ANSWER KEY

AITS FINAL TRACK
PART TEST-10

PHYSICS
SECTION-A

Q.1 (3)	**Q.2** (4)	**Q.3** (3)	**Q.4** (2)	**Q.5** (1)	**Q.6** (1)	**Q.7** (2)	**Q.8** (3)	**Q.9** (1)	**Q.10** (3)
Q.11 (4)	**Q.12** (1)	**Q.13** (3)	**Q.14** (2)	**Q.15** (3)	**Q.16** (2)	**Q.17** (4)	**Q.18** (2)	**Q.19** (4)	**Q.20** (4)
Q.21 (4)	**Q.22** (2)	**Q.23** (2)	**Q.24** (3)	**Q.25** (1)	**Q.26** (1)	**Q.27** (1)	**Q.28** (3)	**Q.29** (3)	**Q.30** (2)
Q.31 (3)	**Q.32** (4)	**Q.33** (3)	**Q.34** (2)	**Q.35** (2)					

SECTION-B

Q.36 (1)	**Q.37** (4)	**Q.38** (4)	**Q.39** (1)	**Q.40** (3)	**Q.41** (2)	**Q.42** (1)	**Q.43** (2)	**Q.44** (3)	**Q.45** (1)
Q.46 (2)	**Q.47** (3)	**Q.48** (3)	**Q.49** (2)	**Q.50** (1)					

CHEMISTRY
SECTION-A

Q.51 (1)	**Q.52** (1)	**Q.53** (3)	**Q.54** (4)	**Q.55** (3)	**Q.56** (1)	**Q.57** (3)	**Q.58** (2)	**Q.59** (3)	**Q.60** (1)
Q.61 (3)	**Q.62** (2)	**Q.63** (2)	**Q.64** (3)	**Q.65** (2)	**Q.66** (2)	**Q.67** (4)	**Q.68** (3)	**Q.69** (3)	**Q.70** (1)
Q.71 (3)	**Q.72** (2)	**Q.73** (3)	**Q.74** (4)	**Q.75** (4)	**Q.76** (2)	**Q.77** (1)	**Q.78** (2)	**Q.79** (1)	**Q.80** (3)
Q.81 (1)	**Q.82** (3)	**Q.83** (2)	**Q.84** (3)	**Q.85** (4)					

SECTION-B

Q.86 (1)	**Q.87** (3)	**Q.88** (3)	**Q.89** (1)	**Q.90** (3)	**Q.91** (3)	**Q.92** (4)	**Q.93** (2)	**Q.94** (1)	**Q.95** (3)
Q.96 (4)	**Q.97** (3)	**Q.98** (3)	**Q.99** (2)	**Q.100** (4)					

BIOLOGY-I
SECTION-A

Q.101 (3)	**Q.102** (4)	**Q.103** (3)	**Q.104** (3)	**Q.105** (3)	**Q.106** (3)	**Q.107** (1)	**Q.108** (1)	**Q.109** (1)	**Q.110** (2)
Q.111 (2)	**Q.112** (2)	**Q.113** (2)	**Q.114** (3)	**Q.115** (2)	**Q.116** (1)	**Q.117** (2)	**Q.118** (2)	**Q.119** (4)	**Q.120** (1)
Q.121 (4)	**Q.122** (3)	**Q.123** (1)	**Q.124** (2)	**Q.125** (1)	**Q.126** (4)	**Q.127** (4)	**Q.128** (2)	**Q.129** (1)	**Q.130** (2)
Q.131 (2)	**Q.132** (2)	**Q.133** (2)	**Q.134** (4)	**Q.135** (2)					

SECTION-B

Q.136 (2)	**Q.137** (3)	**Q.138** (2)	**Q.139** (2)	**Q.140** (2)	**Q.141** (3)	**Q.142** (4)	**Q.143** (3)	**Q.144** (2)	**Q.145** (3)
Q.146 (3)	**Q.147** (2)	**Q.148** (2)	**Q.149** (1)	**Q.150** (1)					

BIOLOGY-II
SECTION-A

Q.151 (2)	**Q.152** (4)	**Q.153** (2)	**Q.154** (4)	**Q.155** (2)	**Q.156** (2)	**Q.157** (2)	**Q.158** (2)	**Q.159** (3)	**Q.160** (3)
Q.161 (2)	**Q.162** (1)	**Q.163** (3)	**Q.164** (3)	**Q.165** (1)	**Q.166** (1)	**Q.167** (1)	**Q.168** (4)	**Q.169** (4)	**Q.170** (3)
Q.171 (3)	**Q.172** (3)	**Q.173** (2)	**Q.174** (3)	**Q.175** (2)	**Q.176** (2)	**Q.177** (3)	**Q.178** (3)	**Q.179** (2)	**Q.180** (4)
Q.181 (3)	**Q.182** (2)	**Q.183** (2)	**Q.184** (3)	**Q.185** (4)					

SECTION-B

Q.186 (4)	**Q.187** (3)	**Q.188** (2)	**Q.189** (1)	**Q.190** (4)	**Q.191** (4)	**Q.192** (2)	**Q.193** (4)	**Q.194** (1)	**Q.195** (1)
Q.196 (1)	**Q.197** (3)	**Q.198** (4)	**Q.199** (4)	**Q.200** (3)					

PHYSICS
SECTION-A

Q.1 (3)

$P = \frac{nE}{t} \quad \Rightarrow E = \frac{Pt}{n}$

$E = \frac{5\times10^{-3}}{8\times10^{15}} J = \frac{5\times10^{-3}}{8\times10^{15}} \times \frac{1}{1.6\times10^{-19}} eV$

$E = 3.9\, eV$

$(K.E)_{max} = E - \phi$

$\phi = 3.9 - 2$

$\boxed{\phi = 1.9\ eV}$

Q.2 (4)

$E_{photon} = -\frac{13.6}{2^2} - \left(\frac{-13.6}{1^2}\right) = 10.2 eV$

$\phi_0 = 4.7\, eV$

$K = E_{photon} - \phi_0 = (10.2 - 4.7)\, eV$

$eV_s = 5.5\, eV$

Stopping potential $V_s = 5.5V$

Q.3 (3)

Photocell is the device which converts light energy into electric energy.

Q.4 (2)

Nuclear density is independent of mass number.

Q.5 (1)

By using $\lambda = \frac{h}{\sqrt{2mE}}$ $E = 10^{-32}$ J = Constant for both particles.

Hence $\lambda \propto \frac{h}{\sqrt{m}}$ since $m_p > m_e$ so $\lambda_p < \lambda_e$

Q.6 (1)

The work function has no effect on current so long as $h\nu > W_0$. The photoelectric current is proportional to the intensity of light. Since there is no change in the intensity of light, therefore $I_1 = I_2$.

Q.7 (2)

$K.E._{max} = h\nu = \phi$

$7ev = h\nu_1 - \phi$

$-6ev = 0 - \phi$

$\phi = 6ev$

$h\nu_1 = 13ev$

$h\nu_2 = 8ev + 6ev$

$= 14ev$

$\frac{h\nu_1}{h\nu_2} = \frac{13}{14}$

$\frac{\nu_1}{\nu_2} = \frac{13}{14}$

Q.8 (3)

Q.9 (1)

$\frac{1}{\lambda} = RZ^2\left(\frac{1}{n_1^2} - \frac{1}{n_3^3}\right)$

$\frac{1}{6561} = R(1)^2\left[\frac{1}{2^2} - \frac{1}{3^2}\right]$

and $\frac{1}{\lambda} = R(2)^2\left[\frac{1}{2^2} - \frac{1}{4^2}\right]$

Therefore $\lambda = 1215$ Å

Q.10 (3)

Five structure of the spectrum of hydrogen atoms we must consider spin angular momentum.

Q.11 (4)

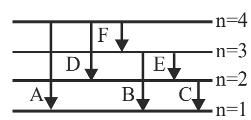
Q.12 (1)

When electron beam of 12.75 eV in incident over H-gaseous.

Energy of H-atoms will be

$= -136 + 12.75 = -0.85 eV$

The corresponds to n = 4 excited state



Clearly, emitted radiation lies in lyman series (A, B and C) few emissions are is Balmer series (D and E). One of them (n =4 to n =3) lies in paschen series (F).

Q.13 (3)

$2\pi r_n = n\lambda \Rightarrow r_n = \frac{n\lambda}{2\pi}$

$r_3 = \frac{3\lambda}{2\pi}$

Q.14 (2)

Released energy = $2 \times 4 \times 7 - 2 \times 1 - 7 \times 5.4$

$= 16$ MeV

Q.15 (3)

$R = R_0(A)^{1/3}$

$A \propto R^3$

$\frac{A_X}{A_{Be}} = \left(\frac{2R}{R}\right)^3$

$A_X = 9 \times 8 = 72$

Q.16 (2)

Mass defect $\Delta m = (Mass)_H + (Mass)_{He}$

$\Delta m = [1 - 0.993] = 0.007$ gm $= 7 \times 10^{-6}$ kg

$E = \Delta m \times c^2$

$= 7 \times 10^{-6} \times 9 \times 10^{16}$
$= 7 \times 9 \times 10^{10}$
$= 63 \times 10^{10} J$

Q.17 (4)
$V_2 > V_1 \Rightarrow f_2 > f_1 \Rightarrow \lambda_2 < \lambda_1$

Q.18 (2)

$$\lambda = \frac{h}{\sqrt{3mkT}} \therefore \frac{\lambda_H}{\lambda_{He}} = \sqrt{\frac{m_{He}}{m_H} \times \frac{T_{He}}{T_H}}$$

$$= \sqrt{\frac{4}{2} \times \frac{127+273}{27+273}} = \sqrt{\frac{4\times400}{2\times300}} = \sqrt{\frac{8}{3}}$$

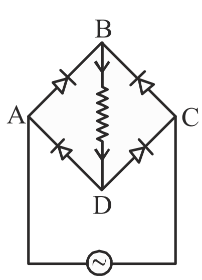
Q.19 (4)
Energy released in the fission of one nucleus
$= 200$ MeV
$= 200 \times 10^6 \times 1.6 \times 10^{-19} J = 3.2 \times 10^{-11} J$
$P = 16KW = 16 \times 10^3$ Watt
Now, number of nuclei required per second

$$n = \frac{P}{E} = \frac{16\times10^3}{3.2\times10^{-11}} = 5 \times 10^{14}$$

Q.20 (4)
The resistance of a conductor is directly proportional to the temperature.
As Copper is a conductor and Germanium is a semiconductor,
When cooled, the resistance of copper decreases and that of germanium increases.

Q.21 (4)
In reverse bias –ve terminal to P side & +ve terminal to N side, with increase in R.B potential width of depletion layer increase.

Q.22 (2)



For both +ve and –ve input of voltage current flows from B to D across load resistance.

Q.23 (2)
$\sigma = n_e e.\mu_e + n_h e.\mu_h$
where $n_e = n_h = n_i$
$\therefore \sigma = en_i (\mu_e + \mu_h)$
$= 1.6 \times 10^{-19} \times 2.29 \times 10^{19} (0.39 + 0.19)$
$= 1.6 \times 2.29 \times 0.58 \text{ (ohm-m)}^{-1}$

Q.24 (3)
Minumum energy required to produce e^- –hole pair

$$h\nu_{min} = \frac{h\nu}{\lambda_{max}} = \Delta Eg$$

$$\lambda_{max} = \frac{hc}{\Delta Eg} = \frac{12400}{0.72} = 17222 Å$$

Q.25 (1)
As we know current density J = nqv

$$\Rightarrow J_e = n_e q v_e \text{ and } J_h = n_h q v_h \Rightarrow \frac{J_e}{J_h} = \frac{n_e}{n_h} \times \frac{v_e}{v_h}$$

$$\Rightarrow \frac{3/4}{1/4} = \frac{n_e}{n_h} \times \frac{5}{2} \Rightarrow \frac{n_e}{n_h} = \frac{6}{5}$$

Q.26 (1)
In reverse biasing, drift current increases due to large velocity of the minority charge carriers.

Q.27 (1)
Reading = main scale reading + (varnier scale reading) (L.C.)

Where L.C. $= \frac{1}{100}$ mm

So reading $= 2mm + (31)\left(\frac{1}{100} mm\right) = 2.31$ mm

Q.28 (3)

$$\frac{P}{55} = \frac{Q}{45} \Rightarrow Q = \frac{9P}{11} = \frac{27}{11}$$

$$\frac{P+x}{75} = \frac{Q}{25} \Rightarrow P + x = 3Q$$

$$3 + x = \frac{81}{11} \Rightarrow x = \frac{81-33}{11} = \frac{48}{11}$$

Q.29 (3)

Q.30 (2)
To increase accuracy.

Q.31 (3)

$$\lambda \propto \frac{1}{\sqrt{E}} \quad \because \lambda' = \frac{\lambda}{2} \Rightarrow E' = 4E$$

SECTION-B

Q.32 (4)

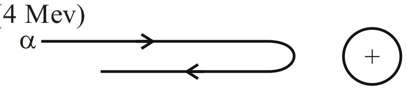
$$\lambda = \frac{h}{\sqrt{2mE}}, \frac{\lambda'}{\lambda} = \sqrt{\frac{E}{E'}} \Rightarrow \frac{E}{E'} = \left(\frac{0.5}{1}\right)^2$$

$\Rightarrow E' = \dfrac{E}{0.25} = 4E$

The energy should be added to decrease wavelength = E'–E = 3E

Q.33 (3)

(4 Mev)



r is called closet approach

$\Delta K.E. = \Delta P.E.$

$$4\times10^{6} = \frac{9\times10^{9}\times2\times92\times1.6\times10^{-19}}{r}$$

$r = 662.4\times10^{-16}$ m

$= 6.62\times10^{-14}$ m $\Rightarrow 6.62\times10^{-12}$ cm

Q.34 (2)

$$\frac{mv^2}{r} = \frac{e^2}{4\pi\epsilon_0 r^2} \text{ or } mv^2 = \frac{e^2}{4\pi\epsilon_0 r}$$

$$KE = \frac{1}{2}mv^2 = \frac{e^2}{8\pi\epsilon_0 r}$$

Q.35 (2)

To transition to the –12eV state with only two photon emissions, the only options are for the electron to make the following transitions:

$-1eV \rightarrow -3eV \rightarrow -12$ eV

giving us photons of energy 2eV and 9eV and or –1eV $\rightarrow -7eV \rightarrow -12$ eV giving photons of energy 6eV and 5eV. This means that the 4 eV photon is not possible with only two transitions.

Q.36 (1)

$${}^{238}_{92}U \xrightarrow{\alpha} {}^{234}_{90}Th \xrightarrow{\beta} {}^{234}_{91}Pa \xrightarrow{\beta} {}^{234}_{92}U$$

Q.37 (4)

nucli with law Bianding energy per nucleon support nuclear fusion process.

Q.38 (4)

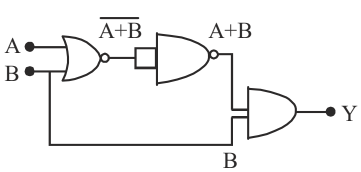
$P + P + e \rightarrow Q$

$2E_P + e \rightarrow E_Q$

Q.39 (1)

B_N is maxiumum at Fe^{56}

Q.40 (3)



$Y = \overline{\overline{(A+B)}}\cdot B$

$Y = (A+B)B$

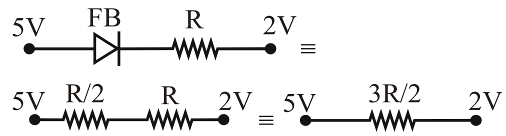
$= AB + B.B$

$= AB + B$

$= (A+1)B$

$= B$

Q.41 (2)



$$\text{Therefore } I = \frac{5V - 2V}{3\frac{R}{2}} = \frac{2V}{R}$$

Q.42 (1)

Silicon is a intrinsic semi-conductor

N-type semiconductor prepared by adding impurity like phosphorus.

P-type semiconductor prepared by adding impurity like indium.

Depletion layer have immobile ion.

Q.43 (2)

$$I_{Load} = \frac{6}{1\times10^3} = 6mA$$

$$I_{100\Omega} = \frac{9-6}{100} = 30mA$$

$I_Z = I_{100} - I_L = 30 - 6 = 24$ mA

Q.44 (3)

$$1MSD = \frac{1cm}{10} = 0.1cm$$

$$L.C. = \left[\frac{n-m}{n}\right]1MSD = \left[\frac{10-8}{10}\right]1MSD$$

$$= \frac{2}{10}\times0.1cm = .02cm$$

Q.45 (1)

Anqditude decreases exponentially

Q.46 (2)

Q.47 (3)

Q.48 (3)

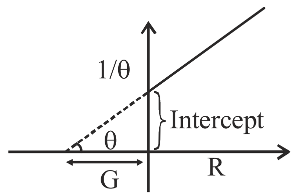
dQ = msdT

$$\frac{dQ}{dt} = ms\frac{dT}{dt}$$

$$\frac{dT}{dt} \propto \frac{1}{s} \qquad \text{Slope} \propto \frac{1}{s}$$

Q.49 (2)

$$R = \frac{E}{K\theta} - G$$



$$\tan\theta = \frac{\text{int ercept}}{G}$$

$$G = \frac{\text{int ercept}}{\tan\theta}$$

$$= \frac{\text{int ercept}}{\text{slope}}$$

Q.50 (1)
After cutoff voltage current increases sharply.

CHEMISTRY
SECTION-A

Q.51 (1)

Q.52 (1)

Q.53 (3)
$CoO + B_2O_3 \rightarrow \underset{\text{Blue}}{Co(BO_2)_2}$

Q.54 (4)
Inert gases are least reactive
(i) as they have completely filled valence shell E.C.
(ii) as they have high I.E.
(iii) as they have more + ve Δeg H.

Q.55 (3)
Diamond contains sp^3. – hybridized C

Q.56 (1)
H_2S gas react with Pb $(CH_3COO)_2$ and give black ppt due to formation as PbS (black comp.)

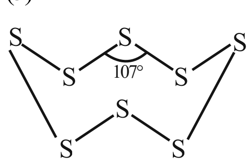
$$H_2S + Pb(CH_3COO)_2 \rightarrow \underset{\text{Black}}{PbS} + CH_3COOH$$

Q.57 (3)
M.P. order : B > Al > Tl > In > Ga

Q.58 (2)

$$4HCl(g) + O_2(g) \xrightarrow[773k]{CuCl_2} 2H_2O(l) + 2Cl_2(g)$$

Q.59 (3)



No. of 'S–S' bonds is 8.

Q.60 (1)
Cu metal react with conc. HNO_3 to form Cu $(NO_3)_2$ and NO_2
$Cu + 4HNO_3 \rightarrow Cu(NO_3)_2 + 2H_2O + 2NO_2$

Q.61 (3)

Magnetic moment $\mu = \sqrt{n(n+2)}$

$Cr^{+3} - 3d^3 \quad n = 3 \therefore \mu = \sqrt{15} = s$

$Fe^{+2} - 3d^6 \quad n = 4 \therefore \mu = \sqrt{24} = r$

$Ni^{+2} - 3d^8 \quad n = 2 \therefore \mu = \sqrt{8} = t$

$Mn^{+2} = 3d^5\ n = 5 \therefore \mu = \sqrt{35} = p$

Q.62 (2)
Most common oxidation. state = +3

Q.63 (2)
In alkaline medium.

$$MnO_4^- + 2H_2O + 3e^- \rightarrow MnO_2 + 4\left[OH^-\right]$$

Q.64 (3)
In dilute alkaline solution $KMnO_4$ change to MnO_2
$2KMnO_4 + H_2O \rightarrow 2MnO_2 + 2KOH + 3[O]$

Q.65 (2)

$$CrO_4^{2-} \underset{OH^-}{\overset{H^+}{\rightleftharpoons}} Cr_2O_7^{2-}$$

Q.66 (2)
During the rxn. between $KMnO_4$ and oxalic acid the Mn^{+2} which is formed in the rxn act as catalyst.
So rxn is slow in the begining and become instantaneous after formation of Mn^{+2} ion.

Q.67 (4)
Due to lanthanide contraction, Zr and Hf are of equal size

Q.68 (3)
Scandium (Sc) only has +3 oxidation state.

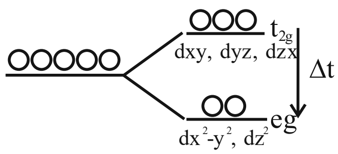
Q.69 (3)

	Alloy	**Constituent metals**
1.	Brass	Cu and Zn
2.	Bronze	Cu and Sn
3.	German silver	Cu, Zn and Ni

Q.70 (1)
Size of lanthanide decrease because of poor screening of 4f electrons.

Q.71 (3)
Coordination comp. are generally formed by transition element is correct. This is due to small size of atoms and ions of transition metals and availability of vacant d-orbital And reason is not correct.

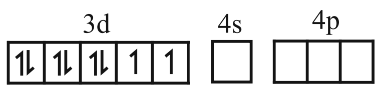
Q.72 (2)
$[Co(SCN)_4]$ is a tetrahedral complex and for tetrahedral complex splitting of d orbital are as follows.



∴ so e^- filling will be
$[Co(SCN)_4]^{-2} - eg^4, t_{2g}^3$

Q.73 (3)
$[NiX_4]^{-2}$ as X → is monodentate anionic ligand
So Ni is in +2 oxidation state

∴ $Ni^{+2} = 3d^8 4s^0 \rightarrow$



As it magnetic moment is zero. So no unpaired e^- in this ion that why hybridisation is dsp^2.

Q.74 (4)
VBT does not explain the colour in co-ordination compound.

Q.75 (4)
When excess NH_3 in added to $CuSO_4$ solution a deep blue color solution is formed due to formation as complex $[Cu(NH_3)_4]^{2+}$
The complex $[Cu(NH_3)_4]^{+2}$ is square planner and paramagnetic in nature.

Q.76 (2)
Correct IUPAC name is Sodium hexanitrito – O – cobaltate(III)

Q.77 (1)
$[Pt(NH_3)_2(Cl_2)_2]$
Ma_2b_2

$$\begin{matrix} \text{trans} - \\ \text{cis} - \end{matrix}\begin{bmatrix} aa & bb \\ ab & ab \end{bmatrix} \rightarrow 2GI$$

Q.78 (2)
$[Ni(CO)_4] \rightarrow$ hybridisation in sp^3
$[Ni(CN)_4] \rightarrow$ hybridisation in dsp^2

Q.79 (1)
$Mn^{2+} = 3d^5 4s^0 4p^0$
∴ No. of unpaired $e^- = 5 \rightarrow \mu = \sqrt{35} = 5.9$
In this case hybridisation = sp^3 and geometry Tetrahedral

Q.80 (3)
As this complex do not contain chelate ligand.

Q.81 (1)
Phenol is less acidic than H_2CO_3 so it can not give $NaHCO_3$ test

Q.82 (3)
In crystallization process seeding in done
In seeding a small crystal is placed in conc. solution.

Q.83 (2)
Fehling solution B is Rochelle salt
chemically it is potassium sodium tartrate tetrahydrate.

Q.84 (3)
Aldehyde and Ketones are distinguished by mild because RCHO easily oxidized by mild oxidizing agent while ketone do not oxidize by mild oxidizing agent.

Q.85 (4)
(i) It in correct that do not inhale vapours of acetyl chloride
(ii) Store acetyl chloride in dry condition – correct.
(iii) Distilling pyridine before it obsorbs moisture - correct
so ans. - All.

SECTION-B

Q.86 (1)

Q.87 (3)
fact

Q.88 (3)

$$\text{Sod. ext.} + FeCl_3(aq.) \longrightarrow NaSCN + FeCl_3$$
$$\downarrow$$
$$FeCl_2(SCN)$$

Ferric chloride thio cyanate
(Blood Red colour)

Q.89 (1)

$$\overset{\ominus}{H}CO_3 + \text{dil } H_2SO_4 \longrightarrow H_2O + CO_2\uparrow + HSO_4^-$$

Q.90 (3)
$\mu = 0$ n = number of unpaired electron.

$\sqrt{n(n+2)} = 0$ $Sc \rightarrow [Ar]3d^1 4s^2$

$n = 0$ $Sc^{3+} \rightarrow [Ar]3d^0 4s^0$

Q.91 (3)
Lanthanoids are good conductors of heat and electricity.

Q.92 (4)
Spin only magnetic moment.

$\mu = \sqrt{n(n+2)} = \sqrt{24}$

$\Rightarrow n^2 + 2n - 24 = 0$

$(n+6)(n-4) = 0$

$\therefore n = 4$

$[\because n = -6$ not possible$]$

Here, n is is the number of unpaired electrons. The electronic configuration of the metal ion M^{x+} is

$Z(25) = 1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 4s^2, 3d^5$

Since, four unpaired electrons are present, the oxidation state must be +3.

$\therefore Z^{3+}(25) = 1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 3d^4$

Q.93 (2)
The order of shielding effect of various orbital electrons is s > p > d > f. Due to the poor shielding effect of 4f-electrons in 5d-series elements, there is enhanced increase in effective nuclear charge. As a result of this the valence electrons are tightly bound with the nucleus and thus their removal require higher energy.

Q.94 (1)
As $[CN^-]$ is strong field lignad so in this case splitting is maximum
Hence Δ_0 will be maximum.

Q.95 (3)
Correct IUPAC name -
(3) Dichloro bis (ethylene diamine) cobalt (III) chloride.

Q.96 (4)
$[NiCl_4]^{-2}$ involue sp^3 hybridisation so geometry tetrahedral and it paramagnetic
$[Ni(CN)_4]^{-2} \rightarrow$ involve dsp^2 hybridisation so geometry square planar and it is diamagnetic

Q.97 (3)
$\Delta_0 < P$ (given)
so it is a case of high spin complex.

that why E.C. = t_{2g}^4, eg^2.

Q.98 (3)

$[CrBr(NH_3)_5]SO_4$ and $[Cr(SO_4)(NH_3)_5]Br$

are ionisation isomers.

Q.99 (2)
O-nitrophenol and p-nitrophenol can be separated from each other by steam distillation.
P-nitrophenol has high boiling point than O-nitrophenol.

Q.100 (4)
$R_f \propto$ distance moved by substance from base line.

BIOLOGY-I
SECTION-A

Q.101 (3)

Q.102 (4)
More realistic growth model is logistic growth.

Q.103 (3)
$N_{t+1} = N_t + [(B+1)-(D+E)]$

Q.104 (3)

Q.105 (3)
Natality leads to increase in population density.

Q.106 (3)

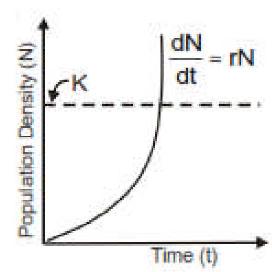
Q.107 (1)

Q.108 (1)

Q.109 (1)

Q.110 (2)

Q.111 (2)
A J-shaped growth curve depicts exponential growth, when conditions are unlimited.



Q.112 (2)
Camouflage is an important mechanism where prey species are cryptically coloured to avoid being easily detected by predator.

Q.113 (2)
It is generally believed that competition occurs when closely related species compete for same resources which are limited. But this is not true as unrelated species also compete for the same resources. This is called interspecific competition. Darwin was convinced that it was a potent force in organic evolution.

Q.114 (3)

Q.115 (2)

Q.116 (1)

Q.117 (2)

Q.118 (2)
The statement in option (2) is incorrect explanation about higher diversity in tropical areas in comparison to the temperate areas. It can be corrected as
More solar energy is available in tropics. This promotes higher productivity and increased biodiversity
Rest of the statements are true.

Q.119 (4)
All the three mentioned species are neither threatened nor indigenous species of India. *Lantana*, *Eichhornia* (water hyacinth) and African catfish (*Clarias gariepinus*) are all alien (exotic) species, which are invasive and have a harmful impact resulting in the extinction of the indigenous species.

Q.120 (1)
Q.121 (4)
Q.122 (3)
Q.123 (1)
In global biodiversity of plants, Fungi has maximum diversity followed by angiosperms.

Q.124 (2)
Q.125 (1)
Q.126 (4)
Hint: The layers of different species in vertical column are called strata.
Sol.: Stratification is the vertical distribution of different species occupying different levels in an ecosystem.

Q.127 (4)

Q.128 (2)

Q.129 (1)

Q.130 (2)
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Q.131 (2)
In a terrestrial ecosystem, a much larger fraction of energy flows through the Detritus Food Chain (DFC) than through the Grazing Food Chain (GFC). DFC may be connected with the GFC at some levels. For example, some of the organisms of DFC are prey to the GFC animals.

Q.132 (2)
Low temperature and anaerobiosis inhibit decomposition. Decomposition is mainly an aerobic process
In aquatic ecosystem GFC is the major conduit for energy flow. As against this in a terrestrial ecosystem much larger fraction of energy flows through the DFC.
Dry weight is more accurate

Q.133 (2)
In a pond ecosystem, fishes occupy the more than one trophic levels.

Q.134 (4)

Q.135 (2)

SECTION-B

Q.136 (2)
Resource partitioning is an important mechanism which promotes co-existence i.e. resource sharing by different time i.e., different foraging patterns e.g., 5-different species of Warblers.

Q.137 (3)

Q.138 (2)

$$\text{Birth rate} = \frac{8}{80} = 0.1$$

Q.139 (2)
In Orchids (Ophrys), there is strange relationship with pollinator insects. The Mediterranean Orchid (Ophrys) employs sexual deceit to get pollination done by a species of bee. One petal of its flower bears an uncanny resemblance to the female of the bee in size, colour and markings. The male bee is attracted to what it perceives as a female. Pseudocopulates with the flower and in that process pollinates the flower

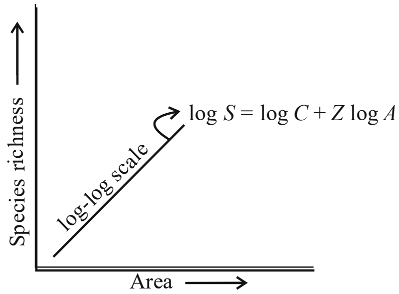
Q.140 (2)

Q.141 (3)

Q.142 (4)
Statements I, II and III are correct and statements IV is incorrect. It can be corrected as
Loss of biodiversity will lead to loss of genes of crops. Therefore, plant production will decrease.

Q.143 (3)
On a logarithmic scale, the species-area relationship is a straight line described by the equation

$$\log S = \log C + Z \log A$$



Q.144 (2)

Q.145 (3)
Assertion is true, but Reason is false. Reason can be corrected as
The currently occurring species extinction is different from the earlier mass extinction as the present species extinction is due to man-made causes, whereas the earlier extinction was due to the natural causes.

Q.146 (3)

Q.147 (2)
The figure represents pyramid of biomass which shows a sharp decrease in biomass at higher trophic level.

Q.148 (2)

Q.149 (1)

Q.150 (1)
Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
Consumers of first order are group of organisms including the herbivores. These directly eat upon green plants producers.

BIOLOGY-II
SECTION-A

Q.151 (2)
Lichens represents an intimate mutualistic relation between a fungus and photosynthetic algae or cyanobacteria. It is the interaction confers benefit for both the interacting species called mutualism

Q.152 (4)
Populations evolve to maximize their reproductive fitness, also called Darwinian fitness (high *r* value), in the habitat in which they live. According to Darwin fitness ultimately and only is reproductive fitness or Darwinian fitness

.

Q.153 (2)
Mycorrhiza represent association between fungi and roots of higher plants. The fungi help the plant in the absorption of essential nutrients from soil, while the plant in return provides carbohydrates and shelter to the fungi.

Q.154 (4)

Q.155 (2)
A species whose distribution is restricted to a small geographical area because of the presence of a competitive superior species, is found to expand its distributional range dramatically when the competing species is experimentally removed. This is the observation of competitive release.

Q.156 (2)
Both Assertion and Reason are true, but Reason is not the correct explanation for Assertion. The correct explan ation is as follows
Plants need the help of insects and animals for pollinating their flowers and dispersing their seeds because plants are immobile and require a medium to transfer their pollen to enable reproduction.

Q.157 (2)
Efficient predator is prudent which will not allow prey to extinction.

Q.158 (2)
Two closely related species competing for the same resources cannot co-exist indefinitely and the competitively inferior one will be eliminated eventually. This is the statement of Gause's Competitive Exclusion Principle.

Q.159 (3)
Parasites have adhesive organs, suckers, high reproductive capacity and complex life cycle but they also show undeveloped digestive system and loss of unnecessary sense organs.

Q.160 (3)
The most spectacular and evolutionary fascinating examples of mutualism are found in plant-animal relationships.

Q.161 (2)

Q.162 (1)
Poisonous glycosides

Q.163 (3)

Q.164 (3)

Q.165 (1)

Q.166 (1)
A - Insects B - Mollusca
C - Crustaceans D- Other animal group.

Q.167 (1)
Q.168 (4)
Q.169 (4)
Q.170 (3)
Q.171 (3)
Q.172 (3)
Q.173 (2)
Q.174 (3)
Q.175 (2)
Seed banks and wildlife safari park are ex-situ conservation strategy.

Q.176 (2)
Decomposition is quicker if detritus is rich in nitrogen and water soluble substances like sugar. It is faster, if warm and moist environment is provided
Rate of decomposition is slower if it is rich in lignin and chitin.
It is oxygen requiring process and slowers down at low temperature and anaerobic condition.

Q.177 (3)

Q.178 (3)

Q.179 (2)
In grazing food chain, frog (C) is a secondary consumer (primary carnivore) which preys upon herbivorous animals and eagle is top carnivore (A) which is not prayed upon by other animals because of their size, ability and ferociousness.
Detritus food chain (B) begins with detritus or dead organic matter. Primary consumers or detritivores (earthworms) feed over it
Thus, option (b) is correct.

Q.180 (4)

Q.181 (3)

Q.182 (2)

Q.183 (2)

Q.184 (3)
Hint: Primary consumers occupy the second trophic level in the food chain.
Sol.: Primary consumers directly feed on producers and can convert plant matter into animal matter. They are also called herbivores.

Q.185 (4) **NCERT (XII) Ch - 14, Pg. 246, Fig. 14.2**

SECTION-B

Q.186 (4)
Tiger census is often based on pug marks and fecal pellets; size of population for any species is not a static parameter.

Q.187 (3)
Q.188 (2)
In predation, parasitism and commensalism common characteristic is interacting species live closely together.

Q.189 (1)
Q.190 (4)
Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
Predation is an interspecific interaction with a feeding strategy. The number of predator usually depends upon the population of prey, but later is also controlled by predators.
Thus, predator and prey maintain a fairly stable population through time and rarely one population becomes scarce or abundant.

Q.191 (4)

Q.192 (2)
Rauwolfia vomitoria is the source of the active chemical drug reserpine, which is prescribed in hypertension and acts as a tranquiliser.
For other options.
• *Datura* is a plant with hallucinogenic properties.
• The compound belladonna is obtained from *Atropa belladonna*.
• The compound opium is obtained fron *Papaver somniferum*.

Q.193 (4)

Q.194 (1)
When host fish species become extinct, its parasite also faces same fate due to co-extinction.

Q.195 (1)

Q.196 (1)

Q.197 (3)

Q.198 (4)
During leaching water-soluble substances present in detritus go down into the sol norizon and get precipitated as unavailable salts.

Q.199 (4)

Q.200 (3)