ANSWER KEY
AITS (NEET)
Class-XI
Part Test-05

PHYSICS

Q.1 (4)	**Q.2** (4)	**Q.3** (1)	**Q.4** (2)	**Q.5** (2)	**Q.6** (1)	**Q.7** (2)	**Q.8** (1)	**Q.9** (3)	**Q.10** (1)
Q.11 (4)	**Q.12** (4)	**Q.13** (1)	**Q.14** (4)	**Q.15** (2)	**Q.16** (2)	**Q.17** (1)	**Q.18** (2)	**Q.19** (1)	**Q.20** (1)
Q.21 (3)	**Q.22** (2)	**Q.23** (4)	**Q.24** (3)	**Q.25** (1)	**Q.26** (3)	**Q.27** (2)	**Q.28** (2)	**Q.29** (1)	**Q.30** (3)
Q.31 (3)	**Q.32** (4)	**Q.33** (4)	**Q.34** (2)	**Q.35** (2)	**Q.36** (1)	**Q.37** (3)	**Q.38** (2)	**Q.39** (1)	**Q.40** (3)
Q.41 (1)	**Q.42** (4)	**Q.43** (4)	**Q.44** (1)	**Q.45** (1)	**Q.46** (1)	**Q.47** (3)	**Q.48** (2)	**Q.49** (1)	**Q.50** (1)

CHEMISTRY

Q.51 (3)	**Q.52** (3)	**Q.53** (3)	**Q.54** (1)	**Q.55** (1)	**Q.56** (2)	**Q.57** (1)	**Q.58** (2)	**Q.59** (2)	**Q.60** (2)
Q.61 (2)	**Q.62** (4)	**Q.63** (4)	**Q.64** (2)	**Q.65** (2)	**Q.66** (3)	**Q.67** (3)	**Q.68** (2)	**Q.69** (3)	**Q.70** (1)
Q.71 (1)	**Q.72** (2)	**Q.73**-(3)	**Q.74** (1)	**Q.75** (3)	**Q.76** (1)	**Q.77** (1)	**Q.78** (2)	**Q.79** (2)	**Q.80** (2)
Q.81 (1)	**Q.82** (4)	**Q.83** (3)	**Q.84** (4)	**Q.85** (1)	**Q.86** (3)	**Q.87** (1)	**Q.88** (3)	**Q.89** (4)	**Q.90** (2)
Q.91 (3)	**Q.92** (4)	**Q.93** (1)	**Q.94** (3)	**Q.95** (4)	**Q.96** (3)	**Q.97** (2)	**Q.98** (3)	**Q.99** (2)	**Q.100** (1)

BIOLOGY

Q.101 (4)	**Q.102** (2)	**Q.103** (2)	**Q.104** (4)	**Q.105** (3)	**Q.106** (2)	**Q.107** (4)	**Q.108**-(3)	**Q.109**-(1)	**Q.110** (3)
Q.111 (3)	**Q.112** (1)	**Q.113** (4)	**Q.114** (1)	**Q.115** (4)	**Q.116** (2)	**Q.117** (4)	**Q.118** (3)	**Q.119** (4)	**Q.120** (3)
Q.121 (2)	**Q.122** (3)	**Q.123** (3)	**Q.124** (2)	**Q.125** (3)	**Q.126** (1)	**Q.127** (1)	**Q.128** (4)	**Q.129** (1)	**Q.130** (2)
Q.131 (2)	**Q.132** (2)	**Q.133** (4)	**Q.134** (3)	**Q.135** (4)	**Q.136** (3)	**Q.137** (1)	**Q.138** (4)	**Q.139** (2)	**Q.140** (3)
Q.141 (2)	**Q.142** (1)	**Q.143** (1)	**Q.144** (1)	**Q.145** (2)	**Q.146** (4)	**Q.147** (2)	**Q.148** (1)	**Q.149** (2)	**Q.150** (1)
Q.151 (4)	**Q.152** (3)	**Q.153** (4)	**Q.154** (4)	**Q.155** (4)	**Q.156** (1)	**Q.157** (3)	**Q.158** (2)	**Q.159** (1)	**Q.160** (2)
Q.161 (1)	**Q.162** (3)	**Q.163** (2)	**Q.164** (2)	**Q.165** (3)	**Q.166** (1)	**Q.167** (3)	**Q.168** (1)	**Q.169** (3)	**Q.170** (1)
Q.171 (4)	**Q.172** (3)	**Q.173**-(4)	**Q.174** (3)	**Q.175** (4)	**Q.176** (2)	**Q.177** (3)	**Q.178** (2)	**Q.179** (3)	**Q.180** (2)
Q.181 (2)	**Q.182** (2)	**Q.183** (3)	**Q.184** (2)	**Q.185** (1)	**Q.186** (2)	**Q.187** (2)	**Q.188** (1)	**Q.189** (3)	**Q.190** (2)
Q.191 (4)	**Q.192** (4)	**Q.193** (4)	**Q.194** (2)	**Q.195** (3)	**Q.196** (2)	**Q.197** (3)	**Q.198** (3)	**Q.199** (3)	**Q.200** (4)

HINT AND SOLUTIONS

PHYSICS
SECTION-A

Q.1 (4)

$$y_1 = a\sin(\omega t + kx + 0.57)$$

$$y_2 = -a\sin(\omega t + kx) = a\sin(\omega t + kx + \pi)$$

Phase diff. $\phi = \pi - 0.57 = 3.14 - 0.57 = 2.57$ rad

Q.2 (4)

$$v^2 = \omega^2(A^2 - x^2)$$

$$v^2 = \omega^2A^2 - \omega^2x^2 \begin{cases} a = \omega^2 x \\ a^2 = \omega^4 x^2 \end{cases}$$

$$v^2 = \omega^2A^2 - \frac{a^2}{\omega^2}$$

Q.3 (1)

$$\frac{1}{2}Kx^2 = \frac{1}{2}K(A^2 - x^2)$$

$2x^2 = A^2$

$$\frac{x^2}{A^2} = \frac{1}{2} \Rightarrow \frac{x}{A} = \pm\frac{1}{\sqrt{2}}$$

Q.4 (2)

$A_1 = 40$

$$A_2 = \sqrt{10^2 + (10c)^2}$$

Given $A_1 = A_2$

$$\Rightarrow 40 = \sqrt{10^2 + (10c)^2} \quad \Rightarrow 100 + 100c^2 = 1600$$

$$\Rightarrow 100\,c^2 = 1500 \quad \Rightarrow c^2 = \frac{1500}{100} \Rightarrow c = \pm\sqrt{15}$$

Q.5 (2)

$$T = 2\pi\sqrt{\frac{m}{k}}$$

$$3 = 2\pi\sqrt{\frac{m}{k}} \quad ...(1)$$

$$5 = 2\pi\sqrt{\frac{m+2}{k}} \quad ...(2)$$

$$\Rightarrow \frac{9}{25} = \frac{m}{m+2} \Rightarrow m = \frac{9}{8}$$

Q.6 (1)

$U = 5 + 3y^2$

$$F = -\frac{dU}{dy} = -6y$$

$$\Rightarrow a = -\frac{6}{m}y \Rightarrow \omega = \sqrt{\frac{6\pi^2}{6}} = \pi$$

Hence $T = \frac{2\pi}{\omega} = 2$ second

Q.7 (2)

$$T = 2\pi\sqrt{\frac{I}{mgr}} = 2\pi\sqrt{\frac{\frac{ml^2}{6}+\frac{ml^2}{2}}{mg\frac{l}{\sqrt{2}}}} = 2\pi\sqrt{\frac{2\sqrt{2}l}{3g}}$$

Q.8 (1)

$a = -\omega^2 x$

Slope $= -\omega^2$

$-\tan 37° = -\omega^2$

$$\omega = \sqrt{\frac{3}{4}}$$

$$T = \frac{2\pi}{\omega} = 2\pi\sqrt{\frac{4}{3}} = \frac{4\pi}{\sqrt{3}}s$$

Q.9 (3)

$a = -\omega^2 x$

Phase difference between displacement and acceleration is π.

Q.10 (1)

$$\frac{1}{2}kx^2 = \frac{1}{2}\left(\frac{1}{2}KA^2\right)$$

$$x = \frac{A}{\sqrt{2}}$$

Q.11 (4)

$$(K.E)_{max} = \frac{1}{2}KA^2 = \frac{1}{2}(6\times10^5)(16\times10^{-4})$$

$\Rightarrow (K.E)_{max} = 480$ J

T.E. $= (K.E)_{max} + (P.E)_{min}$

$\Rightarrow 600 = 480 + PE_{min}$

$\Rightarrow (P.E)_{min} = 120$ J

$\Rightarrow (P.E)_{max} = 600$ J when K.E. = 0

Q.12 (4)

K = 2

$$T = 2\pi\sqrt{\frac{m}{K}} \Rightarrow T = 2\pi\sqrt{\frac{2}{2}} \Rightarrow T = 2\pi$$

Q.13 (1)

In this case,

$$\text{Stress} = \frac{mg}{A}$$

$$\text{Strain} = \frac{l}{L} \qquad \text{(where } l \text{ is extension)}$$

Now, Young's modulus Y is given by

$$Y = \frac{\text{stress}}{\text{strain}} = \frac{mg/A}{l/L}$$

$$mg = \frac{YAl}{L}$$

So, $kl = \frac{YAl}{L}$ $(\because mg = kl)$

(k is force constant)

Now, frequency is given by

$$n = \frac{1}{2\pi}\sqrt{\frac{k}{m}} = \frac{1}{2\pi}\sqrt{\left(\frac{YA}{mL}\right)}$$

Q.14 (4)

Effective value of 'g' remains unchanged.

$$T = 2\pi\sqrt{\ell/g}$$

Effective acc^n is unchanged in van moving with constant velocity.

Q.15 (2)

$$T = 2\pi\sqrt{\frac{\rho H}{\rho_0 g}}$$

At equilibrium condition

F_B = weight

$AH\rho g = Ah\rho_0 g$

$H\rho = h\rho_0$ [A is circular area of cylinder]

$$T = 2\pi\sqrt{\frac{h}{g}}$$

Q.16 (2)

$$n = \frac{p}{2\ell}\sqrt{\frac{T}{m}}$$

for 400 Hz, p = 8 and for 350 Hz, p = 7 are possible for p = 1

$\therefore n_0 = 50$ Hz

Q.17 (1)

At t = 0, y = A sin kx

and it is moving in- x direction

So y = A sin (ωt + kx)

Q.18 (2)

$$\text{Particle } v_P = \frac{\partial y}{\partial t} = 4(-2\pi)\cos(10\pi x - 2\pi t)$$

$$\text{at } x = \frac{1}{5}\text{m and } t = \frac{1}{4}\text{s}$$

$$v_p = -8\pi\cos\left(10\pi\times\frac{1}{5} - 2\pi\times\frac{1}{4}\right)$$

$$= -8\pi\cos\left(2\pi - \frac{\pi}{2}\right) \qquad = -8\pi\cos\frac{3\pi}{2} = 0$$

Q.19 (1)

$$v = \sqrt{\frac{T}{\mu}} = \sqrt{\frac{180}{18\times10^{-3}}} = 100 \text{ m/s}$$

$$t = \frac{\ell}{v} = \frac{15}{100} = 0.15 \text{ sec.}$$

Q.20 (1)

$$\frac{(v_P)_{max}}{v_{wave}} = \frac{\omega A}{(\omega / K)} = KA$$

$$\frac{\pi}{17}\times\frac{10}{11} = \frac{10}{17}$$

Q.21 (3)

$V = f\lambda \Rightarrow 360$ m/s $= 500$ Hz(λ)

$\lambda = 0.72$ m

$$\text{Now we know} \Rightarrow \frac{\Delta x}{\lambda} = \frac{\Delta\phi}{2\pi}$$

$$\frac{\Delta x}{0.72} = \frac{\pi/3}{2\pi}$$

$\Delta x = 0.12$ m

Q.22 (2)

For Transverse elastic waves progation the medium should be rigid.

Q.23 (4)

For fundamental mode frequency of string

$$\nu = \frac{1}{2\ell}\sqrt{\frac{T}{m}} = \frac{1}{2\ell}\sqrt{\frac{T}{\pi r^2\times1\times\rho}}$$

as $T_1 = T_2$ $\ell_1 = L$ and $\ell_2 = 2L$

$r_1 = 2r$ and $r_2 = r$ and $\rho_1 = \rho_2$

$$\frac{\nu_1}{\nu_2} = \frac{\ell_2}{\ell_1}\sqrt{\frac{r_2^2}{r_1^2}} = \frac{\ell_2 r_2}{\ell_1 r_1} = \frac{2L\times r}{L\times 2r} = 1$$

Q.24 (3)

Two waves of same frequency & moves in opposite direction.

Q.25 (1)

$$\text{Velocity of wave} = \frac{600}{2} = 300\text{m/s}$$

$$\text{Frequency} = 500 \text{ Hz, Wavelength } \lambda = \frac{3}{5}\text{m}$$

$$\text{Number of wavelength} = \frac{600}{3/5} = 1000$$

Q.26 (3)

$$v = n\times\frac{v}{2\ell}$$

$$v_0 = \frac{v}{2\ell} = 20 \text{ Hz is possible}$$

$$\therefore 3^{rd} \text{ overtone} = 4\times\frac{v}{2\ell} = 4\times20 = 80 \text{ Hz}$$

Q.27 (2)

$\Delta n = 5$Hz

$$\text{Fundamental frequency } n = \frac{1}{2\ell}\sqrt{\frac{T}{m}}$$

$$\frac{\Delta n}{n} = \frac{1}{2}\frac{\Delta T}{T} \Rightarrow \frac{\Delta T}{T} = 2\frac{\Delta n}{n} = 2\times\frac{5}{500} = 0.02$$

Fraction = 0.02

Q.28 (2)

$$\Delta n = \frac{\text{no. of beats}}{\text{time interval}} = \frac{1}{0.4} = 2.5 \text{ per second}$$

Q.29 (1)

Molecular mass of Water is small than the average molecualr mass of air.

$\therefore$ density decreases

$$\text{also, } V = \sqrt{\frac{\gamma P}{\rho}}$$

$\rho\downarrow \Rightarrow V\uparrow$

Q.30 (3)

$$v = \sqrt{\frac{\gamma P}{\rho}}$$

$$v_{air} = \sqrt{\frac{\gamma P}{\rho_{air}}}$$

$$v_{H_2} = \sqrt{\frac{\gamma P}{\rho_{H_2}}}$$

$V_{H_2} = 4v_{air}$
$= 4 \times 332$
$= 1328$ m/s

Q.31 (3)
Let initial distance be x

$$\frac{2x}{u} = \frac{60}{40} \;\&\; \frac{2(x-90)}{u} = \frac{60}{60}$$

$$\Rightarrow \frac{x}{x-90} = \frac{60}{40} = \frac{3}{2} \Rightarrow x = 270$$

Speed of sound $= \frac{80}{60} \times 270 = 360$ m/s

Q.32 (4)
Sound wave transfers both energy and momentum.

Q.33 (4)

$$I = \frac{1}{2}\rho v A^2\omega^2 = 2\rho^2\rho v A^2 f^2$$

Q.34 (2)
Time interval between successiva maxima

$$= \frac{1}{\text{Beat frequency}} = \frac{1}{4}\text{s}$$

Q.35 (2)

$$T = Mg\,B = 100 = \frac{1}{200} \times 1000 \times 10 \times 50\text{N}$$

$$f_0 = \frac{1}{2L}\sqrt{\frac{T}{\mu}} = \frac{1}{2 \times 0.2} = \sqrt{\frac{50}{0.02}} = 125\text{Hz}$$

SECTION-B

Q.36 (1)
Particle will just able to complete half of the circle.
So periodic but not SHM.

Q.37 (3)
In simple harmonic oscillator, at the mean position kinetic Energy is maximum and potential energy is minimum and total energy is constant.

Q.38 (2)

$$U = U_0 + \frac{1}{2}kx^2$$

$$0.04 = 0.01 + \frac{1}{2}k(20 \times 10^{-3})^2$$

$0.03 \times 2 = k \times 4 \times 10^{-4}$

$$k = \frac{600}{4}$$

$= 150$ N/m.

Q.39 (1)
$T \propto \sqrt{m}$
$E \propto A^2$
$U \propto K$
$V_{max} = A\omega$

Q.40 (3)
$a = -\omega^2 x$

$$\frac{aT^2}{x} = \frac{-\omega^2 x \cdot T^2}{x} = -\omega^2 T^2$$

$-\omega^2 T^2 = \text{constant}$

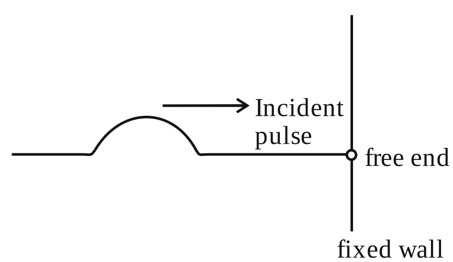
Q.41 (1)
Here, B represents the mean position about which amplitude = A.

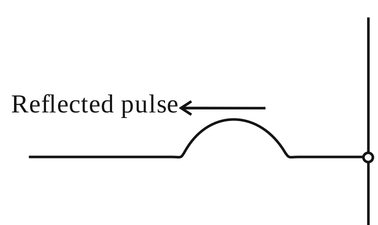
Q.42 (4)

$$T = 2\pi\sqrt{\frac{\ell}{g}}$$

$T \propto \sqrt{\ell}$
$T^2 \propto \ell$
it is parabola

Q.43 (4)





Q.44 (1)

$f \propto \frac{1}{l}$

$l_1 : l_2 = \frac{1}{x} : \frac{1}{2x}$

$l_1 : l_2 = \frac{3}{2x}$

$90 = \frac{3}{2x}$

$\frac{1}{x} = 60$

$\frac{1}{2x} = 30$

Q.45 (1)

$\frac{3\lambda}{2} = \ell \Rightarrow \lambda = \frac{2\ell}{3} \Rightarrow f = \frac{v}{2\ell/3} \Rightarrow \frac{v}{\ell} = 40$

$\Rightarrow n\frac{\lambda}{2} = \ell \Rightarrow f = n\frac{v}{2\ell} \Rightarrow f = n \times 20Hz$

Q.46 (1)

Intensity level = 10 log $\frac{I}{I_0}$

$30 = 10 \log \frac{I}{I_0}$

$3 = \log \frac{I}{I_0}$

$\frac{I}{I_0} = 10^3 = 1000$

Q.47 (3)

Here only odd harmonics are present. Hence it is a closed pipe.

$425 : 595 : 765 = 5 : 7 : 9$

Hence $\frac{5v}{4l} = 425 \quad \Rightarrow \frac{5 \times 340}{4l} = 425$

$\Rightarrow l = 1m$

Q.48 (2)

From the given equations of progressive waves

$\omega_1 = 500\pi$ and $\omega_2 = 506\pi$

$\therefore n_1 = 250$ and $n_2 = 253$

So beat frequency = $n_2 - n_1$

$= 253 - 250$

= 3 beats per sec

$\therefore$ Number of beats per min = 180

Q.49 (1)

Frequency of pipe closed at one end -

$n_1 = \frac{V}{4L_1}$

frequency of pipe open at both ends -

$n_2 = \frac{V}{2L_2}$

After joining the pipes -

$n = \frac{V}{4(L_1 + L_2)}$ {Closed at one end}

$n = \frac{V}{4\left(\frac{V}{4n_1} + \frac{V}{2n_2}\right)} = \quad n = \frac{n_1 n_2}{(n_2 + 2n_1)}$

Q.50 (1)

$v = \sqrt{\frac{\gamma RT}{M}}$

$v^2 = \frac{\gamma RT}{M}$

$v^2 \propto T$ (T in Kelvin)

CHEMISTRY
SECTION-A

Q.51 (3)

$Al(OH)_3 \Rightarrow$ Amphoteric hydroxide

$LiOH \Rightarrow$ Basic hydroxide

$Mg(OH)_2 \Rightarrow$ Basic hydroxide

$Be(OH)_2 \Rightarrow$ Amphoteric hydroxide

Q.52 (3)

Hologens have maximum electron gas enthalpy Atomic no. 7.

Q.53 (3)

Second I. E. is always greater than first I.E.

Q.54 (1)

O – F bond least polar.

Q.55 (1)

SCO_2 most acidic oxide

Down the gland acidic character decrease

Q.56 (2)

Z = 50

$_{36}$[kg] $5s^2\ 4d^{10}\ 5p^2$ p-block

Q.57 (1)

Mn $\rightarrow$ (Ar) $4s^2\ 3d^5$

has maximum Sunpaired e^-

Q.58 (2)
Electronegativity olepends on atom to which it is bond E.N. increases from left to right.

Q.59 (2)
IV B grand 7 period has atomic no. = 104
14PAC $\rightarrow$ unnilquentium $\rightarrow$ Un q

Q.60 (2)
First ionization energy in group –13 is

Tl >	Ga >	Al >	In
1079	762	709	558

Q.61 (2)
Hg is d - block element
Because In Hg last electron occupi in 5d. orbital.

Q.62 (4)
F is the most electronegative element so given 4^{th} statement is incorrect statement

Q.63 (4)
Element which is coming after uranium known as transuranic elelment.

Q.64 (2)
X belong to group 14th and 5th period so, it is Sn At. no. 50
hence, E.C. – $1s^2, 2s^2, sp^6, 3s^2\ 3p^6, 4s^2, 3d^{10}, 4s^2, 5s^2, 4d^{10}$ $5p^2$

Q.65 (2)
For isoelectronic species cations are smaller is size and anion are large size so Mg^{+2} is smaller and O^{-2} larger.

Q.66 (3)
At. No. 118 – $[_{86}Rn]\ 7s^2, 5f^{14}, 6d^{10}\ 7p^6$
So, it period is 7^{th}

Q.67 (3)
Electronic configuration $1s^2\ 2s^2$
removing Ist e^- configuration
become – $1s^2\ 2s^1$. Now it is unstable
So removal of 2^{nd} e^- will be easy
Hence IP_2 volue will be less, but after removing 2^{nd} e^- it aquire sable configuration $1s^2$
so removal of 3^{rd} e^- will be difficult
Consequently IP_3 value high.

Q.68 (2)
Terminal B–H bond are 2-centre, 2-electron bond not 2-Centre 3-electron bond so it is in correct.

Q.69 (3)
Silica dissolve in exess HF to form SiF_4
$SiO_2 + HF \rightarrow SiF_4 + 2H_2O$

Q.70 (1)
Fluorspar is CaF_2.

Q.71 (1)
Quartz is the purest form of silica.

Q.72 (2)
Allotropy : The existence of a chemical element in two or more forms, which may differ in the arrangements of atoms in crystalline solids.

Q.73 (3)
In C atom d - orbital are not available
So it can not extend its covalency.

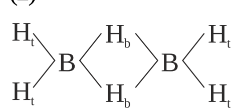
Q.74 (1)
BH_3 is trigonal planar where B is sp^2 hybridised.

Q.75 (3)
Boron exists as a giant covalent solid due to which its melting point is high.

Q.76 (1)
CO has great affinity with haemoglobin and forms a complex, carboxyhaemoglobin.

Q.77 (1)
$Na_2B_4O_7 \cdot 10H_2O / Na_2[B_4O_5(OH)_4].8H_2O$

Q.78 (2)
In Boric acid BO_3^{-3} units are joined through H–bond so give rise polymeric structure.

Q.79 (2)


H_t = Terminal Hydrogen = 4
H_b = Bridge Hydrogen = 2

Q.80 (2)
Many metals form coloured bead which is glass like Boric anhydride bead form metal borats and which are coloured and different metal borate have their specific color e.g.

$$Na_2B_4O_7 \cdot 10H_2O \rightarrow 2\underbrace{NaBO_2 + B_2O_3}_{\text{Glass like Bead}} + 10H_2O$$

$$Cr_2(SO_4)_3 + 3B_2O_3 \rightarrow \underset{\text{Green}}{2Cr(BO_2)_3} + SO_3$$

$$CuSO_4 + B_2O_3 \rightarrow \underset{\text{Blue}}{Cu(BO_2)_2} + SO_3$$

Q.81 (1)

$$B(OH)_3 + H_2O \rightleftharpoons [B(OH)_4]^- + H^+$$

Q.82 (4)
In graphite, electrons are spread out between the structure.

Q.83 (3)
CO_2 is used as fire extinguisher.

- $CaCO_3 \xrightarrow{\Delta} CaO + CO_2$
  (Limestone)

- Gaseous CO_2 is used to carbonate soft drinks.
- CO_2 is used as fire extinguisher as it is non-supporter of combustion.
- Solid CO_2 (Dry ice) is used as refrigerant for frozen food or ice cream.

Q.84 (4)
Boron form different hydride of general formula B_nH_{n+4} and B_nH_{n+6} but BH_3 is unknown.

Q.85 (1)
$Al_4C_3 + 12H_2O \rightarrow 3CH_4 + 4Al(OH)_3$

SECTION-B

Q.86 (3)
Due to help filled configuration

Q.87 (1)
Zn due to full filled configuration in ground as well as excited state.

Q.88 (3)
Panling ΔCaCl defined electronegativity in terms of bond energy.

Q.89 (4)
Cl, Br, I is the Doberenier triad.

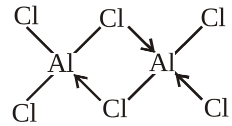
Q.90 (2)
According to Auf bau principle 7s < 5f < 6d < 7p

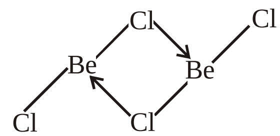
Q.91 (3)

Q.92 (4)
E. Configuration $ns^1 \rightarrow$ denotes group 1 So I.E. will be less
E. Condiguration $ns^2 \rightarrow 2^{nd}$ group configuration so more value $I.E_1$
E. Configuration $ns^2\ np^1 \rightarrow$ 13 group So $I.E_1$ will be less $I.E_2$ will be more
E. Configuration $ns^2\ np^2 \rightarrow$ 14 group E.C. so $I.E_1$ will be high

Q.93 (1)
Electronic Configuration $1s^2\ 2s^1$ belong to I^{st} grap So $I.E_1$ value will be minimum.

Q.94 (3)
Chlorides of both beryllium and aluminium have bridged structures in solid phase.





Boric acid is not a protonic acid

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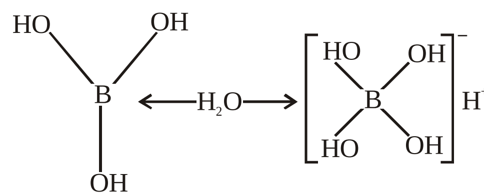


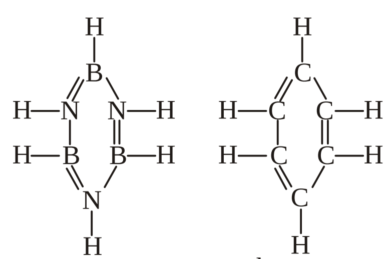
Borazole, inorganic benzene contains $B_3N_3H_6$.

Q.95 (4)
In two dimensional sheet silicates, three oxygens of each SiO_4^{4-} units are shared. Thus contain $(Si_2O_5)^{2-}$ type anions. Cyclic silicates are obtained by sharing of two oxygens of each SiO_4^{4-} tetrahedron. Chain silicates are also formed by the sharing of two oxygen atoms of each SiO_4^{4-} units.

Q.96 (3)
Borron atom form acidic hydroxide $B(OH)_3$ which is known as Boric Acid (H_3BO_3)

Q.97 (2)
In B_2H_6 (diborase) banana bond is present.

Q.98 (3)
Borazine, $B_3N_3H_6$ is also known as inorganic benzene due to its resemblance in structure and properties with benzene.



borazole or borazine   benzene

Q.99 (2)
Generally IV group element shows catenation tendency and carbon has more catenation power.

Q.100 (1)
Due to absence of d - orbital in C - atom.

BIOLOGY-I
SECTION-A

Q.101 (4)
In the tissues, the factor favourable for dissociation of oxygen from the oxyhaemoglobin are low pO_2, high pCO_2, high H^+ concentration and higher temperature.

Q.102 (2)
The thoracic chamber is formed dorsally by the vertebral column, ventrally by sternum, laterally by ribs and on lower side by diaphragm.

Q.103 (2)
In emphysema, walls of alveoli are damaged.

Q.104 (4)
The 'exchange part' of respiratory passages are involved with diffusion of O_2 and CO_2 between blood and atmospheric air.

Q.105 (3)
Contraction of external intercostal muscles increases the volume of thoracic chamber in dorsoventral axis.

Q.106 (2)
Nearly 70% of CO_2 is transported in bicarbonate form in plasma.

Q.107 (4)
IRV+TV = Inspiratory capacity

Q.108 (3)
The total thickness of the diffusion membrane is less than 1 milimeter.
The diffusion membrane is made up of three major layers (figure) namely, the thin squamous epithelium of alveoli, the endothelium of alveolar capillaries and the basement substance in between them. However, its total thickness is much less than a millimeter. Therefore, all the factors in our body are favourable for the diffusion of O_2 from alveoli to tissues and that of CO_2 from the tissues to alveoli

Q.109 (1)
Humans have two lungs, which are covered by a double membrane called pleura, with pleural fluid between them. Pleural fluid reduces the friction on the lung surface. The outer pleural membrane is in close contact with the thoracic lining whereas the inner pleural membrane is in the contact with the lung surface

Q.110 (3)
Fluid filled cavity is present around lungs.
Pleura is divided into two layers. Outer pleural membrane is in close contact with thoracic lining whereas inner pleural membrane is in contact with lung surface.

Q.111 (3)
TV + IRV + ERV = TLC - RV
TLC - RV = VC,
EC = ERV + TV = 1100 + 500 = 1600 ml

Q.112 (1)
Q.113 (4)
Q.114 (1)
Q.115 (4)
The right atrium receives deoxygenated blood from the superior and interior vena cava.

Q.116 (2)
Semilunar valves prevent backward flow of blood into ventricles from arteries.

Q.117 (4)
Ecosinophils are granulocytes

Q.118 (3)
Bundle of His, also called AV Bundle, transmits the impluses to ventricle.

Q.119 (4)
A person with blood group AB can receive blood from people with blood groups AB, A, B and O.

Q.120 (3)
T wave represents the repolarisation of ventricles.

Q.121 (2)
Identify the machine use to measure an ECG.
Electrical activities of heart is measured by an instrument known as electrocardiograph and graph obtained is known as electrocardiogram. Stethoscope is used to hear heart sounds.

Q.122 (3)
Q.123 (3)
Q.124 (2)
Q.125 (3)
Q.126 (1)
Q.127 (1)
Q.128 (4)
Large amounts of water could be reabsorbed from collecting duct to produce concentrated urine.

Q.129 (1)
Q.130 (2)

Q.131 (2)
This hormone is released by atrial walls.
Vasa recta acts as countercurrent exchanger because they exchange water for ions. ANF opposes RAAS.

Q.132 (2)
These are region between medullary pyramids in kidney.
Invagination of cortex into medulla forms columns of Bertini which divide medullary region of kidney into renal pyramidals.

Q.133 (4)
Q.134 (3)
Q.135 (4)

SECTION-B

Q.136 (3)
Factor that does not affect simple diffusion.
The factors that affect the rate of diffusion of gases are :
(a) Partial pressure gradient
(b) Solubility of the gases
(c) Thickness of the membranes involved in diffusion

Q.137 (1)
Q.138 (4)
Q.139 (2)
Central chemoreceptors recognises changes in $[H]^+$ and pCO_2 in CSF.

Q.140 (3)
Stroke volume multiplied by the number of beats per minute gives the cardiac output.

Q.141 (2)
These cells give rise to enucleated platelets.
Megakaryocytes are specialised large cells in red bone marrow which divide to form cellular fragments lacking nucleus known as blood platelets/ thrombocytes.

Q.142 (1)
Q.143 (1)
Q.144 (1)
Q.145 (2)
Enzyme which is released in body injured site in presence of Ca^{+2}.
Prothrombinase/thrombokinase is also responsible for conversion of inactive plasma protein prothrombin into an active enzyme thrombin responsible for conversion of fibrinogen into fibrin.

Q.146 (4)
Heart failure is inability of heart to pump blood effectively in blood vessels while heart attack is death of cardiac muscles.

Q.147 (2)
High threshold substance like glucose is completely absorbed in kidney in a normal healthy person.
Diabetes insipidus occurs due to deficiency of ADH (vasopressin) from hypothalamus. All types of nephrons have peritubular capillary networks. GFR in healthy individual is 125 ml/minute or 180 L/day.

Q.148 (1)
Q.149 (2)
Q.150 (1)

BIOLOGY-II
SECTION-A

Q.151 (4)
On an average, 1100-1200 ml of blood is filtered by the kidneys per minute which constitutes roughly $1/5^{th}$ of the blood pumped out by each ventricle of heart in a minute

Q.152 (3)
Renin is secreted by JG cells, JGA is formed by cellular modifications in DCT and afferent arteriole at location of their contact.

Q.153 (4)
Osmoreceptors of the body are activated by changes in blood volume, body fluid volume and ionic concentration. Excessive loss of fluid from the body can activate these receptors that trigger the release of ADH from posterior pituitary.

Q.154 (4)
Q.155 (4)
Q.156 (1)
Q.157 (3)
Atlanto occipital is a type of condyloid joint.
Atlas axis is a pivot joint.

Q.158 (2)
Each pectoral girdle is formed of two halves. Each half of pectoral girdle consists of a clavicle and a scapula.

Q.159 (1)
Q.160 (2)
Q.161 (1)
Hammer shaped bone.
Middle ear bones in man are malleus, incus and stapes. Mandible forms lower jaw, maxilla the upper jaw and metacarpus form the palm.

Q.162 (3)
This is a contractile protein.
Actin filaments slide over myosin filaments during muscle contraction.

Q.163 (2)

Q.164 (2)
Q.165 (3)
Q.166 (1)
Q.167 (3)
Dendrites receive impulses from other neurons and transmit These towards the cell body of the neuron.

Q.168 (1)
Q.169 (3)
Q.170 (1)
Dorsal portion of the midbrain comprises four round swellings.
Corpus callosum connects the two cerebral hemispheres.

Q.171 (4)
Centre present in medulla
Swallowing centre is present in medulla oblongata, region of hindbrain. Association areas regulate complex functions of brain such as intersensory association, memory and communication.

Q.172 (3)
Q.173 (4)
The outer part of cerebral hemisphere is called cerebral cortex.
The cerebral cortex referred to as the grey matter due to its grayish appearance. The neurone cell bodies are concentrated here giving the colour. This thick layer of Grey matter is also known as neopallium/ pallium.

Q.174 (3)
Q.175 (4)
Q.176 (2)
Oxytocin and vasopressin are stored in posterior pituitary.

Q.177 (3)
lslets of langerhans are the endocrine part of pancreas secreting only hormones and not enzymes.

Q.178 (2)

Q.179 (3)
Secretin is released by duodenum especially in response to acidic chyme.

Q.180 (2)
Thymosin produced by thymus promotes production of antibodies to provide humoral immunity.

Q.181 (2)
Q.182 (2)
Hypersecretion of growth hormone in adults results in severe disfigurement, particularly in bones of face resulting in Acromegaly.

Q.183 (3)
Q.184 (2)
Q.185 (1)

SECTION-B

Q.186 (2)
Q.187 (2)
Urinary bladder contains smooth muscles. The internal and external urethral sphincters relax to bring about micturition. Signal for micturition is initiated by stretching of urinary bladder.

Q.188 (1)
Q.189 (3)
Q.190 (2)
Q.191 (4)
Q.192 (4)
$Na^+ – K^+$ pump restores the polarised state in neuron

Q.193 (4)
Impulse transmission across an electrical synapse is always faster than that across a chemical synapse.

Q.194 (2)
Q.195 (3)
Q.196 (2)
The cerebellum is vital to coordination of various rapid muscular activities

Q.197 (3)
Assertion is true, but Reason is false. Reason can be corrected as
Cholecystokinin (CCK) stimulates the secretion of both the pancreatic enzymes as well as the bile juice.

Q.198 (3)
Aldosterone is responsible for electrolyte and water balance in blood.

Q.199 (3)
G H is growth hormone and ACTH is adenocorticotropic hormone which acts on adrenal cortex.

Q.200 (4)
Cortisol is a steroid hormone whereas insulin and glucagon are polypeptides.