ANSWER KEY
NEET (FINAL TRACK)
PART TEST-09 (XII)

PHYSICS

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

CHEMISTRY

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

BIOLOGY

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

SOLUTIONS

PHYSICS
SECTION-A

Q.1 (4)

Image is inverted, so it is real. u and v both are negative. Magnification is $\frac{1}{3}$. therefore, $v = \frac{u}{3}$

Given, $u = -30$ cm, $v = -10$ cm

Using the mirror formula,

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

We have, $\frac{1}{f}=\frac{1}{-10}+\frac{1}{-30}=\frac{-2}{15}$

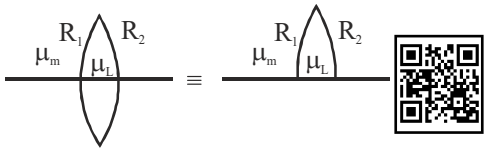
$f = -7.5$ cm

Q.2 (4)

Focal length of a mirror only depends on radii of curvature so after dipping in water focal length of mirror remains as it is while focal length of lens depends on both radii of curvature and refractive index of surrounding medium. So, after dipping in water focal length of lens get changed.

Q.3 (3)

$$\text{Power} = \frac{1}{\text{focal length}} = \frac{1}{f} = \left(\frac{\mu_L}{\mu_m}-1\right)\left(\frac{1}{R_1}-\frac{1}{R_2}\right)$$



After cut, none of the parameters μ_M, μ_L, R_1, R_2 got changed. So, focal length and power of lens remains same.

Q.4 (4)

(a) Convex mirror always produces virtual image for real object

⇒ Magnification is positive, virtual image formed is diminished.

(b) Concave mirror forms both real and critical image. Virtual image is enlarged.

⇒ Magnification is positive and greater than one.

Real image is both enlarged and diminished

⇒ Magnification is negative and $|m| < 1$ and $|m| > 1$

Q.5 (2)

Equivalent power,

$P_{eq} = P_1 + P_2 = -15D + 5D$

$= -10D$

$\Rightarrow \frac{1}{f_{eq}} = -10$

$\Rightarrow \frac{1}{f_{eq}} = -\frac{1}{10} m = -10\ cm$

Q.6 (3)

$\sin\theta_C = \frac{\mu_R}{\mu_D} = \frac{v_D}{v_R}; \frac{4}{5} = \frac{v_D}{3\times10^8}$

$v_D = 2.4 \times 10^8$ m/s

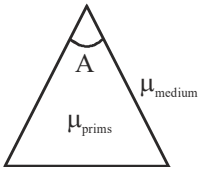
Q.7 (4)

Angle of minimum deviation,

$\delta_m = (\mu_{relative} - 1) A$

where A = angle of prism

$\mu_{relative} = \frac{\mu_{prism}}{\mu_{medium}} = \frac{\frac{3}{2}}{\frac{4}{3}} = \frac{9}{8}$



$\text{Ratio} = \frac{\delta_{m_1}}{\delta_{m_2}} = \frac{\left(\frac{9}{8}-1\right)}{\left(\frac{3}{2}-1\right)} = \frac{\frac{1}{8}}{\frac{1}{2}} = \frac{1}{4}$

Q.8 (2)

$u = -30; f = -20$

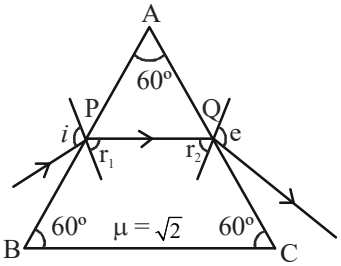
$v = \frac{uf}{u+f} = \frac{(-30)(-20)}{-30-20} = -12cm$

(left of the lens)

$m = \frac{-v}{u} = \frac{-(-12)}{-30} = \frac{2}{5}$

[erect and diminsished]

Q.9 (2)



Applying snell's law at P and Q,

$1 \times \sin i = \mu \sin r_1$

$\Rightarrow \sin 45° = \sqrt{2} \sin r_1$

$\Rightarrow \frac{1}{\sqrt{2}} = \sqrt{2} \quad \sin r_1 \Rightarrow \sin r_1 = \frac{1}{2}$

$\Rightarrow r_1 = 30°$

As $r_1 + r_2 = A = 60°$ $\quad \mu \sin r_2 = 1 \times \sin e$

$\Rightarrow 30° + r_2 = 60°$ $\quad \sqrt{2} \sin 30° = \sin e$

$\Rightarrow r_2 = 30°$ $\quad \Rightarrow \sin e = \sqrt{2}\left(\frac{1}{2}\right) = \frac{1}{\sqrt{2}}$

$\Rightarrow e = 45°$

Q.10 (3)

Light will retrace its path if it falls normally on reflecting surface

$\Rightarrow r_2 = 0$

As $r_1 + r_2 = 30°$

$\Rightarrow r_1 + 0 = 30°$ $\quad \Rightarrow r_1 = 30°$

Applying snell's law

$1 \times \sin 45° = \mu \sin 30° \Rightarrow \frac{1}{\sqrt{2}} = \mu \frac{1}{2}$

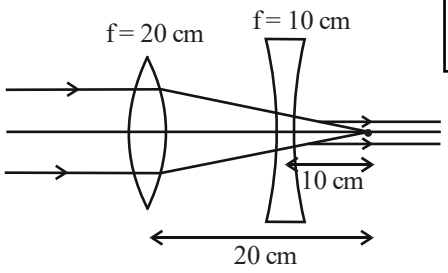
$\Rightarrow \mu = \sqrt{2}$

Q.11 (2)

When light goes from one medium to other, then speed and wavelength changes. Frequency of light remains constant

$\Rightarrow$ ratio is 1:1

Q.12 (2)

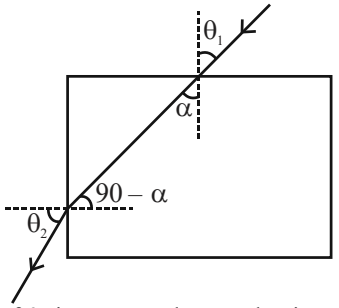


d = 10 cm

Q.13 (4)

Equivalent focal length of lenses does not depend on orientation of lenses.

Q.14 (3)



If θ_1 increases, then α also increases

So, $90-\alpha$ decreases so, θ_2 also decreases.

Q.15 (1)

$P_{eq} = +5\ D$

$f_{eq} = \frac{1}{P_{eq}} = \frac{100}{5}\ cm$

$f_{eq} = 20\ cm$

Magnifying power $= \frac{D}{f_{eq}} = \frac{25}{20} = 1.25$

Q.16 (3)

For concave mirror distance between real object and real image is zero.

Q. 17 (4)

$\mu_{turpentine} > \mu_{water}$

$\Rightarrow$ light goes from denser to rarer medium, bends away from normal or total internal reflection takes place.

Path 2 shows TIR.

Q.18 (2)

Q.19 (4)

$\delta = i + e - A$

for minimum deviation $i = e$

$\therefore$ minimum deviation $= 2i - A \Rightarrow A = 60°$

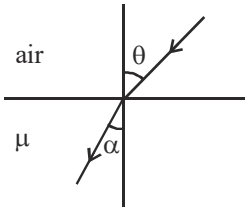
$$\mu = \frac{\sin\left(\frac{A+\delta_m}{2}\right)}{\sin(A/2)} = \frac{\sin\left(\frac{60+60}{2}\right)}{\sin\left(\frac{60}{2}\right)} = \sqrt{3}$$

$\delta_1 = i_1 = e - A$

$65° = i_1 + 70° - 60°$

$i_1 = 55°$

Q.20 (1)



From Snell's law,

$1 \times \sin\theta = \mu \sin\alpha$

$\Rightarrow \frac{1}{\mu} = \frac{\sin\alpha}{\sin\theta}$

Critical angle, $\theta_C = \sin^{-1}\left(\frac{1}{\mu}\right)$

$\theta_C = \sin^{-1}\left(\frac{\sin\alpha}{\sin\theta}\right) \Rightarrow \sin\theta_C = \frac{\sin\alpha}{\sin\theta}$

Q.21 (3)

Fringe width, $\beta = \frac{\lambda D}{d}$

where λ is wavelength in given medium.

Refractive index, $\mu = \frac{\lambda_{vaccum}}{\lambda_{medium}}$

$\Rightarrow \lambda_{medium} = \frac{\lambda_{vaccum}}{\mu}$

$\Rightarrow \beta_{medium} = \frac{\beta_{vaccum}}{\mu}$

$= \frac{0.6}{1.5} = 0.4$

Q.22 (3)

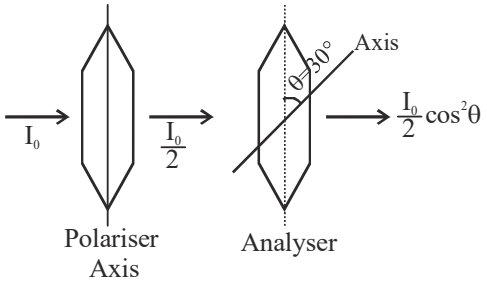
Refractive index of A $= \frac{C}{V_A} = \mu_A$

Refractive index of B $= \frac{C}{V_B} = \mu_B$

$\Rightarrow \frac{\mu_A}{\mu_B} = \frac{V_B}{V_A} \Rightarrow \frac{1.5}{2} = \frac{30}{x}$

$\Rightarrow x = 40\ m$

Q.23 (3)



$I = \frac{I_0}{2}\cos^2 30° = \frac{I_0}{2}\left(\frac{\sqrt{3}}{2}\right)^2 = \frac{I_0}{2}\left(\frac{3}{4}\right)$

$\Rightarrow I = \frac{3I_0}{8}$

Q.24 (3)

Fringe width is distance between two consecutive fringes = 0.5 mm

$\Rightarrow \beta = \frac{\lambda D}{d} = 0.5 \times 10^{-3}$

$$\Rightarrow \frac{500\times10^{-9}\times D}{0.1\times10^{-3}} = 0.5\times10^{-3}$$

$$\Rightarrow D = \frac{1}{10}m = 0.1m$$

Q.25 (1)

Distance of 5th bright fringe from central maximum is $5\beta = 2cm$

$$\Rightarrow \beta = \frac{2}{5}cm$$

Distance of 3rd dark fringe from central maximum is

$$2\beta + \frac{\beta}{2} = \frac{5\beta}{2}$$

$$= \frac{5}{2}\times\frac{2}{5} = 1cm$$

Q.26 (2)

When intensity due to two sources are equal then minima is complete dark and best contrast is observed.

Also, intensity $\propto$ (amplitude)^2

Q.27 (3)

Path difference between interfering wave for minimum intensity is $\frac{(2n-1)\lambda}{2}$.

Q.28 (3)

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

$$= \left(\frac{2+1}{2-1}\right)^2$$

$= 9:1$

Q.29 (3)

For minima

$\Delta\phi = (2n-1)\pi$

Q.30 (1)

$$\text{In medium, } \theta' = \frac{\theta}{\mu} = \theta' = \frac{0.08\times3}{4}$$

$$= 0.02\times3$$

$$\theta' = 0.06°$$

Q.31 (1)

According to question $n_1\lambda_1 = n_2\lambda_2$

$$\text{So, } \frac{n_1}{n_2} = \frac{\lambda_1}{\lambda_2} = \frac{10000}{12000} = \frac{5}{6}$$

so minimum n_1 and n_2 are 5 and 6 respectively.

$$X_{min} = \frac{n_1\lambda_1 D}{d} = \frac{5\left(12000\times10^{-10}\right)\times1}{2\times10^{-3}}$$

$= 3\times10^{-3}\,m = 3\,mm$

Q.32 (2)

$I = I_1 + I_2 + 2\sqrt{I_1}\sqrt{I_2}\cos\phi$

$I_1 = I_2 = I'$

for $\Delta = \lambda, \phi = 2\pi$

$I_{max} = 4I' = I_0$

$$I' = \frac{I_0}{4}$$

$$\text{for } \Delta = \frac{\lambda}{3},\ \phi = \frac{2\pi}{3}$$

$$I = \frac{I_0}{4} + \frac{I_0}{4} + 2\sqrt{\frac{I_0}{4}}\sqrt{\frac{I_0}{4}}\cos\frac{2\pi}{3}$$

$$I = \frac{I_0}{2} + 2\times\frac{I_0}{4}\times\left(-\frac{1}{2}\right) = \frac{I_0}{2} - \frac{I_0}{4} = \frac{I_0}{4}$$

Q.33 (2)

$a\sin\theta = \lambda \Rightarrow a\sin30° = \lambda \Rightarrow a = 2\lambda$

$a = 2\times5\times10^{-7}\,m$

$a = 1.0\times10^{-4}\,cm$

Q.34 (2)

All wavelengths have common central maxima. So, all central maxima coincide results white central maxima.

Q.35 (2)

In YDSE, if white light is used in place of a monochromatic light, then coloured fringes are obtained on the screen with red fringes of larger size than that of violet, because fringe width is directly proportional to wavelength and $\lambda_{red} > \lambda_{violet}$.

SECTION-B

Q.36 (1)

Speed of blue light in vaccum $= 3\times10^8$ m/s

$$\text{Frequency} = \frac{\text{Speed}}{\text{work length}} = \frac{3\times10^8}{450\times10^{-9}}$$

$$\Rightarrow f = \frac{1}{150}\times10^{17} = 6.67\times10^{14}\,Hz$$

When light goes from one medium to other medium, wavelength and speed changes.
Frequency remains same.
$\Rightarrow$ f(in vaccum) = f(in medium)
$= 6.67 \times 10^{14}$ Hz

Q.37 (2)
From Len's makers formula,

$$\frac{1}{f} = \left(\frac{\mu_{lens}}{\mu_{medium}} - 1\right)\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$$

In air, $\frac{1}{f} = \left(\frac{3}{2} - 1\right)\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$

$$\Rightarrow \frac{1}{f_{air}} = \frac{1}{f} = \frac{1}{2}\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$$

In water,

$$\frac{1}{f_{water}} = \left(\frac{\frac{3}{2}}{\frac{4}{3}} - 1\right)\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$$

$$\Rightarrow \frac{1}{f_w} = \left(\frac{9}{8} - 1\right)\left(\frac{1}{R_1} - \frac{1}{R_2}\right) = \frac{1}{8}\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$$

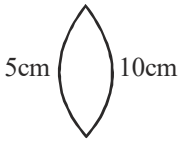
Dividing both equations,

$$\frac{f_w}{f_{air}} = \frac{\frac{1}{2}\left(\frac{1}{R_1} - \frac{1}{R_2}\right)}{\frac{1}{8}\left(\frac{1}{R_1} - \frac{1}{R_2}\right)}$$

$\Rightarrow f_w = 4f$

Q.38 (1)
From Len's maker's formula :

$$\frac{1}{f} = (\mu - 1)\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$$



Applying sign convention,

$$\frac{3}{20} = (\mu - 1)\left(\frac{1}{5} - \frac{1}{-10}\right)$$

$$\Rightarrow \frac{3}{20} = (\mu - 1)\left(\frac{2+1}{10}\right) = (\mu - 1)\left(\frac{3}{10}\right)$$

$$\Rightarrow \frac{3}{20} = (\mu - 1)\left(\frac{3}{10}\right)$$

$$\Rightarrow \mu - 1 = \frac{1}{2} \Rightarrow \mu = \frac{3}{2}$$

Q.39 (1)
While changing medium, frequency remains same.
Speed of light in medium A = Wavelength × frequency

Refractive index of A $= \frac{C}{V_A} = \frac{3 \times 10^8}{1.5 \times 10^8} = 2$

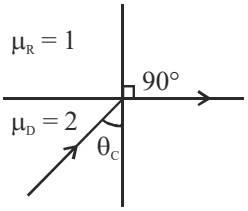
Refractive index of A w.r.t B $= \frac{\mu_A}{\mu_B} = \frac{V_B}{V_A} = \frac{5}{4}$

$$\Rightarrow \mu_B = \left(\frac{4}{5}\right)\mu_A$$

$$\Rightarrow \mu_B = \left(\frac{4}{5}\right) \times 2 = \frac{8}{5}$$

$= 1.6$

Q.40 (1)
Critical angle is the angle of incidence for which angle of refraction is 90° when light goes from denser to rarer medium



Applying snell's law
$\mu_D \sin\theta_c = \mu_R \times \sin 90°$
$\Rightarrow 2 \times \sin\theta_c = 1 \times 1$

$$\Rightarrow \sin\theta_c = \frac{1}{2}$$

$\Rightarrow \theta_C$ (critical angle) = 30°

Q.41 (1)
Magnifying power of an astronomical telescope when the final image is formed at infinity is expressed as:

So, $M = \frac{f_0}{f_e}$, here f_0 is the focal length of objective and f_e is the focal length of the eyepiece.

Q.42 (4)

Applying $d_{app} = \frac{d}{\mu}$

$d = (\mu)\, d_{app}$
$\therefore d_1 = (1.5)(4) = 6$ cm
$d_2 = (1.5)(6) = 9$ cm
Therefore actual thickness of the glass slab is
$d_1 + d_2 = 15$ cm

Q.43 (2)

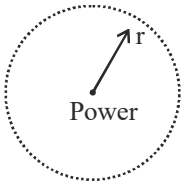
$n_1\beta_1 = n_2\beta_2$

$\Rightarrow 6 \times \frac{\lambda_1 D}{d} = 7 \times \frac{\lambda_2 D}{d}$

$\Rightarrow 6 \times 700\ nm = 7\lambda_2$

$\Rightarrow \lambda_2 = 600\ nm = 6000\text{Å}$

Q.44 (2)



Point source has spherical wavefront

Intensity, $I = \frac{p}{4\pi r^2}$

$\Rightarrow I \propto \frac{1}{r^2}$

Q.45 (3)

When two waves of same frequency superimpose, then redistribution of energy takes place which remains constant with time.

When two waves of different frequency superimpose, then redistribution of energy takes place which carries with time.

Q.46 (2)

From Brewsters's law,

$\tan\theta_p = \mu$

where θ_p = polarising angle or angle of polarisation or Brewsters's angle

As $\mu \geq 1 \Rightarrow \tan\theta_p \geq 1$

$\Rightarrow \theta_p \geq 45°$

Q.47 (3)

Shift of fringes = $(\mu-1)t$

$\Rightarrow (\mu-1)t = n\lambda$

$\Rightarrow (\mu-1) \times 12 \times 10^{-7} = 600 \times 10^{-9}$

$\Rightarrow \mu - 1 = \frac{1}{2}$

$\Rightarrow \mu = 1.5$

Q.48 (2)

$\text{Sin}\theta_C = \frac{1}{\mu}$ and $\tan\theta_p = \mu$

where θ_C = critical angle

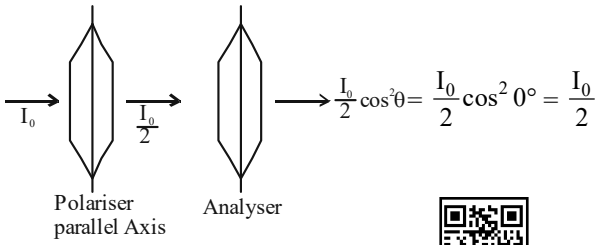
θ_p = polarising angle

$\Rightarrow \sin\theta_C = \frac{1}{\tan\theta_p}$

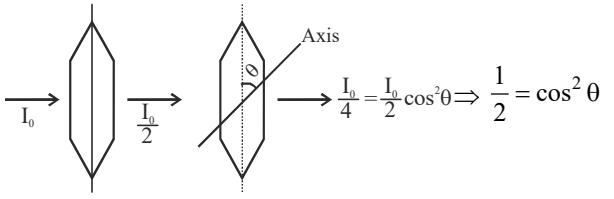
$\Rightarrow \tan\theta_p = \frac{1}{\sin\theta_C} = \frac{5}{3}$

$\Rightarrow \theta_p = \tan^{-1}\left(\frac{5}{3}\right)$

Q.49 (4)



Now,



$\Rightarrow \cos\theta = \pm\frac{1}{\sqrt{2}}$

if $\cos\theta = +\frac{1}{\sqrt{2}} \Rightarrow \theta = 45° = \frac{\pi}{4}$

if $\cos\theta = -\frac{1}{\sqrt{2}} \Rightarrow \theta = 135° = \frac{3\pi}{4}$

Q.50 (3)

From Brewster's law :

$\tan\theta_p = \mu = \frac{C}{V}$ where θ_p = polarising angle

$\Rightarrow \tan\theta_p = \frac{3\times10^8}{2.25\times10^8} = \frac{12}{9} = \frac{4}{3}$

$\Rightarrow \theta_p = 53°$

CHEMISTRY
SECTION-A

Q.51 (3)

Primary amine can give isocyanide test.

Q.52 (3)

Only 1° amide can give Hofmann bromamide reaction.

$CH_3 - \underset{\underset{O}{\|}}{C} - NH - CH_3 \rightarrow 2°$ Amide

[N-Methyl acetamide]

Q.84 (1)

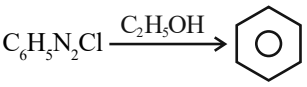
Insulin is a hormone.

Q.85 (2)

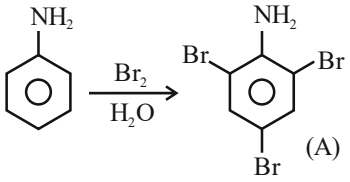
Vitamin $B_2 \rightarrow$ Riboflavin

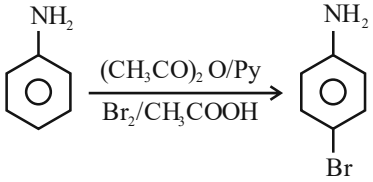
SECTION-B

Q.86 (4)



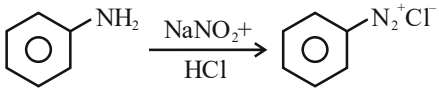
Q.87 (2)

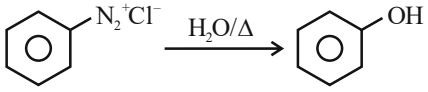




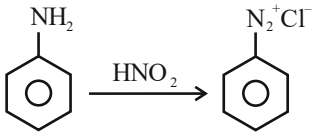
(B)

Q.88 (1)



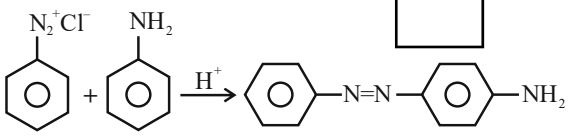


Q.89 (3)



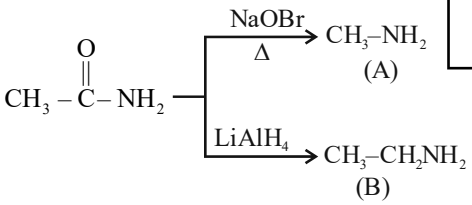
[Diazonium salt]

Q.90 (4)



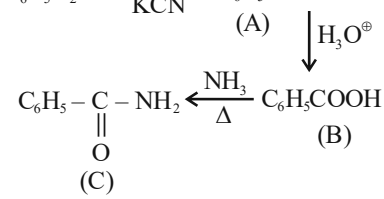
(yellow dye) (A)

Q.91 (4)

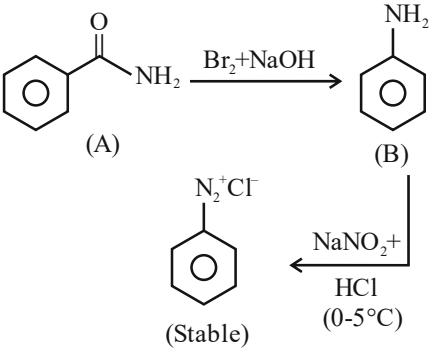


(A) and (B) are homologous of each other.

Q.92 (2)



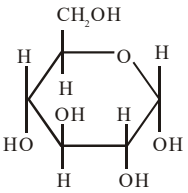
Q.93 (2)



Q.94 (3)

Pentaacetate of glucose does not react with NH_2OH because its cyclic structure do not have free –CHO group.

Q.95 (3)



α-D-glucose

Q.96 (2)

Glucose $\xrightarrow{NH_2OH}$ oxime

Q.97 (1)
Amylose have 1 → 4 α-linkage
Amylopective have 1 → 4 α-linkage and 1 → 6 α-linkage

Q.98 (3)
Sucrose → α-D-glucose + β-D-fructose
Lactose → β-D-galactose + β-D-glucose
Maltose → α-D-glucose

Q.99 (1)
Maltose → 2 α-D-glucose

Q.100 (4)
Glucose does not perform $NaHSO_3$ test due to absence of free Aldehyde group.
Here, Aldehyde group is involved in Hemiacetal formation so it is not free.

BIOLOGY-I
SECTION-A

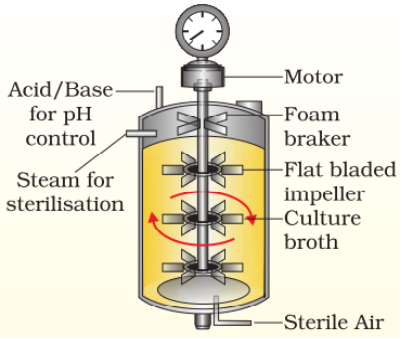
Q.101 (3)
New NCERT Pg. No. 171
Recombinant DNA technology involves following steps in order:
(1) Isolation of DNA
(2) Fragmentation of DNA
(3) Isolation of desired DNA fragment
(4) Transferring the DNA in host
(5) Culturing the host cells in a medium

Q.102 (3)
New NCERT Pg. No. 164
The construction of the first rDNA emerged from the possibility of linking a gene encoding antibiotic resistance with a native plasmid of *Salmonella typhimurium.*

Q.103 (2)
New NCERT Pg. No. 171
Fungal cell wall is made up of chitin for extraction of genetic material (DNA) frm a fungal cell, chitanase, RNAase and protease can be used.

Q.104 (3)
New NCERT Pg. No. 175
Quality control testing is a process involved in downstream processing.

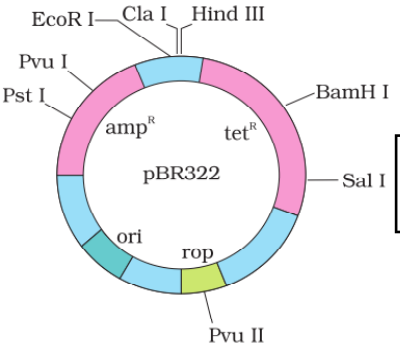
Q.105 (3)
New NCERT Pg. No. 174



Q.106 (3)
New NCERT Pg. No. 165
In the year 1963, two enzymes were isolated from *E.coli* that were restricting growth of bacteriophages in them : one was methylase and the other was restriction endonuclease.

Q.107 (3)
New NCERT Pg. No. 165
More than 900 restriction enzymes are isolated from over 230 strains of bacteria which recognise different recognition sequence.

Q.108 (1)
New NCERT Pg. No. 169

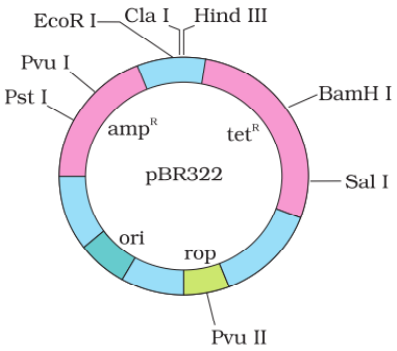


Pvu II is present at roop site which codes for proteins required for replication of plasmid.

Q.109 (3)
New NCERT Pg. No. 166
Palindrome in DNA is a sequence of base pairs that reads same on the two strands when orientation of reading is kept the same.

Q.110 (1)
New NCERT Pg. No. 167,168, 169
Similar sticky ends facilitates the action of enzyme DNA ligase and helps in formation of recombinant molecules.
Selectable marker helps in distinguishing between transformants and non-transformants.

Q.111 (1)
New NCERT Pg. No. 169



Q.112 (2)
New NCERT Pg. No. 171
Heat shock is given at 42°C in transformation process.

Q.113 (2)
New NCERT Pg. No. 164
Plasmid confers antibiotic resistance to bacteria.

Q.114 (4)
New NCERT Pg. No. 171
Purified DNA is precipitated by addition of chilled ethanol.

Q.115 (2)
New NCERT Pg. No. 168
The separated bands of DNA are cut out from the and extracted from the gel piece. This step is known as elution.

Q.116 (3)
New NCERT Pg. No. 169
E.coli can be modified to carry resistance against antibiotics sucha as; tetracycline or ampicillin.

Q.117 (3)
New NCERT Pg. No. 171
Recombinant DNA technology involves several steps in specific sequence such as isolation of DNA, fragmentation of DNA by restriction endonucleases, isolation of a desired DNA fragment, ligation of the DNA fragment into a vector, transferring the recombinant DNA into the host, culturing the host cells in a medium at large scale and extraction of the desired product.

Q.118 (3)
New NCERT Pg. No. 166
RE binds to DNA and cut each of the two strands of the double helix at specific points in their sugar-phosphate backbones.

Q.119 (1)
New NCERT Pg. No. 165
The first RE isolated was Hind II.

Q.120 (3)
New NCERT Pg. No. 169
The genes encoding resistance to antibiotics are considered as useful selectable markers.
For example, you can ligate a foreign DNA at the BamH I site of tetracycline resistance gene in the vector pBR322

Q.121 (2)
New NCERT Pg. No. 170
In order to force bacteria to take up the rDNA, the host cell is made competent by treating them with a specific concentration of a divalent cation.

Q.122 (2)
New NCERT Pg. No. 180
Agrobacterium tumificiens is known as natural genetic engineer of plants and is used to introduce nematode specific genes in plants.

Q.123 (3)
New NCERT Pg. No. 180
RNAi is a method of cellular defence, it involves post-transcriptional gene silencing in eukaryotes.

Q.124 (3)
New NCERT Pg. No. 182
The lymphocytes from the blood of the patient are grown in a culture outside the body
↓
A functional ADA cDNA (using retroviral vector) is then introduced into these lymphocytes
↓
The lymphocytes with ADA cDNA are returned to the patient.

Q.125 (3)
New NCERT Pg. No. 180
CryIAc → Cotton bollworms
CryIAb → Corn borer
Meloidegyne incognitia → Nematode parasite
Bacillus thuringiensis → Insecticidal protein

Q.126 **(1)**
New NCERT Pg. No. 184
In 1997, the first transgenic cow, Rosie, produced human protein-enriched milk (2.4 grams per litre)
The milk contained the human alpha-lactalbumin protein.

Q.127 (3)
New NCERT Pg. No. 178
Imagine a situation when a protoplast of tomato is fused with that of potato, and then they are grown – to form new hybrid plants combining tomato and potato characteristics. Well, this has been achieved – resulting in formation of pomato;

Q.128 (1)
New NCERT Pg. No. 178
The capacity to generate a whole plnat from any cell/explant is called totipotency.

Q.129 (4)
New NCERT Pg. No. 184
Transgenic mice are being used to test the safety of the polio caccine.
Toxicity testing in transgenic animals allow us to obtain results in less time.

Q.130 (1)
New NCERT Pg. No. 181
Insulin that is used to treat diabetes was earlier extracted from pancreas of slaughtered cattle and pigs.
Because that insulin was from an animal source, some patients develop unwanted immune response to it.

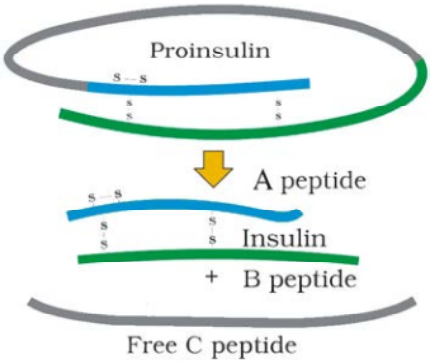
Q.131 (3)
New NCERT Pg. No. 181
At present, about 30 recombinat therapeutics have been approved for human-use the world over.
In India, 12 of these are presently being marketed.

Q.132 (2)
New NCERT Pg. No. 182
In enzyme replacement therapy, functional ADA is given to the patient by injection.

Q.133 (1)
New NCERT Pg. No. 178
Main growth regulators used in tissue culture are auxins and cytokinins.

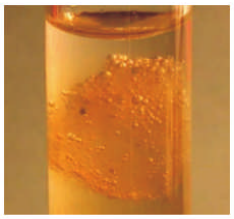
Q.134 (3)
New NCERT Pg. No. 178
Explants are any part of a plant taken out and grown in a test tube, under sterile conditions in special nutrient media.

Q.135 (3)
New NCERT Pg. No. 182
2 polypeptide chains A and B of human insulin are joined together via disulphide bridges.



SECTION-B

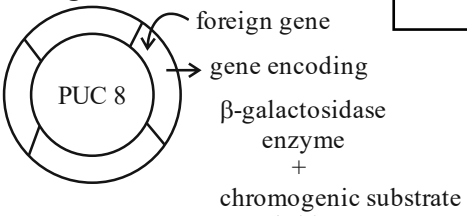
Q.136 (1)
New NCERT Pg. No. 171
DNA that gets separated out after addition of chilled ethanol can be removed by spooling.



DNA that separates out can be removed by spooling

Q.137 (1)
New NCERT Pg. No. 169
Selectable marker helps in identifying and eliminating non-transformants and selectively permitting the growth of the transformants.
Transformation is a procedure through which a piece of DNA is introduced in a host bacterium (you will study the process in subsequent section).

Q.138 (4)
New NCERT Pg. No. 170



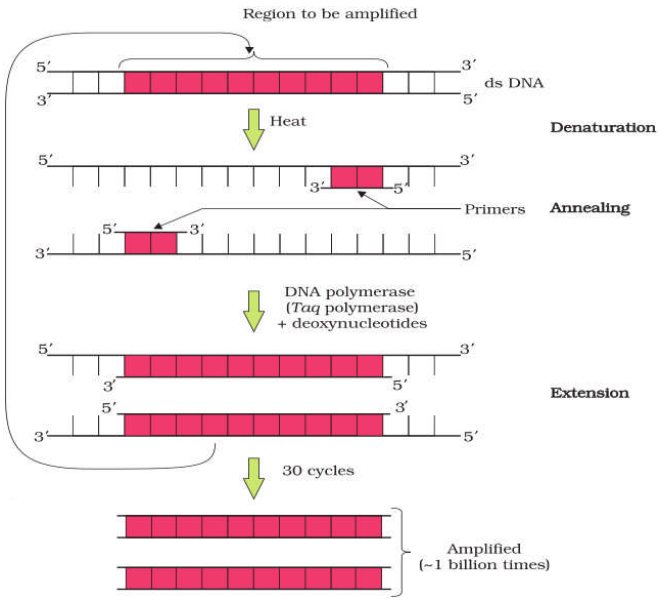
Recombinants yield no colour due to insertional inactivation.

Q.139 (2)
New NCERT Pg. No. 167, 169
DNA ligase is used to join same kind of sticky-ends together.

Q.140 (2)
New NCERT Pg. No. 169
The antibiotic resistance gene gets inactivated and helps in selection of recombinants and non-recombinant transformants.

Q.141 (1)
New NCERT Pg. No. 167
DNA ligase is used to join fragments of DNA by catalysing the formation of a phosphodiester bond.

Q.142 (4)
New NCERT Pg. No. 172



Q.143 (4)
New NCERT Pg. No. 168
The separated DNA fragments can be visualised only after staining the DNA with ethidium bromide. DNA fragments are negatively charged molecules, they can be separated by forcing them to move towards the anode under an electric field through a medium/matrix.

Q.144 (4)
New NCERT Pg. No. 169
Rop codes for the proteins involved in the replication of the plasmid.

Q.145 (4)
New NCERT Pg. No. 169
Ampicilin and tetracycline encoding genes are useful selectable markers.

Q.146 (3)
New NCERT Pg. No. 183
PCR is now routinely used to detect HIV in suspected AIDS patients.

Q.147 (1)
New NCERT Pg. No. 180
Meloidegyne incognitia is a nematode.

Q.148 (1)
New NCERT Pg. No. 184
α-1-antitrypsin is used to treat emphysema.

Q.149 (1)
New NCERT Pg. No. 184
Transgenic mice are being used to test the safety of the polio vaccine before they are used on humans.

Q.150 (4)
New NCERT Pg. No. 179
Dipterans are flies and mosquitoes.
Coleopterans are beetles.
Lepidopterans are tobacco budworm, armyworm.

BIOLOGY-II
SECTION-A

Q.151 (4)
New NCERT Pg. No. 168
Plasmids and bacteriophages have the ability to replicate within bacterial cells independent of the control of chromosomal DNA.

Q.152 (3)
New NCERT Pg. No. 177
Three critical research areas of biotechnology are:
(i) Providing the best catalyst in the form of improved organism usually a microbe or pure enzyme.
(ii) Creating optimal conditions through engineering for a catalyst to act.
(iii) Downstream processing technologies to purify the protein/organic compound.

Q.153 (2)
New NCERT Pg. No. 166
Each restriction endonuclease recognises a specific palindromic nucleotide sequences in the DNA.

Q.154 (1)

New NCERT Pg. No. 169

Presence of more than one recognition sites could generate several fragments of DNA. Presence of more than one recognition sites within the vector will generate several fragments, which will complicate the gene cloning.

Q.155 (2)

New NCERT Pg. No.165, 166

Restriction endonuclease – Cuts DNA at specific position
Restriction exonuclease – Removes nucleotides from the ends of DNA
DNA ligase – joins the DNA fragments
Taq polymerase – extends primers on genomic DNA template

Q.156 (2)

New NCERT Pg. No. 172

Taq-polymerase is a DNA-polymerase that remains active during high temperature. It is isolated from bacterium *Thermus aquaticus* and is heat-resistant enzyme.

Q.157 (4)

New NCERT Pg. No. 173

If the process of replication of DNA is repeated many times, the segment of DNA can be amplified to approximately billion times, i.e., 1 billion copies are made. Such repeated amplification is achieved by the use of a thermostable DNA polymerase (isolated from a bacterium, *Thermus aquaticus*), which remain active during the high temperature induced denaturation of double stranded DNA

Q.158 (1)

New NCERT Pg. No. 165

The convention for naming RE is the first letter of the name comes from the genes and the second two letters come from the species of the prokaryotic cell from which they were isolated.

Q.159 (3)

New NCERT Pg. No. 170

The Ti plasmid of *Agrobacterium tumifaciens* has been modified into a cloning vector which is no more pathogenic to the plants but is still able to use the mechanisms to deliver genes of our interest into a vairety of plants.

Q.160 (3)

New NCERT Pg. No. 165, 166

RE are isolated from bacteria and not from viruses.

Q.161 (1)

New NCERT Pg. No. 172

Primers are short oligonucleotide sequences added at 3' end of template DNA during PCR.

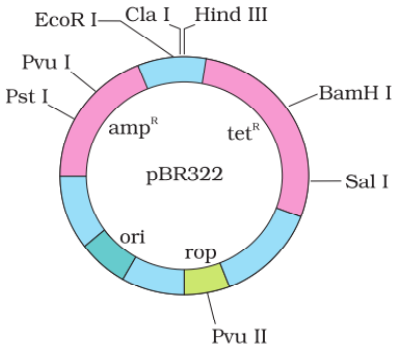
Q.162 (1)

New NCERT Pg. No. 171

In biolistics or gene gun method, cells are bombarded with high velocity micro-particles of gold or tungsten coated with DNA.

Q.163 (4)

New NCERT Pg. No. 169



Q.164 (1)

New NCERT Pg. No. 164

Stanley Cohen and Herbert Boyer accomplished consteruction of first recombinant DNA in 1972.

Q.165 (3)

New NCERT Pg. No. 163

The European Federation of Biotechnology has given a definition of biotechnology that encompasses both traditional view and modern molecular biotechnology.

Q.166 (1)

New NCERT Pg. No. 170

Selectable markers have been developed which differentiate recombinants from non-recombinants on the basis of their ability to produce colour in the presence of a chromogenic substrate. In this, a recombinant DNA is inserted within the coding sequence of an enzyme, ß-galactosidase. This results into inactivation of the gene for synthesis of this enzyme, which is referred to as insertional inactivation. The presence of a chromogenic substrate gives blue coloured colonies if the plasmid in the bacteria does not have an insert

Q.167 (1)
New NCERT Pg. No. 168
The DNA fragmetns separate (resolve) according to their size through sieving effect provided by the agarose gel.

Q.168 (1)
New NCERT Pg. No. 170
Retroviruses have been disarmed and are used to deliver desirable genes into animal cells.

Q.169 (4)
New NCERT Pg. No. 170
Agrobacterium tumifaciens is able to deliver a place of T-DNA using Ti plasmid.

Q.170 (3)
New NCERT Pg. No. 166
The palindrome in DNA is a sequence of base pairs that reads same on the two strands when orientation of reading is kept same.

Q.171 (2)
New NCERT Pg. No. 168
Ethidium bromide is used to see bright orange coloured bands of DNA exposed to UV light.

Q.172 (2)
New NCERT Pg. No. 180
The proteins encoded by the genes cryIAc and cryIIAb control the cotton bollworms, and that of cryIAb controls corn borer.

Q.173 (3)
New NCERT Pg. No. 179
The activated Bt-toxin binds to the surface of midgut epithelial cells of the insects and create pores in it.

Q.174 (4)
New NCERT Pg. No. 180
The source of complementary RNA in RNAi could be from an infection by viruses having RNA genomes or mobile genetic elements (transposons) that replicate via an RNA intermediate.

Q.175 (3)
New NCERT Pg. No. 184
Genetic engineering approval committee makes decisions regarding the validity of GM research and the safety of introducing GMO's for public services.

Q.176 (4)
New NCERT Pg. No. 179
Dipterans are flies and mosquitoes.
Coleopterans are beetles
Lepidopterans are tobacco budworm, armyworm.

Q.177 (3)
New NCERT Pg. No. 179
Genetically modified plants exhibit increased efficiency of mineral usage.

Q.178 (3)
New NCERT Pg. No. 179
Golden rice is nutritionaly enhanced (vit. A enriched rice).

Q.179 (3)
New NCERT Pg. No. 182
If the gene isolated from marrow cells producing ADA is introduced into cells at early embryonic stages, it could be a permanent were for ADA deficiency. Both bone marrow transplantation and enzyme replacement therapy are temporary cure.

Q.180 (1)
New NCERT Pg. No. 184
In chemical safety testing, transgenic animals are made to carry genes which make them more sensitive to toxic substances than non-transgenic animals.

Q.181 (4)
New NCERT Pg. No. 183, 184
Over 95% of all existing transgenic animals are mice.
• Animals that have had their DNA manipulated to possess and express an extra gene are known as transgenic animals.
• Transgenic rats, rabbits, pigs, sheep, cows and fishes have been produced, although over 95 per cent of all existing transgenic animals are mice.

Q.182 (3)
New NCERT Pg. No. 179
Bt-toxins are endotoxins and are activated in insect gut due to its alkaline pH.
They are not toxic to humans because they are insect group-specific and are digested in acidic environment of stomach.

Q.183 (3)
New NCERT Pg. No. 178
In Green Revolution, increased yields of crops have partly been due to the use of improved crop varieties, but mainly due to the use of better management practices and use of agrochemicals. (fertilisers and pesticides).

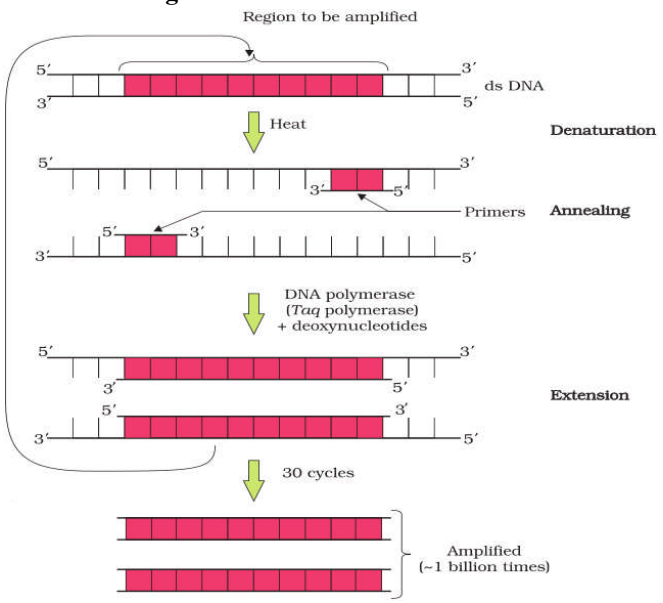
Q.184 (2)
New NCERT Pg. No. 182
The first clinical gene therapy was given in 1990 to a 4-year-oid girl with adenosine deaminase (ADA) deficiency.

Q.185 (3)
New NCERT Pg. No. 178
Somaclones are genetically identical to the original plant from which they were grown.

SECTION-B

Q.186 (4)

New NCERT Pg. No. 172



Q.187 (4)
New NCERT Pg. No. 171
In biolistics or gene gun method, cells are bombarded with high velocity microparticles of gold or tungsten coated with DNA.

Q.188 (1)
New NCERT Pg. No. 166
A recognition sequence of DNA is a palindromic sequence that reads same in both the direction if orientation of reading is kept same.

Q.189 (2)
New NCERT Pg. No. 163
According to EFB, the integration of natural science and organisms, cells, parts there of, and molecular analogues for products and services.

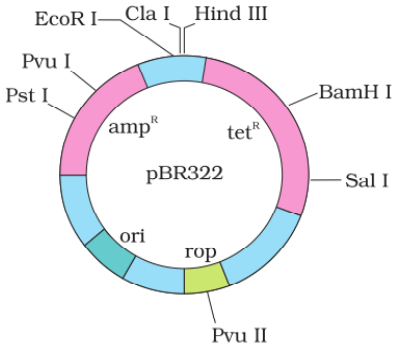
Q.190 (3)
New NCERT Pg. No. 168, 169
A probe is a ssDNA or ssRNA radio active tag ged molecule used in technique autoradiography.

Q.191 (2)
New NCERT Pg. No. 168
Agarose gel provides sieving effect during gel-electrophoresis.

Q.192 (2)
New NCERT Pg. No. 170
Bacterial cells are made competent to take DNA by treating them with divalent cations called calcium.

Q.193 (2)
New NCERT Pg. No. 165
Roman numbers following the names indicate the order in which the enzymes were isolated from that strain of bacteria.

Q.194 (2)
New NCERT Pg. No. 169



Q.195 (2)
New NCERT Pg. No. 165
Recognition sequence of Hind II
5' – GTC ↓ GAC – 3'
3' – CAG ↑ CTG – 5'

Q.196 (4)
New NCERT Pg. No. 183, 184
Toxicity testing in transgenic animals allow us to obtain results in less time.

Q.197 (1)
New NCERT Pg. No. 180
Using *Agrobacterium* vectors, nematode specific genes were introduced into the host plant. The introduction of DNA was such that it produced both sense and anti-sense RNA in the host cells. These two RNA's being complementary to each other formed a double stranded (dsRNA) that specific mRNA of the nematode. The consequence was that the parasite could not survive in a transgenic host expressing specific interfering RNA.

Q.198 (3)
New NCERT Pg. No. 182
For effective treatment of a disease, early diagnosis and understanding its pathophysiology is very important.

Q.199 (1)

New NCERT Pg. No. 181

The recombinant DNA technological processes have made immense impact in the area of healthcare by enabling mass production of safe and more effective therapeutic drugs.

Q.200 (4)

New NCERT Pg. No. 178

For increasing food production, following options can be throught

(a) agro-chemical based agriculture

(b) organic agriculture

(c) genetically engineered crop-based agriculture.