngwwUf;Fk;
2. Gj ;a ufqfs; cUthf thagG , Uf;fwJ.
3. edF Ki sfFk; jwDi la tpi j fs; cUthFk;

j j kfs;

1. Gwf; fhuz pfs; , yi yNay; may; kfuej r; Nrufi f ei l ngw , ayhJ.
2. kfuej j; Jfsfs; tL hFk; thagG , Uf;fwJ.

- 49) vqF Nehf;fYk; Gi f kz l yk; #oej pUj j y; **c l y; eyj j pF Vwwj yy** kwWk;
 RwWrRoYfFk; Vwwj yy. , j dhy; gytj Ntz l j j fhj tpi sTfs; cz l hFk;
 1) thfdgGi f> nj hoprhi yfs; pUeJ tUk; Gi f RwWrRoY y khRgLj J f pWJ.
 2) Gi fapdhy; kdj d; Ei uaby; ghj pf;fggLk;
 3) nj hl uej Gi f kz l yk; GwWNehi a VwgLj j yhk;
 4) Gi fapdhy; kdj d; Rthrj j p; Fi wAk;
 5) Gi ff;fhwwpy; Fi wej msNt Mf;] p[d; c ssj hy; c l yeyf;Fi wT VwgLk;
 6) Gi f %LgdAl d; NrueJ erRgGi fi a c UthfFk;
 7) Gi f Rø , UggJ kpf;gngUk; Nfl bi d tpi stpfFk;

- 50) **2 NaHCO₃ → Na₂CO₃ + H₂O + CO₂**
m) Nrhbak; i g fhhgNdl; 2 Nkhyfs; (1 kj p;ngz)
M) Nrhbak; i gfhgNdl bd; epi w: (3 kj p;ngz)

$$\begin{aligned} &Na (23) + H (1) + C(12) + O_3 (3 \times 16) \\ &= 23 + 1 + 12 + 48 = 84 \text{ fp} \\ &\text{vdNt \%yfR\$W epi w } 84 \text{ fp} \\ &\text{Nrhbak; i gfhgNdl bd; epi w} \\ &= \text{Nkhy; vz z pfi f x \%yf\$W epi w} \\ &= 2 \times 84 = 168 \text{ fp} \end{aligned}$$

,) fhhg; i l Mfi] L 1 Nkhy;(1 kj p;ngz)

- 51) etd mZ fnfhs; fapd; Nfhl ghLfs; (vi tNaDk; 3 NghJ khdJ - 3 kj p;ngz)

1. mZ vdgJ Ntj pti dapy; <LgLk; kpfrrpwa Jfs; MFk;
2. mZ ffs; gpf;fggl f\$bai t.
3. xU j d; k j j p; mi dj J mZ ffs k; vyyh gz Gfs;Yk; xj j pUff Ntz ba mtrpak;
 , yi y. v.fh. **I NrhNI hgGfs; = (¹⁷C1³⁵, ¹⁷C1³⁷).**
4. nttNtW j d; k qfi sr; Nruej mZ ffs; rpy gz Gfs;Y; xj j pUff;pdwd.
 v.fh. **I Nrhghh;fs; = (¹⁸Ar⁴⁰, ²⁰Ca⁴⁰).**
5. xU %yf;\$wpy; c ss mZ ffs;pd; tpfj k; KOi kahdJk; epuz apf;fggl J k; MFk; Mdhy;
 mJ vsa tpfj khf , Uff Ntz ba mtrpak; , yi y.
 v.fh C₁₂ H₂₂ O₁₁ - RfNuh] ;
6. khwWj ; j d; k khff; Ki way; xU j d; k j j p; mZ ffi s kwnwhU j d; k j j p; mZ ffs;hf
 khww KbAk;
7. xU j d; k j j p; epi wi a Mwwyhf khww KbAk;
 , J l d;] Bd; rkdghL E = mc² d; gb mi kAk;

mZ Tffk; %yf\$Wffk; , i l Na c ss NtWghLfs; (2 kj p;ngz)

	mZ ffs	%yf\$Wfs
1	Ntj pti dapy; <LgLk; xU j d; k j j p; kpfrrpweJ Jfs; mZ thFk;	xU j d; k k; myyJ xU Nrhk j j p; kpfrrpwa Jfs; %yf;\$whFk;
2	mZ vdgJ gpi z gGwhj ; Jfs;	%yf;\$W vdgJ gpi z gGww Jfs
3.	mZ vdgJ j d; j Nj h NrheNj h fhz ggLk	%yf;\$W j d; j J fhz ggLk;

- 52) m) rkkww Gwtpi rnahdW nraygl L khwWk; ti u vej xU nghUS k; j dJ Xa;T epi yi aNah myyJ xNu NehfNfhl by; mi kej r;hd , aff epi yi aNah khwwpf;nfhs;shky; nj hl heJ mNj epi yapy; , Uffk; (2 kj p;ngz)

epahaggLj Jj y; (1 kj p;ngz)

v.fh1: Nki rapy; c ss Gj j fk; tpi r nraygl hj ti u Xa;T epi yi a khwwpf;nfhs;tj pyi y.

v.fh2: , aff; j j py; c ss nghUS; tpi ri a (j i l i a) nraygl j j k; ti u

, aff; epi ya;NyNa , Uff; pWJ. (fhww> GtpabgG tpi r j i uffk; nghUS fFk; , i l Na cuha;Ttj r Nghdwi t , yi y vdf; nfhs;f)

$$M) F = 5N \quad m = 2.5 \quad a = ?$$

$$F = ma \quad (1 \text{ kj } \text{pgngz})$$

$$\text{vdNt } ma = F$$

$$a = \frac{F}{m} = \frac{5}{2.5} = 2 \text{ ms}^{-2} \quad (1 \text{ kj } \text{pgngz})$$

53) **rej puhad;1 , d; rhj i dfs; (VNj Dk; 5 rhj i dfs; 5 kj pgngz)**

1. epytpd; kz z py; **eb; %yf\$Wfs;** mj pfg; guggpy; gutpapUej i j f; fz l wpej J.
2. rej puhadpd; fdpk ti u fUtp epyT Kw,fhyj j py; KwwpYk; **cUfpaei yapy;** Uej i j c Wj p nrafpwJ.
3. l Nuhggpa tpe ntspe i kaj j pd; gadRi kapd; X-fj pu; epwkhi ykhdp 24fFk; Nkwgl l typi k Fdwp **Rupa xspgGayfi sg;** gj pTnraj J.
4. rej puhadpd; epyti ugl xspggl f; fUtp mnkupf;fhtpd; **mggyNyh 15> 11** epyTfffydfs; **epytty; j i uapwqfpa** , l qfi sg; gj pT nraJssJ.
5. epytpd; **fdk tsk;** gwwpa j ftyfs; c au; gFj pvd; epwkhi ykhdp %yk; ngwgg l J.
6. epytpd; Nyru; nj hi ytwpAk; fUtp epytpd; **JUtqfs; kwWk; Kffpa gFj pfs;** gwwpa j ftyfi s msj j J.
7. CIXS X-fj pu; gl f;fUtp epytpe; **mYkdpak; nkfdtpak; kwWk; rypf;fhd;** , twwpd; j l aqfi sg; gj pTnraj J.
8. 75 ehsfspy; rej puhad; Gi fgggl f; fUtp **4000fFk; Nkwgl l gl qfi sg;** Gtpf;F mDggpaJ.
9. epytpd; NkLgssqfi s epyti ugl xspggl f; fUtp gj pT nraj J. epyg; gugG Vuhskhd gssj j hf;Ffi sf; nfhz l J. epyTgguggpy; **kdj ufspd;** **ci wtp khfg; gadgLk; gy Fi ffi sf;** fz l wpej J.
10. **Gtppd; KObtj j j Ak;** Kj dKi wahfg; gj pT nraJ mDggpaJ.