ANSWER KEY

AITS FINAL TRACK
PART TEST-09

PHYSICS
SECTION-A

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

SECTION-B

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

CHEMISTRY
SECTION-A

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

SECTION-B

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

BIOLOGY-I
SECTION-A

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

SECTION-B

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

BIOLOGY-II
SECTION-A

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

SECTION-B

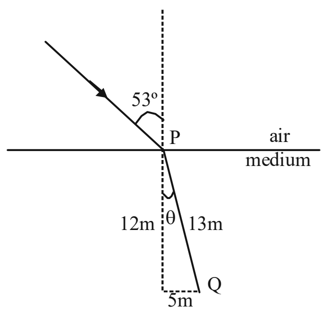
Q.186 (1)	**Q.187** (4)	**Q.188** (3)	**Q.189** (2)	**Q.190** (1)	**Q.191** (1)	**Q.192** (3)	**Q.193** (1)	**Q.194** (3)	**Q.195** (2)
Q.196 (3)	**Q.197** (3)	**Q.198** (3)	**Q.199** (3)	**Q.200** (4)					

PHYSICS
SECTION-A

Q.1 (3)

$\sin\theta = \frac{5}{13}$ $\quad\quad m\sin\theta = (1)\sin 53^o$

$\Rightarrow \mu\left(\frac{5}{13}\right) = \frac{4}{5} \Rightarrow \mu = \frac{52}{25}$



$V_m = \frac{c}{\mu} = \frac{3\times10^8}{52/25}$

Time taken $= \frac{13\times(52/25)}{3\times10^8} = 9\times10^{-8}$s

Q.2 (3)
$\delta_m = 2i - A$
$= 2\times38 - 40 = 36^o$

Q.3 (2)

$\frac{1}{u} - \frac{1}{v} = \frac{1}{f}; -\frac{1}{u^2}\frac{du}{dt} + \frac{1}{v^2}\frac{dv}{dt} = 0$

$\therefore \frac{dv}{dt} = \frac{v^2}{u^2}\left(\frac{du}{dt}\right) = \left(\frac{10}{30}\right)^2 \times 9 = 1$ m/s

Q.4 (3)
Light can fall on either surface. of lens. the two principal focal lengths differ when medium on the two sides have different refractive indices.

Q.5 (3)
Optical fibers are based on total internal reflection.

Q.6 (3)

$m_T = \frac{f}{f-u} + \frac{1}{2} = \frac{+10}{+10-u} \Rightarrow 10 - u = 20 \Rightarrow u = -10$ cm

Q.7 (1)
$L = v_0 + f_e$
$v_0 = L - f_e = 75 - 5 = 70$ cm

$\frac{1}{v_0} - \frac{1}{u_0} = \frac{1}{f_0}$

$\frac{1}{u_0} = \frac{1}{v_0} - \frac{1}{f_0} = \frac{1}{70} = \frac{1}{50} = -\frac{20}{3500}$

$u_0 = -175$ cm

Q.8 (1)

Q.9 (1)
Let lens is placed at a distance x cm from object.
Then, $u = -x$ & $v = \pm(100 - x)$

$\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$

$\frac{1}{(100-x)} + \frac{1}{x} = \frac{1}{24}$

Solving, we get
$x = 40, 60$ cm

Q.10 (1)
Property of parabola.

Q.11 (2)
Cutting a lens in transverse direction doubles their focal length i.e. 2f Using the formula of equivalent focal length,

$\frac{1}{f} = \frac{1}{f_1} + \frac{1}{f_2} + \frac{1}{f_3} + \frac{1}{f_4}$

We get equivalent focal length as f/2.

Q.12 (1)

$\frac{\mu_2}{v} - \frac{\mu_1}{u} = \frac{\mu_2 - \mu_1}{R}$

$\frac{1.5}{v} - \frac{1.2}{-10} = \frac{1.5-1.2}{-60}$

$\frac{1.5}{v} = \frac{-0.3}{60} - \frac{1.2}{10}$

$\frac{1.5}{v} = -\frac{(0.3+7.2)}{60}$

$v = -12$ cm.

Q.13 (2)
$\because$ Refractive index of glass is greater than that of water

Q.14 (2)

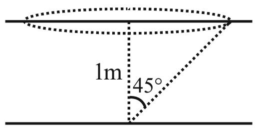
$v = \frac{u}{u+f}$

As the image is virtual.

$\therefore$ Intensity decreases continuously.

Q.15 (1)

$r = h \tan C = 1 \tan 45° = 1m$



Area $= \pi r^2 = \pi m^2$

Q.16 (2)

$$\mu = \frac{\sin\frac{(A+\delta_m)}{2}}{\sin\left(\frac{A}{2}\right)} = \frac{\sin\frac{(60°+46°)}{2}}{\sin\left(\frac{60°}{2}\right)}$$

$$\frac{\sin 53°}{\sin 30°} = \frac{\frac{4}{5}}{\frac{1}{2}} = \frac{8}{5} = 1.6$$

Q.17 (1)

$$\frac{\theta_i}{\theta_0} = \frac{f_0}{f_e} = \frac{400}{10} = 40$$

$$\Rightarrow \theta_0 = \frac{3.5\times10^3}{3.8\times10^3} = \frac{35}{3800}$$

$$\Rightarrow \theta_i = 40 \times \frac{35}{8000} \approx 0.36 \text{rad}$$

Q.18 (2)

$$\mu \propto \frac{1}{\lambda}$$

$\lambda_R > \lambda_g > \lambda_v$

$\mu_R < \mu_g < \mu_v$

$\delta \propto \mu [\because \delta = (\mu - 1)A]$

$\theta_1 < \theta_2 < \theta_3$

Q.19 (4)

Here, $u = -10$

$v = +20$

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$$

$$P = 100\left[\frac{1}{v} - \frac{1}{u}\right] \text{(in D)}$$

$$= 100\left[\frac{1}{20} + \frac{1}{10}\right]$$

$$= 100 \times \frac{3}{20}$$

$P = +15 D$

Q.20 (1)

Optical path $= \mu \times \ell$

$\Rightarrow \mu_1 \ell_1 = \mu_2 \ell_2$

$$\Rightarrow \frac{4}{3} \times (6\text{cm}) = \mu \times (4\text{cm}) \Rightarrow \boxed{\mu = 2}$$

Q.21 (3)

$$\frac{1}{30} = (1.5 - 1)\left(\frac{1}{R} - \frac{1}{-R}\right) \Rightarrow R = 30\text{cm}$$

Q.22 (1)

For secondary maxima

$$x = \frac{5\lambda f}{2d}$$

$$\Rightarrow \text{diameter} = 2x = \frac{5\lambda f}{d} = 6 \text{ mm}$$

Q.23 (1)

Change in optical path diff $\Delta x = (\mu - 1)t$

Phase diff $\Delta\phi = \dfrac{2\pi}{\lambda} \Delta x$

$$= \frac{2\pi}{600\times10^{-9}} \times 0.4 \times 5 \times 10^{-6} = \frac{20\pi}{3}$$

$$I_{res} = I_0 \cos^2\left(\frac{\Delta\phi}{2}\right) = I_0 \cos^2\left(\frac{10\pi}{3}\right) \Rightarrow I_{res} = \frac{I_0}{4}$$

Q.24 (3)

$$x = \frac{2\lambda D}{a}$$

$$x = \frac{2\times600\times10^{-9}\times2}{1\times10^{-3}} = 24 \times 10^{-4} = 2.4 \text{ mm}$$

Q.25 (2)

Frequency is property of source will not change so $n' = n$

Q.26 (3)

$$\beta = \frac{\lambda D}{d}$$

$$\beta' = \frac{\lambda' D}{d}$$

$$\frac{\beta'}{\beta} = \frac{\lambda'}{\lambda} = \frac{\mu}{\lambda} = \frac{1}{\mu}$$

$$\beta' = \frac{\beta}{\mu} = \frac{0.6\text{mm}}{1.5} = 0.4\text{mm}$$

Q.27 (2)

At the polarising angle, the reflected ray is fully polarised while the transmitted ray is partially polarised. In fact a method to produce plane polarised light is by reflection at the polarising angle.

Q.28 (4)

$$\frac{2\lambda D}{a}=2\times10^{-3}\Rightarrow D=\frac{2\times10^{-3}\times1\times10^{-3}}{2\times6\times10^{-7}}=\frac{5}{3}\text{m}$$

Q.29 (3)

Let intensity of light coming from each slit of a coherent source is I.

As first slit has width 4 times the width of the second slit, so

$I_1 = 4I$ and $I_2 = I$

$$\therefore\ \frac{I_{max}}{I_{min}}=\frac{(\sqrt{I_1}+\sqrt{I_2})^2}{\left(\sqrt{I_1}-\sqrt{I_2}\right)^2}=\frac{\left(\sqrt{4I}+\sqrt{I}\right)^2}{\left(\sqrt{4I}-\sqrt{I}\right)^2}=\frac{9}{1}$$

Q.30 (3)

Size of obstacle should be nearly equal to the wavelength of wave.

Q.31 (2)

$I(\phi)=I_1+I_2+2\sqrt{I_1I_2}\ \cos\phi$ ....(1)

Here, $I_1 = I$ and $I_2 = 4I$. At point A, $\phi=\frac{\pi}{2}$

$\therefore\ I_A = I + 4I = 5I$ At point B, $\phi=\pi$

$\therefore\ I_B = I + 4I - 4I = I$

$\therefore\ I_A - I_B = 4I$

Q.32 (1)

$$\therefore\ I_{av}=\frac{I_0}{2}$$

$$\left(\frac{A}{2}\right)^2=\frac{A_0^2}{2}\quad\{\because I\propto A^2\}$$

$$\frac{A^2}{2}=A_0^2\quad A_0=\frac{A}{\sqrt{2}}$$

Q.33 (2)

Here, $\theta=45^{\circ}$

intensity transmitted through first polaroid -

$$I_1=\frac{I_0}{2}\ (\text{average value})$$

Now, Intensity transmitted through second poloroid

$$I_2 = I_1\cos^2 45$$

$$=\frac{I_0}{2}\cdot\frac{1}{2}=\frac{I_0}{4}$$

$$\frac{I_2}{I_0}\times100=25\%$$

Q.34 (3)

$$W_a=\frac{\lambda}{d}$$

$$1\times\frac{\pi}{180}=\frac{6000\times10^{-10}}{d}$$

$d = 0.03$ mm

Q.35 (3)

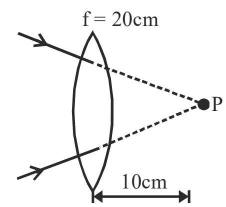
SECTION-B

Q.36 (3)

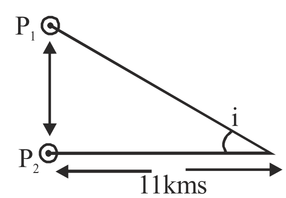
$$\frac{1}{v}-\frac{1}{u}=\frac{1}{f};\frac{1}{v}-\frac{1}{+10}=\frac{1}{20}$$

$$\frac{1}{v}=\frac{1}{20}=\frac{1}{10}=\frac{1+2}{20}$$

$$v=\frac{20}{3}\text{cm}$$



Q.37 (2)



$$1\times\frac{1}{60}\times\frac{\pi}{180}=\frac{d}{11000}$$

$d = 3.2$ m

Q.38 (1)

A Converging lens forms a magnified virtual image always.

Q.39 (2)

$P_1 = -2x$

$P_2 = 3x$

$P = P_1 + P_2$

$$f_2=\frac{1}{3x}=\frac{1}{3}\times\frac{30}{100}=10\,\text{cm}$$

$$x=\frac{100}{30}$$

$$f_1=\frac{1}{-2x}=\frac{130}{-2\times100}=-15\,\text{cm}$$

$$f_2=\frac{1}{3x}=\frac{1}{3}\times\frac{30}{100}=10\,\text{cm}$$

Q.40 (2)

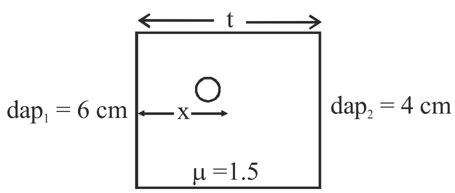
(A) $m=\dfrac{f}{f-u}=\dfrac{f}{f+f}=\dfrac{1}{2}$

(B) $m=\dfrac{f}{f-u}=\dfrac{-f}{-f+f}=\infty$

(C) $m=\dfrac{-f}{-f+2f}=-1$

(D) $m=\dfrac{f}{f+2f}=\dfrac{1}{3}$

Q.41 (3)



$$dap_1=\frac{x}{\mu}=6$$
$x=6\mu=6\times1.5=9$ cm

$$dap_2=4=\frac{t-x}{\mu}$$
$4\times1.5=t-9$
$6=t-9$
$t=15$ cm

Q.42 (4)
$i=2r$

$$\mu=\frac{\sin i}{\sin r}=\frac{\sin 2r}{\sin r}$$

$$\mu=\frac{2\sin r.\cos r}{\sin r}$$

$\mu=2\cos r$
$\sqrt{2}=2\cos r$

$$\text{cor } r=\frac{1}{\sqrt{2}}=\cos 45^{o}$$

$r=45^{o}$
$A=2r=2\times45=90^{o}$

Q.43 (1)
Normal shift

$$=d_1\left(1-\frac{1}{\mu_1}\right)+d_2\left(1-\frac{1}{\mu_2}\right)+d_3\left(1-\frac{1}{\mu_3}\right)$$

$$=6\times\frac{1}{3}+5\times\frac{1}{5}+4\times\frac{1}{4}=4\text{ cm above P}$$

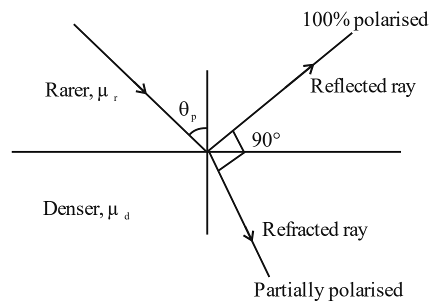
Q.44 (3)

From the formula $\sin C=\dfrac{1}{{}_1\mu_2}\Rightarrow \sin c={}_2\mu_1$

$$=\frac{\mu_1}{\mu_2}=\frac{v_2}{v_1}\Rightarrow \sin C=\frac{10x/t_2}{x/t_1}$$

$$\Rightarrow \sin C=\frac{10t_1}{t_2}\Rightarrow C=\sin^{-1}\left(\frac{10t_1}{t_2}\right)$$

Q.45 (4)



If angle of incidence = θ_p = angle of polarisation

then, $\mu=\dfrac{\mu_d}{\mu_r}=\tan\theta_p$

Q.46 (1)
$\mu=\tan i_p$

$$\mu=\tan 53^{\circ}=\frac{4}{3}$$

$$\mu=\frac{c}{v}$$

$$\mu=\frac{c}{\mu}=\frac{3\times10^8}{\left(\frac{4}{3}\right)}=\frac{9}{4}\times10^8$$

Q.47 (2)

$$n_1\lambda_1=n_2\lambda_2\Rightarrow n_2=n_1\times\frac{\lambda_1}{\lambda_2}=12\times\frac{600}{400}=18$$

Q.48 (2)

$$\frac{\text{Shift}}{D}=\frac{\text{Path difference}}{d}$$

$$\text{Shift}=\frac{t(\mu-1)D}{d}$$

$$=\frac{2.5\times10^{-5}(1.5-1)\times100}{0.5\times10^{-3}}$$
$=2.5\times10^{-2}$ m $=2.5$ cm

Q.49 (3)

$$\sin\theta = \frac{\Delta x}{a} \Rightarrow a = \frac{\Delta x}{\sin\theta} \Rightarrow a\frac{\lambda}{\left(\frac{1}{\sqrt{2}}\right)} = \sqrt{2}\lambda$$

$$\sin\theta = \frac{3\lambda}{2a} \Rightarrow \sin\theta = \frac{3\lambda}{2\times\sqrt{2}\lambda} \Rightarrow \theta = \sin^{-1}\left(\frac{3}{2\sqrt{2}}\right)$$

Q.50 (4)

For central fringe

$$\Delta x_{total} = 0$$

$$d\sin\theta + (\mu - 1)t + y\frac{xd}{D} = 0$$

Value of y depends on

θ & t

CHEMISTRY

Q.51 (3)

$$CH_3 - \overset{\overset{\large O}{||}}{C} - NH_2 \xrightarrow{LiAlH_4} CH_3 - CH_2 - NH_2$$

Q.52 (1)

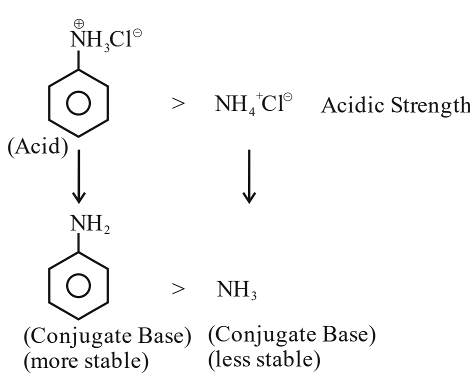
$R{-}NH_2 + CHCl_3 + 3KOH \rightarrow R - N \equiv C + 3KCl + 3H_2O$

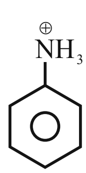
This reaction is known as carbylamine reaction (isocyanide test)

Q.53 (1)

$$R{-}CO{-}\boxed{OCOR + H}{-}NH{-}R' \longrightarrow \underset{\text{(Amide)}}{R{-}\underset{\underset{O}{||}}{C}{-}NH{-}R'} + R{-}\underset{\underset{O}{||}}{C}{-}OH$$

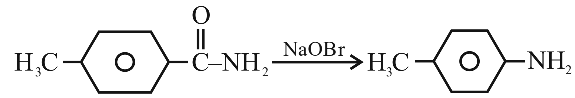
Q.54 (3)



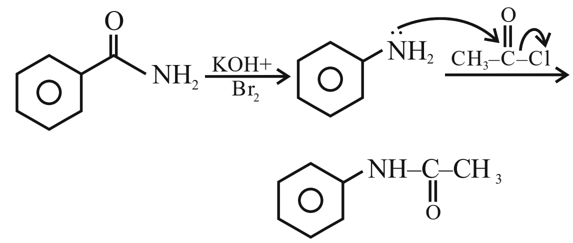


Anilinium ion does not show Resonance.

Q.55 (3)

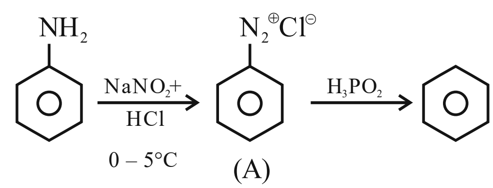


Q.56 (3)



Q.57 (3)

Q.58 (1)



Q.59 (1)

1°, 2° and 3° amines are differentiated by Hinsberg Reagent Test.

Q.60 (2)

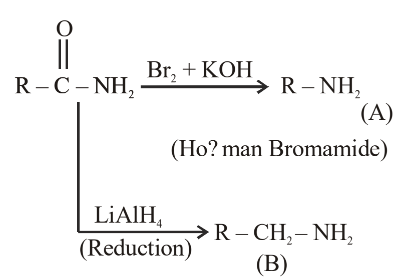
1. $CH_3 - \overset{\overset{O}{||}}{C} - NH_2 \xrightarrow{LiAlH_4} CH_3{-}CH_2{-}NH_2$ 1° Amine

2. $CH_3{-}NC \xrightarrow{LiAlH_4} CH_3{-}NH{-}CH_3$ 2° Amine

3. $CH_3{-}CN \xrightarrow{LiAlH_4} CH_3{-}CH_2{-}NH_2$ 1° Amine

4. $CH_3{-}CH_2{-}NO_2 \xrightarrow{LiAlH_4} CH_3{-}CH_2{-}NH_2$ 1° Amine

Q.61 (2)



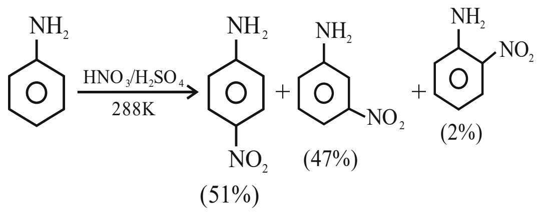
(A) and (B) are homologues.

Q.62 (1)

$R-NH_2 + CHCl_3 \xrightarrow{KOH} R-NC$

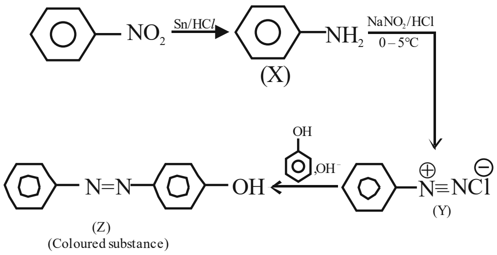
Carbyl amine Reaction

Q.63 (4)



Q.64 (3)

Hint: The reaction involves diazotisation followed by coupling reaction with phenol.



Q.65 (4)

Hint : Sandmeyer reaction is used for the preparation of chlorobenzene, bromobenzene and benzonitrile

Q.66 (4)

Vitamin – A is fat soluble vitamin.

Q.67 (4)

Glucose contains Aldehyde functional group and fructose contains ketone functional group.

Q.68 (1)

Peptide linkage is kind of secondary amide linkage $-\underset{\underset{O}{\|}}{C}-NH-$.

Q.69 (1)

D-Glucose and L-Glucose are enantiomers of each other.

Q.70 (3)

$C_{12}H_{22}O_{11} + H_2O \xrightarrow[\text{(from yeast)}]{\text{Maltase}} 2C_6H_{12}O_6$ Glucose

Q.71 (4)

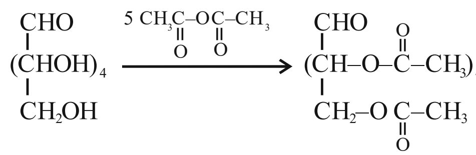
Vitamin $B_1 \rightarrow$ Beri – Beri

Vitamin $B_2 \rightarrow$ Cheilosis

Vitamin B12 $\rightarrow$ Pernicious anaemia

Vitamin $B_6 \rightarrow$ Convulsions

Q.72 (2)



Q.73 (1)

Sucrose is disaccharide unit of α–D glucopyranoside and β–D– fructofuranoside.

Q.74 (4)

D-Glucose, D-Mannose, D-Fructose give same osazone.

Q.75 (2)

Methionine is essential amino acid.

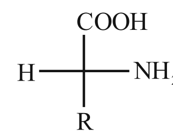
Alanine, Tyrosine, Glutamine is non essential amino acids.

Q.76 (3)

Vitamin $B_{12} \rightarrow$ Pernicious anaemia.

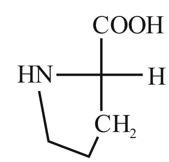
Q.77 (2)

Amino acid



Lysine –R group $NH_2(CH_2)_4-$

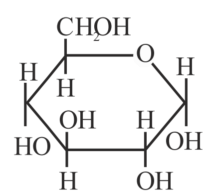
Proline



Serine $HO-CH_2-$

Phenylalanine $Ph-CH_2-$

Q.78 (2)



α-D-(+)-glucopyranose

Q.79 (1)

Adenine and Guanine is Purine bases but Cytosine, Thymine and Uracil is pyrimidine bases.

Q.80 (2)

Adenine is present in DNA and RNA both.

Q.81 (3)
Vitamin B and C is water soluble vitamin.

Q.82 (2)
Insulin is a hormone that controls the metabolism of glucose in body.

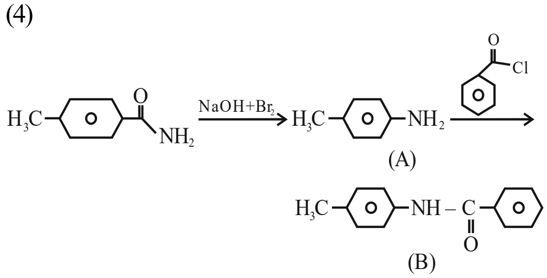
Q.83 (1)
Monosaccharide units are connected by glycosidic linkage.

Q.84 (3)
Sucrose is a disaccharide consisting of one molecule of glucose and one molecule of fructose.

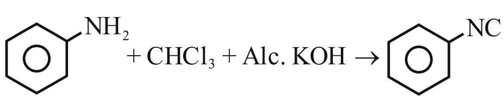
Q.85 (1)
Monomer of nucleic acid (DNA or RNA) is nucleotides.

SECTION-B

Q.86 (4)

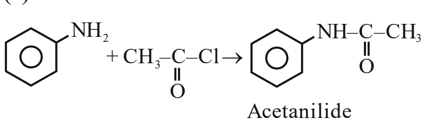


Q.87 (3)

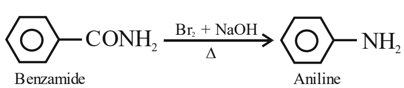


Q.88 (3)
Gabriel phthalimide reaction is used for the preparation of Aliphatic primary amine.

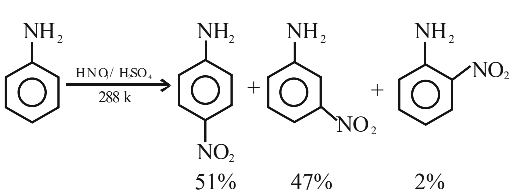
Q.89 (3)



Q.90 (2)
Hint : Hoffmann bromamide reaction.



Q.91 (2)
Hint : o-nitro aniline is the minor product.



Q.92 (2)

$$Ph-\overset{O}{\overset{\|}{C}}-NH_2 \xrightarrow{P_2O_5} \underset{(A)}{Ph-CN} \xrightarrow[\Delta]{H_3O^+} PhCOOH\ (B) \xrightarrow{SOCl_2} PhCOCl$$

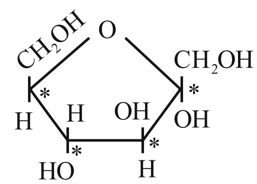
Q.93 (4)
$Ph-N_2^+Cl^-$ is soluble in water.

Q.94 (4)
Cytosine, uracil and thymine are pyrimidine bases in nucleic acid.

Q.95 (2)
Maltose is reducing sugar because it can reduces Tollen's Reagent.

Q.96 (2)
Br_2/H_2O oxidise aldehyde group of glucose to – COOH group.

Q.97 (3)



α–D–Fructofuranose

Q.98 (4)
Amylose is straight chain polymer of α–D–Glucose units.

Q.99 (1)
Sucrose is dimer of α–D Glucose and β–D–Fructose which is combined together by glycosidic linkage and sucrose is a non–reducing sugar.

Q.100 (1)
Keretin is fibrous protein.

BIOLOGY-I
SECTION-A

Q.101 (2)

Q.102 (1)

Q.103 (2)

Q.104 (3)

Q.105 (1)

Q.106 (4)

Q.107 (2)

Q.108 (2)

Q.109 (3)

Q.110 (2)

Q.111 (3)

Q.112 (4)

Q.113 (2)

Q.114 (3)

Q.115 (4)
Hint: More than 200, less than 300.
Sol.: More than 900 restriction enzymes that we know have been acquired from over 230 strains of bacteria.

Q.116 (4)
Agarose gel obtained from sea weeds is used in gel electrophoresis.

Q.117 (3)

Q.118 (4)
R.E. cleaves within the recognition site.

Q.119 (2)

Q.120 (1)

Q.121 (3)

Q.122 (3)

Q.123 (2)

Q.124 (1)

Q.125 (4)

Q.126 (3)

Q.127 (2)

Q.128 (1)

Q.129 (1)

Q.130 (2)
Stickiness of the sticky ends of the DNA facilitates the action of DNA ligase and these ends joined together end -to -end

Q.131 (3)
Since DNA is a hydrophilic molecule, it cannot pass through cell membranes. In order to force bacteria to take up the plasmid, the bacterial cells must first be made 'competent' to take up DNA. This is done by treating them with a specific concentration of a divalent cation, such as calcium, which increases the efficiency with which DNA enters the bacterium through pores in its cell wall. Possibly, calcium chloride causes the DNA to precipitate onto the outside of the cells or it may improve DNA binding.

Q.132 (2)

Q.133 (3)
RDT experiments require nuclease and ligase to create the nick and to fill it respectively. Nuclease is used for cutting and ligase is used for joining the DNA strands.

Q.134 (3)

Q.135 (4)

SECTION-B

Q.136 (4)

Q.137 (3)

Q.138 (4)
Statements I, II and IV are incorrect and can be corrected as
• DNA fragments are negatively charged molecules and are loaded in the middle of the gel. The fragments can be separated by forcing them to move towards the anode under an electric field through a medium/matrix.
• The concentration of gel affects the resolution of DNA separation.
• The separated DNA fragments can be visualised only after staining the DNA with a compound known as ethidium bromide followed by exposure to UV-radiation.

Q.139 (2)
Restriction endonuclease makes cut at palindromic sequence which can be read same from both directions, eg. GAATTC and CTTAAG, when read in complimentary way.

Q.140 (3)

Q.141 (1)

Q.142 **(2)**
Hint: Separation of finer particles from larger particles.
Sol.: During gel electrophoresis, DNA fragments move towards the anode. The matrix used commonly is agarose gel. The movement of the DNA fragments occurs according to their fragment size. This separation according to the size of the fragments is called sieving effect.

Q.143 (1)
In insertional inactivation, the recombinant DNA is inserted within the coding sequence of the enzyme β-galactosidase. This results into inactivation of the gene synthesising this enzyme.

Q.144 (4)

Q.145 (1)

Q.146 (3)

Q.147 (3)

Q.148 (1)

Q.149 (1)
Antibiotic resistance genes in biotechnology are used as selectable markers.

Q.150 (4)
Downstream processing is separation and purification of products after the completion of biosynthetic stage

BIOLOGY-II
SECTION-A

Q.151 (1)
Genes of plants, bacteria, fungi and animals have been changed by manipulations therefore, these organisms are called Genetically Modified Organisms (GMOs). The behavior of a GMOs depends on the nature of genes transferred, nature of host plants, bacterium and animals

Q.152 (4)

Q.153 (2)

Q.154 (3)

Q.155 (4)

Q.156 (1)

Q.157 (4)
Plant cells do not have endogeneous plasmids. The plasmid vectors used for plant cell transformation are mostly based on Agrobacteriumtumefaciens-Ti plasmid. These are plant pathogenic Gram-ve soil bacteria which cause crown gall disease of dicot plants.

Q.158 (2)
ELISA is based on the principle of antigen-antibody interactions. It can detect infections caused by pathogens by detecting the presence of antigens (proteins, glycoproteins etc.) or by antibodies synthesised against the pathogen.

Q.159 (2)

Q.160 (4)
Assertion is false, but Reason is true. Assertion can be corrected as
ADA deficiency disorder is caused due to the lack of gene which codes for adenosine deaminase. This enzyme is crucial for the immune system to function. Thus, ADA deficiency affects the immune system of the human.

Q.161 (3)

Q.162 (3)

Q.163 (2)

Q.164 (2)

Q.165 (2)
α-1- antitrypsin enzyme play protective role in emphysema because it digests enzyme elastase released by leukocytes.

Q.166 (3)
Genetic modification has helped to reduce post harvest losses. Genetically modified corps show more tolerance to abiotic stresses, decreased reliance on chemical pesticides and increase effciency of mineral usage by plants.

Q.167 (3)
There are about 200000 varieties of rice found in India.

Q.168 (4)

Q.169 (2)
In RNA interference process, by using *Agrobacterium* vector, nematode specific genes were introduced into the host plants, which produced both sense and antisense RNAs in the host cells.

Q.170 (3)

Q.171 (3)
Transgenic mice are developed to test the safety of polio vaccine before being used on humans. If successful and found to be reliable these could replace the use of monkeys to test the safety of batches of the vaccine.

Q.172 (1)

Q.173 (3)

Q.174 (1)
A nematode, *Meloidegyne incognitia*, infects the roots of tobacco plants, which reduce the production of tobacco.

Q.175 (4)

Q.176 (1)

Q.177 (4)

Q.178 (2)
For the first time in 1990, M Blease and WF Andresco of National Institute of Health, attempted gene therapy on a 4 year old girl with Adenosine Deaminase (ADA) deficiency. ADA deficiency is caused due to the deletion of gene for adenosine deaminase.

Q.179 (3)
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Q.180 (3)
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Q.181 (4)
Q.182 (1)

Q.183 (2)

Q.184 (2)
Transgenic animals are those which have foreign DNA in all of its cells.

Q.185 (3)
In 1997, the first transgenic cow, Rosie, produced human protein-enriched milk. The milk contained the human alpha-lactalbumin and was nutritionally a more balanced product for human babies than natural cow-milk.

SECTION-B

Q.186 (1)
In 1997, the first transgenic cow, Rosie, produced human protein enriched milk (2.4 g/L). The milk contained the human α-lactalbumin and was nutritionally more balanced for the human babies than normal cow milk.

Q.187 (4)

Q.188 (3)

Q.189 (2)
Desired proteins can be made by inserting that gene (responsible for making desired protein) into bacteria.

Q.190 (1)

Q.191 (1)

Q.192 (3)

Q.193 (1)

Q.194 (3)
Assertion is true, but Reason is false. Reason can be corrected as
PCR helps in early detection of diseases or pathogens by the amplification of their nucleic acid.
ELISA (Enzyme Linked Immuno Sorbent Assay) is based on the principle of antigen-antibody interaction. Infection by pathogen can be detected by the presence of antigens or by detecting the antibodies synthesised agaisnt the pathogen.

Q.195 (2)
Inactive protoxin after entering into gut of insects is converted into active toxin in alkaline medium which creates pores in epithelial cells of gut causing their lysis.

Q.196 (3)
Flavr-Savr tomato was produced by anti-sense mRNA technique.

Q.197 (3)

Q.198 (3)

Q.199 (3)

Q.200 (4)
The statement in option (d) is incorrect. It can be corrected as
The improvement of quality of agrochemicals does not come under the critical research areas of biotechnology.
There are three critical research areas of biotechnology
- Providing best catalyst as improved organism, usually a microbe or pure enzyme.
- Creating optimal conditions by engineering for a catalyst to act.
- Downstream processing technologies to purify the proteins/organic compounds