

All India Aakash Test Series for NEET - 2026

TEST - 8 (Code-A)[Click here for Code-B Sol.](#)

Test Date : 08/02/2026

ANSWERS

1. (2)	37. (4)	73. (3)	109. (3)	145. (1)
2. (4)	38. (4)	74. (1)	110. (3)	146. (3)
3. (3)	39. (2)	75. (3)	111. (4)	147. (3)
4. (1)	40. (2)	76. (3)	112. (3)	148. (2)
5. (3)	41. (1)	77. (4)	113. (2)	149. (3)
6. (4)	42. (1)	78. (3)	114. (3)	150. (3)
7. (4)	43. (4)	79. (2)	115. (3)	151. (3)
8. (3)	44. (3)	80. (4)	116. (2)	152. (2)
9. (1)	45. (3)	81. (4)	117. (4)	153. (1)
10. (1)	46. (1)	82. (1)	118. (4)	154. (4)
11. (2)	47. (1)	83. (3)	119. (1)	155. (4)
12. (3)	48. (1)	84. (1)	120. (2)	156. (3)
13. (4)	49. (2)	85. (1)	121. (3)	157. (1)
14. (4)	50. (3)	86. (1)	122. (4)	158. (2)
15. (3)	51. (3)	87. (4)	123. (3)	159. (2)
16. (3)	52. (2)	88. (3)	124. (4)	160. (1)
17. (3)	53. (3)	89. (2)	125. (2)	161. (4)
18. (1)	54. (4)	90. (2)	126. (4)	162. (2)
19. (4)	55. (1)	91. (3)	127. (4)	163. (2)
20. (1)	56. (2)	92. (4)	128. (4)	164. (3)
21. (2)	57. (2)	93. (3)	129. (1)	165. (2)
22. (3)	58. (1)	94. (3)	130. (4)	166. (2)
23. (4)	59. (2)	95. (2)	131. (4)	167. (1)
24. (3)	60. (3)	96. (2)	132. (1)	168. (1)
25. (4)	61. (3)	97. (2)	133. (4)	169. (3)
26. (4)	62. (3)	98. (1)	134. (4)	170. (3)
27. (2)	63. (2)	99. (3)	135. (4)	171. (1)
28. (4)	64. (3)	100. (1)	136. (4)	172. (2)
29. (4)	65. (4)	101. (4)	137. (1)	173. (3)
30. (4)	66. (1)	102. (1)	138. (1)	174. (3)
31. (3)	67. (3)	103. (1)	139. (2)	175. (2)
32. (3)	68. (4)	104. (1)	140. (2)	176. (2)
33. (3)	69. (1)	105. (2)	141. (2)	177. (1)
34. (3)	70. (4)	106. (2)	142. (2)	178. (2)
35. (1)	71. (2)	107. (1)	143. (2)	179. (3)
36. (3)	72. (1)	108. (4)	144. (2)	180. (2)

HINTS & SOLUTIONS

[PHYSICS]

1. Answer (2)

Hint: $\Delta E = h\nu$

Sol.: Series limit for Lyman series

$$n_2 = \infty \text{ to } n_1 = 1$$

$$h\nu_0 = E_{\text{final}} - E_{\text{initial}} = 0 - (-13.6)$$

$$h\nu_0 = 13.6 \text{ eV}$$

Series limit for Balmer series

$$n_2 = \infty \text{ to } n_1 = 2$$

$$h\nu = 0 - (-3.4) = 3.4 \text{ eV}$$

$$\nu = \frac{\nu_0}{4}$$

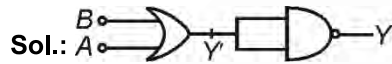
2. Answer (4)

Hint & Sol.: All nuclear reactions obey mass-energy conservations.

3. Answer (3)

Hint: Use Boolean Expression

$$\overline{A \cdot A} = \overline{A}$$



$$Y' = A + B$$

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

$$= \overline{A + B} = \text{NOR Gate}$$

4. Answer (1)

Hint: Use Einstein's photoelectric equation,

$$\text{K.E.}_{\text{max}} = h\nu - h\nu_0$$

Sol.: $\text{K.E.}_{\text{max}} = h\nu - h\nu_0$

$$\frac{1}{2}mv^2 = h[10\nu_0 - \nu_0] \quad \dots(1)$$

$$\frac{1}{2}mv'^2 = h[2\nu_0 - \nu_0] \quad \dots(2)$$

$$\frac{(6 \times 10^6)^2}{v'^2} = \frac{9\nu_0}{\nu_0}$$

$$v'^2 = \left(\frac{6 \times 10^6}{3} \right)^2 = (2 \times 10^6)^2$$

$$v' = 2 \times 10^6 \text{ units}$$

5. Answer (3)

Hint: de Broglie wavelength $\lambda = \frac{h}{p} = \frac{h}{\sqrt{2mE}}$

$$\text{Sol.} \quad \lambda = \frac{h}{\sqrt{2mE}}$$

$$\lambda \propto \frac{1}{\sqrt{E}}$$

$$\frac{\lambda_1}{\lambda_2} = \sqrt{\frac{E_2}{E_1}}$$

$$\frac{\lambda}{\lambda/2} = \sqrt{\frac{E_2}{E_1}}$$

$$4E_1 = E_2$$

$$\% \text{ change in energy} = \frac{E_2 - E_1}{E_1} \times 100 = 300\%$$

6. Answer (4)

Hint & Sol.: The maximum kinetic energy above the threshold frequency of the emitted photoelectrons is a function of frequency of incident radiation but is not a function of intensity.

7. Answer (4)

Hint & Sol.: For electron emission, incident frequency (ν) should be greater than or equal to threshold frequency (ν_0) or incident wavelength (λ) should be less than or equal to threshold wavelength (λ_0).

8. Answer (3)

Hint: Use $\Delta E = h \frac{c}{\lambda}$

Sol.: $E_3 - E_2 = h \frac{c}{\lambda}$

$$\lambda = \frac{6.64 \times 10^{-34} \times 3 \times 10^8}{13.6 \left[-\frac{1}{9} + \frac{1}{4} \right] \times 1.6 \times 10^{-19}}$$

$$\lambda = 6.59 \times 10^{-7} = 6590 \text{ \AA}$$

9. Answer (1)

Hint & Sol.: In forward bias, the net flow of electrons is from n -side to p -side.

10. Answer (1)

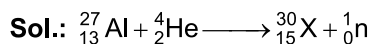
Hint: $E = \Delta m \times c^2$

Sol.: $E = 0.01585 \times c^2 \times 931$

$$E = 0.01585 \times 931 = 14.756 \text{ MeV}$$

11. Answer (2)

Hint: In a nuclear reaction the mass number and atomic number on both sides would be equal.



12. Answer (3)

Hint: Wavelength of emitted photon in an electronic transition is given by $\lambda = \frac{hc}{\Delta E}$

Sol.: $\lambda = \frac{hc}{\Delta E}$

$$\lambda_1 = \frac{hc}{\Delta E_1}$$

$$\lambda_2 = \frac{hc}{\Delta E_2}$$

$$\frac{\lambda_1}{\lambda_2} = \frac{\Delta E_2}{\Delta E_1} = \frac{\left(\frac{4}{3}E - E\right)}{(3E - E)} = \frac{1}{2}$$

$$= \frac{1}{6}$$

13. Answer (4)

Hint: Use equation, $E = -Z^2 \frac{(13.6)}{n^2} \text{ eV}$

Sol.: $E = -Z^2 \frac{(13.6)}{n^2} \text{ eV}$

For Li^{+2} , $Z = 3$

And for second excited state $n = 3$

$$E = -(9) \frac{13.6}{9} \text{ eV}$$

\therefore Ionisation energy for second excited state of Li^{+2} is 13.6 eV

14. Answer (4)

Hint & Sol.: We know that radius of orbit, $r \propto \frac{n^2}{Z}$

i.e. the variation would be parabolic.

15. Answer (3)

Hint & Sol.: All photons of a particular frequency (ν) or wavelength (λ) have the same energy (E) and momentum (P) whatever the intensity of radiation may be.

16. Answer (3)

Hint: Work function $\phi_0 = h\nu_0$

Sol.: Work function $\phi_0 = h\nu_0$

$$= \frac{6.67 \times 10^{-34} \times 0.72 \times 10^{15}}{1.6 \times 10^{-19}} \text{ eV}$$

$$= 3 \text{ eV}$$

17. Answer (3)

Hint & Sol.: Semiconductor in thermal equilibrium follows $n_i^2 = n_e n_h$

18. Answer (1)

Hint: Binding energy per nucleon is the measure of stability.

Sol.: $\left(\frac{\text{B.E.}}{\text{nucleon}}\right)_P = 5$

$$\left(\frac{\text{B.E.}}{\text{nucleon}}\right)_Q = 16$$

$$\left(\frac{\text{B.E.}}{\text{nucleon}}\right)_R = 12$$

$\Rightarrow Q$ is most stable and P is least stable.

19. Answer (4)

Hint & Sol.: Conductivity of pure silicon can be increased by increasing the temperature and by doping with acceptor as well as donor impurities.

20. Answer (1)

Hint: No current will flow through the bulb only when both the switches are in closed position.

Sol.: The truth table will be:

x	y	z
0	0	1
0	1	1
1	0	1
1	1	0

This is the truth table of NAND gate.

21. Answer (2)

Hint: Current through battery, $i = \frac{V - V_d}{R}$

$$\text{Sol.: } 4 \times 10^{-3} = \frac{10 - 0.7}{R}$$

$$\Rightarrow R = \frac{9.3}{4 \times 10^{-3}} = 2325 \Omega$$

22. Answer (3)

Hint: Wavelength of photon when an electron

makes transition is given by, $\frac{1}{\lambda} = Rz^2 \left[\frac{1}{n_1^2} - \frac{1}{n_2^2} \right]$

Sol.: We know, $\frac{1}{\lambda} = Rz^2 \left[\frac{1}{n_1^2} - \frac{1}{n_2^2} \right]; n_1 = 1, n_2 = 2$

$$\Rightarrow \frac{1}{\lambda} \propto z^2 \Rightarrow \frac{1}{\lambda_1} : \frac{1}{\lambda_2} : \frac{1}{\lambda_3} = 1 : 1 : 9$$

$$\Rightarrow \lambda_1 = \lambda_2 = 9\lambda_3$$

23. Answer (4)

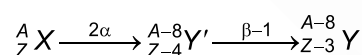
Hint & Sol.: If p-type semiconductor is at higher potential and n-type semiconductor is at lower potential then p-n junction diode is forward biased.

24. Answer (3)

Hint: In α -decay, mass number A decreases by 4 and atomic number Z decreases by 2.

In β^- -decay, mass number A remains same and atomic number Z increases by +1.

Sol.:



25. Answer (4)

Hint & Sol.: Photoelectric effect involves elastic collision between photon and electron and in accordance with energy conservation.

Photoelectric current is directly proportional to intensity of incident light. Einstein explained observations of photoelectric emission on the basis of photon as particles of light.

26. Answer (4)

Hint & Sol.: Energy gap for insulators is greater than 3 eV.

27. Answer (2)

Hint: Impact parameter is the perpendicular distance of the initial velocity vector of the α -particle from centre of nucleus.

Sol.: For a large impact parameter, the α -particle goes nearly undeflected and has a small deflection.

28. Answer (4)

Hint: Isotones: Elements having same number of neutrons in their nuclei.

Isobars: Elements having same mass number and different atomic number.

Sol.: ${}^3_1\text{H}$ and ${}^3_2\text{He}$ having same mass number are isobars.

${}^{198}_{80}\text{Hg}$ and ${}^{197}_{79}\text{Au}$ with same neutron number but different atomic number are isotones.

29. Answer (4)

Hint. $Q_{\text{value}} = (\text{B.E.})_{\text{products}} - (\text{B.E.})_{\text{reactants}}$.

Sol.: Energy needs to be supplied for this nuclear fission to take place because the product being formed are less stable as compared to the reactants.

$$Q_{\text{value}} = 7.07 \times 8 + 7.86 \times 12 - 20 \times 8.03$$

$$= -9.72 \text{ MeV}$$

Negative Q value denotes that energy will be absorbed.

30. Answer (4)

Hint & Sol.: $\text{B.E.} = (\Delta m) c^2$

i.e. energy equivalence of mass defect.

Binding energy is equal to energy supplied to nucleus to disassociate it into its component.

31. Answer (3)

Hint: Use Einstein's photoelectric equation $h\nu = h\nu_0 + eV_0$

Sol.: Einstein's photoelectric equation

$$h\nu = h\nu_0 + eV_0$$

$$h\nu - eV_0 = h\nu_0 \quad \dots(1)$$

$$\frac{h\nu}{2} - \frac{eV_0}{3} = h\nu_0 \quad \dots(2)$$

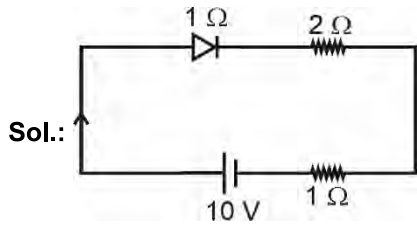
Solving equations (1) and (2), we get

$$h\nu \left[\frac{-1}{6} \right] = \frac{-2}{3} h\nu_0$$

$$v_0 = \frac{v}{4}$$

32. Answer (3)

Hint: Diode conducts in forward bias only.

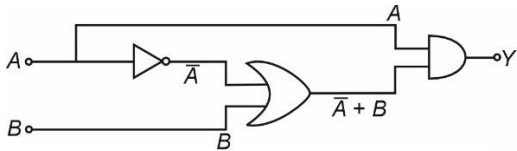


Sol.:

$$I = \frac{10}{4} = 2.5 \text{ A}$$

33. Answer (3)

Hint & Sol.:



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

34. Answer (3)

Hint & Sol.: NOR and NAND gates are universal gates.

35. Answer (1)

Hint & Sol.: Statement I is correct as conductivity increases due to more electron hole pairs are generated with increase in temperature.

If an electron absorbs a photon of energy $h\nu > E_g$, then it is transferred to conduction band.

36. Answer (3)

Hint & Sol.: In α -decay, A decreases by 4 and Z decreases by 2

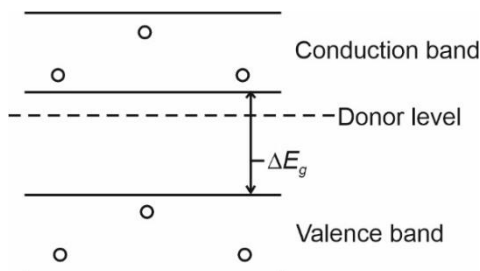
In β^- decay, A remains unchanged and Z increases by 1

In β^+ decay, A remains unchanged and Z decreases by 1.

In γ -decay, A and Z remains unchanged.

37. Answer (4)

Hint & Sol.:



In case of n type semiconductor, donor energy level is slightly below conduction band and electrons move from donor level to conduction band with a very small supply of energy.

38. Answer (4)

Hint: Diffusion is due to concentration difference.

Sol.: During the formation of pn -junction due to concentration gradient i.e. holes are majority in p -type and electrons are majority carriers in n -type, holes diffuse from p -side to n -side and electrons diffuse from n -side to p -side.

39. Answer (2)

Hint: By Einstein's equation $(K.E.)_{\max} = h\nu - \phi_0$

Sol.: $(K.E.)_{\max} = h\nu - \phi_0$

$$0.6 = h\nu - \phi_0 \quad \dots(i)$$

$$0.9 = 1.4 h\nu - \phi_0 \quad \dots(ii)$$

$$0.6 \times 1.4 = 1.4 h\nu - 1.4 \phi_0$$

$$\underline{0.9} = \underline{1.4 h\nu} - \underline{1.4 \phi_0}$$

$$\underline{-0.06} = \underline{-0.4 \phi_0}$$

$$\phi_0 = 0.15 \text{ eV}$$

40. Answer (2)

Hint: Zener diode acts as a voltage regulator in given circuit.

Sol.: $V = IR$

Potential difference across 2 kΩ resistor = 10 V

$$10 = I(2 \times 10^3)$$

$$I = 5 \times 10^{-3} = 5 \text{ mA}$$

41. Answer (1)

Hint: $I_g G = (I - I_g)S$.

Sol.: $\frac{I_g}{5} G = \frac{4I_g}{5} \times 0.6$

$$G = 2.4 \Omega$$

42. Answer (1)

Hint: de-Broglie wavelength, $\lambda = \frac{h}{\sqrt{2mE}}, \lambda \propto \frac{1}{\sqrt{m}}$

Sol.: $\frac{\lambda_P}{\lambda_\alpha} = \sqrt{\frac{m_\alpha}{m_P}} = \sqrt{\frac{4}{1}} = \frac{2}{1}$

43. Answer (4)

Hint: $e = \frac{I_2 - 3I_1}{2} = 0.6r$

Sol.: For a resonance tube

End correction $e = \frac{I_2 - 3I_1}{2}$

$$e = \frac{78 - 3(24.8)}{2}$$

$$e = 1.8$$

Also, $e = 0.6$ (radius)

$$\text{Radius} = \frac{1.8}{0.6} = 3 \text{ cm}$$

44. Answer (3)

Hint: Use Einstein's photoelectric equation,

$$h\nu = \phi_0 + K.E._{\text{max}}$$

$$\text{Sol.: } E = \phi_0 + K.E._{\text{max}}$$

$$E = 2.5 \times 1.6 \times 10^{-19} + \frac{1}{2} \times 9 \times 10^{-31} \times 10^{12}$$

$$= (4 \times 10^{-19} + 4.5 \times 10^{-19}) \text{ J}$$

$$h\nu = 8.5 \times 10^{-19}$$

$$\nu = \frac{8.5 \times 10^{-19}}{6.63 \times 10^{-34}} = 1.28 \times 10^{15} \text{ Hz}$$

45. Answer (3)

$$\text{Hint: de Broglie wavelength} = \lambda = \frac{h}{\sqrt{2mE}}$$

$$\text{Sol.: } \lambda' \text{ of electron} = \frac{h}{\sqrt{2m(2E)}}$$

$$\text{where } E = \frac{hc}{\lambda}$$

$$\lambda' = \frac{h}{\sqrt{2m \cdot 2 \cdot \frac{hc}{\lambda}}} = \sqrt{\frac{h\lambda}{4mc}}$$

[CHEMISTRY]

46. Answer (1)

Hint: Smaller the value of pK_b , stronger is the base.

Sol.: Amine pK_b value

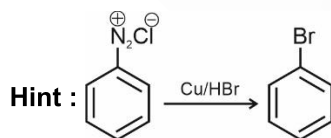
Benzenamine 9.38

Methanamine 3.38

N-Methylmethanamine 3.27

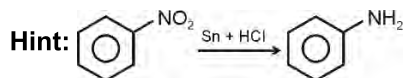
N, N-Dimethylmethanamine 4.22

47. Answer (1)

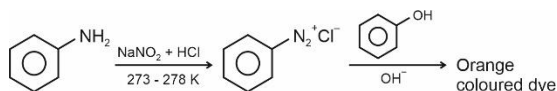


Sol.: The given reaction is known as Gattermann reaction.

48. Answer (1)



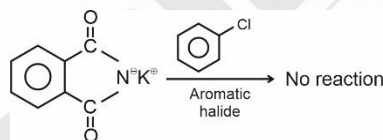
Sol.:



49. Answer (2)

Hint: Aromatic 1° amine cannot be prepared by Gabriel phthalimide synthesis.

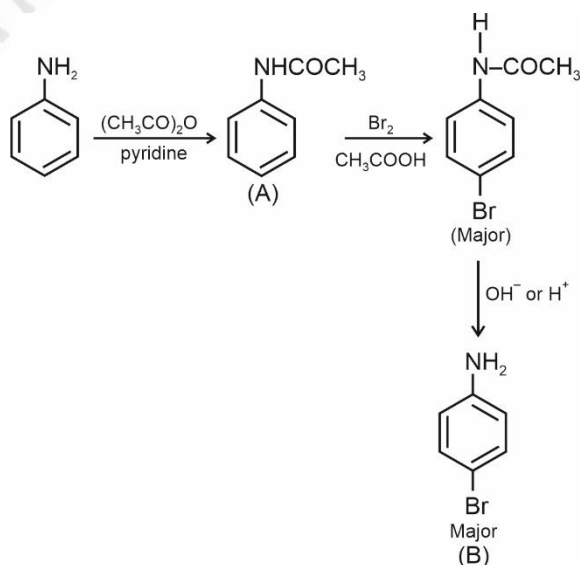
Sol.:



50. Answer (3)

Hint: For the formation of monosubstituted aniline derivative, the activating effect of $-NH_2$ group should be controlled.

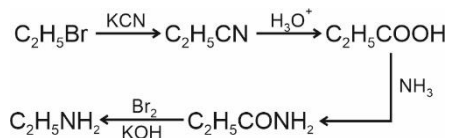
Sol.:



51. Answer (3)

Hint: Cyanide on complete hydrolysis gives carboxylic acid.

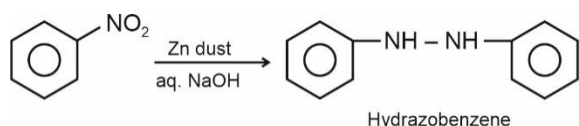
Sol.:



52. Answer (2)

Hint: Nitrobenzene gives different products in alkaline medium.

Sol.:



53. Answer (3)

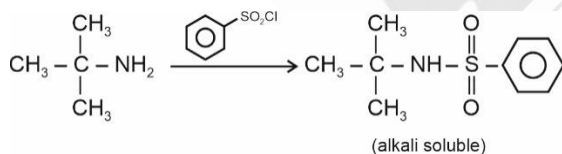
Hint : Oxygen in hydroxyl group of Butan-1-ol is more electronegative than the nitrogen in the NH_2 group of butan-1-amine.

Sol.: The difference in electronegativity leads to stronger intermolecular H-bonding between butan-1-ol and water molecules as compared to butan-1-amine and water.

54. Answer (4)

Hint: Product of reaction of 1° amine with Hinsberg's reagent is alkali soluble.

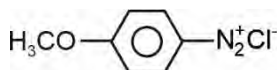
Sol.:



55. Answer (1)

Hint: Electron donating group at para position stabilise benzene diazonium salt by +R effect or +I effect.

Sol.: Due to +M effect of $-\text{OCH}_3$ group in



It is most stable.

56. Answer (2)

Hint: NH_3 has high boiling point due to H-Bonding.

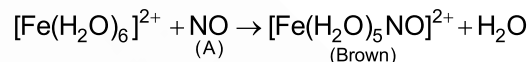
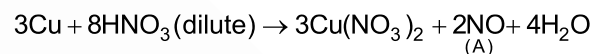
Sol.:

Compound	Boiling Point/K
NH_3	238.5
PH_3	185.5
AsH_3	210.6
SbH_3	254.6
BiH_3	290

57. Answer (2)

Hint: $[\text{Fe}(\text{H}_2\text{O})_5(\text{NO})]^{2+}$ is brown coloured complex.

Sol.:



58. Answer (1)

Hint: White phosphorus is insoluble in water but soluble in CS_2 .

Sol.: Red phosphorus is insoluble in water as well as in CS_2 .

59. Answer (2)

Hint : Gypsum $\rightarrow \text{CaSO}_4 \cdot 2\text{H}_2\text{O}$

Sol.: Epsom salt $\rightarrow \text{MgSO}_4 \cdot 7\text{H}_2\text{O}$

Baryte $\rightarrow \text{BaSO}_4$

Galena $\rightarrow \text{PbS}$

60. Answer (3)

Hint: In group 16 hydrides (E – H) bond dissociation enthalpy decreases down the group.

Sol.: Due to decrease in bond dissociation enthalpy, acidic character increases.

61. Answer (3)

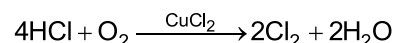
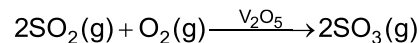
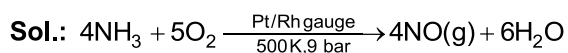
Hint: Due to resonance, two oxygen-oxygen bond lengths are identical in ozone molecule.

Sol.: $\text{O}_3 \longrightarrow \text{O}_2 + \text{O}$

Formation of O_3 from O_2 is endothermic process.

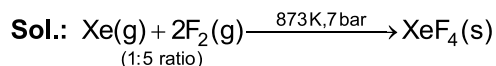
62. Answer (3)

Hint: $\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightleftharpoons 2\text{NH}_3(\text{g})$, catalyst is used Iron oxide with small amounts of K_2O and Al_2O_3 .



63. Answer (2)

Hint: Xe forms various compounds with F_2 under appropriate experimental conditions.



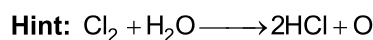
64. Answer (3)

Hint: Due to small size of fluorine atom, there are strong inter electronic repulsion so fluorine has less negative electron gain enthalpy than that of Cl.

Sol.:

Element	$\Delta_{\text{eg}}\text{H}/(\text{kJ mol}^{-1})$
F	-333
Cl	-349
Br	-325
I	-296

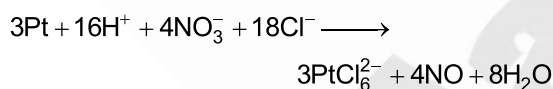
65. Answer (4)



Sol.: HCl reacts with finely powdered iron to form FeCl_2 because liberation of H_2 prevents formation of FeCl_3 .

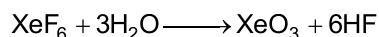
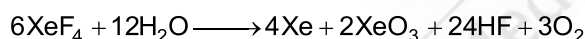
66. Answer (1)

Hint: When three parts of concentrated HCl and one part of concentrated HNO_3 are mixed, aqua regia is formed.

Sol.:

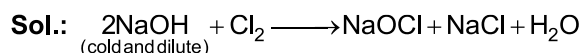
67. Answer (3)

Hint: XeF_2 , XeF_4 and XeF_6 are colourless crystalline solids.

Sol.:

68. Answer (4)

Hint : Cl_2 gets disproportionated in basic medium.



69. Answer (1)

Hint: HF forms intermolecular H-Bonds.

Sol.: Due to H-bonding the Boiling point order is $\text{HF} > \text{HI} > \text{HBr} > \text{HCl}$

70. Answer (4)

Hint: Al^{3+} , Ni^{2+} , Ca^{2+} and Cu^{2+} belongs to group III, IV, V and II respectively in qualitative analysis of cations.

Sol.: $\text{Al}^{3+} \rightarrow \text{NH}_4\text{OH}$ in presence of NH_4Cl

$\text{Ni}^{2+} \rightarrow \text{H}_2\text{S}$ in presence of NH_4OH

$\text{Ca}^{2+} \rightarrow (\text{NH}_4)_2\text{CO}_3$ in presence of NH_4OH

$\text{Cu}^{2+} \rightarrow \text{H}_2\text{S}$ gas in presence of dil. HCl.

71. Answer (2)

Hint: PbCrO_4 is insoluble in water and it forms a yellow ppt.

Sol.:

72. Answer (1)

Hint: Metal salts impart characteristic colour to the flame test.

Sol.:

$\text{Cu}^{2+} \rightarrow$ Green flame with blue centre

$\text{Sr}^{2+} \rightarrow$ Crimson red

$\text{Ba}^{2+} \rightarrow$ Apple green

$\text{Ca}^{2+} \rightarrow$ Brick red

73. Answer (3)

Hint: Generally coupling reaction with benzene diazonium salt produces coloured dye.

Sol.: β -Naphthol reacts with Benzene diazonium salt to produce scarlet red dye.

74. Answer (1)

Hint:

Percentage purity

$$= \frac{\text{Mass of pure substance}}{\text{Mass of sample}} \times 100$$

Sol.: 10 mL of 0.1 N KMnO_4 correspond to

= 0.001 eq. KMnO_4

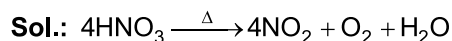
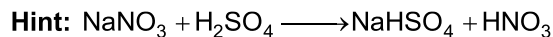
0.001 eq. Mohr's salt is reacted.

Mass of Mohr's salt = 0.001 \times 392

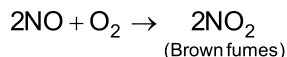
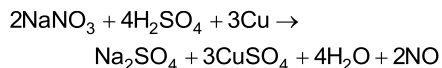
= 0.392 g

$$\% \text{ purity} = \frac{0.392}{0.98} \times 100 = 40\%$$

75. Answer (3)



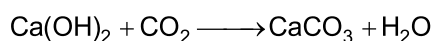
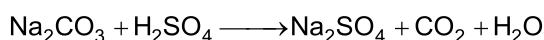
On addition of Cu turnings.



76. Answer (3)

Hint: CO_2 gas is evolved when CO_3^{2-} is present in salt.

Sol.:



77. Answer (4)

Hint: Colloidal particles ranges from 1-1000 nm.

Sol.: Lyophilic sols are reversible sols.

78. Answer (3)

Hint: $[\text{Fe(SCN)}]^{2+} \rightarrow$ Blood red

Sol.: $\text{Fe}_4[\text{Fe(CN)}_6]_3 \cdot x\text{H}_2\text{O} \rightarrow$ Prussian blue

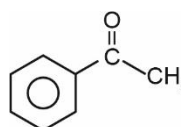
79. Answer (2)

Hint: $\text{H}^+ + \text{OH}^- \rightarrow \text{H}_2\text{O}$; $\Delta H = -57.1 \text{ kJ mol}^{-1}$

Sol.: Heat evolved on neutralisation of 1 mol NaOH with 1 mol HCl is nearly 57.1 kJ/mol

80. Answer (4)

Hint: Compound with $\text{CH}_3 - \overset{\text{O}}{\parallel}{\text{C}} -$ gives positive Iodoform test.

Sol.:  gives positive Iodoform test.

81. Answer (4)

Hint: Amylose constitutes about 15-20% of Starch.

Sol.: Amylopectin constitutes about 80-85% of starch.

82. Answer (1)

Hint: Glucose has aldehyde group so it is an aldohexose.

Sol.: Glucose does not form the hydrogen sulphite addition product with NaHSO_3 .

83. Answer (3)

Hint: Vitamin A deficiency causes Xerophthalmia.

Sol.: Vitamin $\text{B}_1 \rightarrow$ Beri beri

Vitamin $\text{B}_2 \rightarrow$ Cheilosis

Vitamin D \rightarrow Rickets

84. Answer (1)

Hint: Glutamic acid, Aspartic acid, Cystine and Tyrosine are non-essential amino acids.

Sol.: Arginine, Isoleucine and threonine are essential amino acids.

85. Answer (1)

Hint: Nucleoside is formed by attachment of nitrogenous base with pentose sugar.

Sol. RNA contains uracil instead of thymine.

86. Answer (1)

Hint & Sol.: Glucose reacts with Br_2 water to form Gluconic acid.

87. Answer (4)

Hint: Vitamin A, D, E and K are fat soluble.

Sol.: Vitamin B and Vitamin C are water soluble.

88. Answer (3)

Hint: Molecule without any symmetry will be chiral and optically active.

Sol.: Glycine does not contain chiral centre. Therefore it is an achiral molecule.

89. Answer (2)

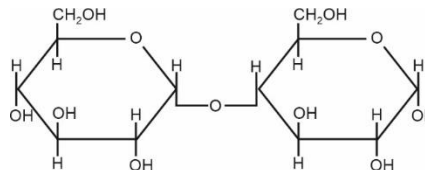
Hint: Keratin and myosin are fibrous proteins.

Sol.: Albumins and Insulin are globular proteins.

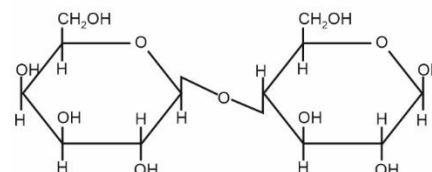
90. Answer (2)

Hint: Maltose is composed of two α -D-glucose units.

Sol.:



Maltose



Lactose

[BOTANY]

91. Answer (3)

Hint: Anthropogenic ecosystem has little diversity and no self-regulatory mechanism.

Sol.: Anthropogenic ecosystems have a simple food chain

92. Answer (4)

Hint: Temperate areas have undergone frequent glaciations in the past.

Sol.: Tropical communities receive more sunlight over the year and therefore they are more productive and can support wider range of species.

93. Answer (3)

Hint: Productivity and energy flow are functional aspects of the ecosystem.

Sol.: Species composition is not a functional aspect of the ecosystem but a structural aspect of the ecosystem.

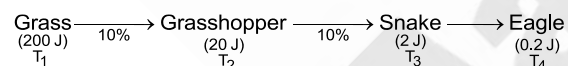
94. Answer (3)

Hint & Sol.: Annual productivity of the oceans is 55 billion tons.

95. Answer (2)

Hint: Transfer of energy across the trophic levels follows the 10% law.

Sol.:



96. Answer (2)

Hint: Decomposition of detritus is slow if it contains tannins, cellulose and phenolics.

Sol.: The factor which contributes to a faster rate of decomposition is tropical humid environment, and presence of aeration.

97. Answer (2)

Hint: Cryopreservation is the preservation of gametes of threatened species in a viable and fertile condition.

Sol.: (i) Sacred groves – Last refuge of large number of rare and threatened plants.

(ii) Endemism – Species confined to a region and not found anywhere else.

(iii) Co-extinction – Seen in obligate associations

98. Answer (1)

Hint: Food web is a network of interconnected food chains

Sol.: Food web provide stability to the ecosystem as food chains are interconnected at different trophic levels in a biotic community, providing diverse food options.

99. Answer (3)

Hint: Rivet popper hypothesis explains the effect of reduction in biodiversity in the ecosystem.

Sol.: Rivet popper hypothesis was proposed by Paul Ehrlich.

100. Answer (1)

Hint: GFC is the major conduit of energy in an aquatic ecosystem

Sol.: In parasitic or auxilliary food chain, parasites are present at the top trophic levels and therefore the size of the organism does reduce.

101. Answer (4)

Hint: Availability of solar radiations, soil moisture, temperature and nutrients are abiotic factors affecting magnitude of primary productivity.

Sol.: The plant factor affecting the magnitude of primary productivity is photosynthetic capacity of the producers.

102. Answer (1)

Hint: Standing crop is expressed in terms of fresh or dry weight.

Sol.: Standing crop is the amount of living material present in different trophic levels at a given time.

103. Answer (1)

Hint: Variation seen within a species is due to genetic diversity.

Sol.: Variation in potency and concentration of reserpine produced by *Rauwolfia vomitoria* is due to genetic diversity.

104. Answer (1)

Hint & Sol.: Habitat loss and fragmentation is the most important cause of biodiversity loss among the "Evil Quartet".

105. Answer (2)

Hint: Stratification is a structural aspect of the ecosystem.

Sol.: Stratification is the vertical distribution of different species occupying different levels.

106. Answer (2)

Hint: Ecological pyramids don't accommodate food webs as they only assume simple food chains.

Sol.: In terrestrial ecosystems, a much larger fraction of energy flows through DFC than through GFC. NPP is available for both herbivores and decomposers.

107. Answer (1)

Hint: Primary productivity can be expressed in terms of weight or energy.

Sol.: Primary productivity of the ecosystem is expressed as $(\text{gm m}^{-2}) \text{yr}^{-1}$ or $(\text{kcal m}^{-2}) \text{yr}^{-1}$

108. Answer (4)

Hint: Wild life sanctuaries are *in-situ* conservation method.

Sol.: (i) Buffer zone, which is sandwiched between transition and core zone is generally an area marked for research and educational activities.

(ii) Thylacine is a carnivorous marsupial that became extinct from Australia.

109. Answer (3)

Hint: Broadly utilitarian ecosystem services do not have a direct economic benefit.

Sol.: Coir, Drugs, furniture, fruit, dyes are narrowly utilitarian services.

110. Answer (3)

Hint: The World Summit (2002) was held in Johannesburg, South Africa.

Sol.: The Earth Summit (1992) was held in Rio de Janeiro, Brazil

111. Answer (4)

Hint: Light availability decreases with depth in oceans.

Sol.: Nitrogen is the most limiting nutrient in the marine ecosystem.

112. Answer (3)

Hint: Organisms at A, B and D can be herbivore or omnivore.

Sol.: A – Sparrow (Omnivore)

B – Insect (Herbivore)

C – Frog (Carnivore)

D – Mice (Omnivore)

113. Answer (2)

Hint: Edward Wilson - Popularized the term biodiversity.

Sol.: Robert May estimated the global species diversity to be about 7 million.

114. Answer (3)

Hint: Species, more susceptible to extinction generally occupy higher trophic level in the food chain.

Sol.: Species having high reproductive rate and occupying lower trophic levels are generally less susceptible to extinction.

115. Answer (3)

Hint & Sol.: The rate of production of organic matter by the consumers is called secondary productivity.

116. Answer (2)

Hint: Decomposers are saprophytic organisms which feed on dead remains of plants and animals.

Sol.: They secrete digestive enzymes, which convert complex organic substances into simpler ones.

117. Answer (4)

Hint: African catfish is posing threat to our rivers.

Sol.: Introduction of the Nile perch into the lake Victoria led to the extermination of a unique assemblage of more than 200 species of cichlid fishes.

118. Answer (4)

Hint: According to IUCN Red list (2004), birds are least vulnerable to extinction.

Sol.: Amphibians as a group are the most vulnerable to extinction as these organisms require both land and aquatic habitat.

119. Answer (1)

Hint: India is among the 12 mega diversity regions of the world.

Sol.: India has only 2.4% of the world's land area and possesses 8.1% species diversity of the world.

120. Answer (2)

Hint: Plants account for nearly 22% of the total species

Sol: Number of angiosperms is not more than the total number of species of fungi, lichens, algae and ferns taken together.

121. Answer (3)

Hint: Net primary productivity is the available biomass for consumption to heterotrophs (T_2).

Sol.: Net primary productivity is less than the GPP (Gross Primary Productivity). It is GPP-Respiratory loss.

122. Answer (4)

Hint & Sol.: Herbivores are accommodated in the ecological pyramids.

123. Answer (3)

Hint: Lichens share the least proportion in biodiversity.

Sol.: B – Angiosperm

E – Fungi

A – Algae

C – Mosses

D – Lichens

124. Answer (4)

Hint & Sol.: Higher plants as well as higher animals both show sexual reproduction hence this is not a major reason for more diversification of animals than plants.

125. Answer (2)

Hint: Loss of biodiversity leads to decreased ecosystem stability and services.

Sol.: There is more opportunity of disease emergence, due to loss of biodiversity.

126. Answer (4)

Hint: Pyramid of biomass in an aquatic ecosystem is generally inverted

Sol.: Pyramid of number in a tree ecosystem can be inverted or spindle shaped.

127. Answer (4)

Hint: Organism X can be a Hawk or parasites.

Sol.: Therefore, the pyramid of number will be inverted or spindle shaped when 'X' is considered parasites or hawk respectively.

128. Answer (4)

Hint: Fragmentation is the process of eating and pulverization of detritus into fine particles.

Sol.: Key industry animals are first order consumers. Fragmentation is performed by earthworms.

129. Answer (1)

Hint: Many of the microbial species cannot be cultured.

Sol.: Microscopy alone will not be able to distinguish microorganisms.

130. Answer (4)

Hint: Aquariums have low productivity.

Sol.: Croplands such as sugarcane fields are the most productive ecosystems.

131. Answer (4)

Hint: The slope of regression is much steeper for large areas.

Sol.: The value of 'Z' for large areas like entire continents is 0.6 – 1.2.

132. Answer (1)

Hint: Ecosystem was compared to the aeroplane in rivet popper hypothesis.

Sol.: Rivets on the wings of aeroplane represent, "key species" in an ecosystem.

133. Answer (4)

Hint: National parks and biosphere reserves are *in-situ* conservation.

Sol.: Gene banks are a method of *ex-situ* conservation.

134. Answer (4)

Hint: Scandinavian countries like Norway have low ecological diversity.

Sol.: Sarguja and Bastar are sacred groves located in Madhya Pradesh.

135. Answer (4)

Hint: For a small area the value of slope of regression (z) lies between 0.1 - 0.2.

Sol.: The relationship between species richness and area is a straight line on a log scale.

[ZOOLOGY]

136. Answer (4)

Hint: Also called GMO

Sol.: Animals that have had their DNA manipulated to possess and express an extra (foreign) gene are known as transgenic animals. Genetically identical copy of a cell, tissue or organism created through asexual reproduction or artificial methods is called clone.

137. Answer (1)

Hint: Nutritionally a more balanced product.

Sol.: In 1997, the first transgenic cow, Rosie produced human protein-enriched milk (2.4 gms/litre). The milk contained the human alpha-lactalbumin and was nutritionally a more balanced product for human babies than natural cow milk.

138. Answer (1)

Hint: Vaccine for infantile paralysis

Sol.: Many transgenic animals have been produced like rabbits, pigs, sheep, cows and fishes. Over 95 per cent of all the existing transgenic animals are mice.

- Transgenic mice are being used to test the safety of the polio vaccine.
- There is no vaccine for AIDS/HIV.

139. Answer (2)

Hint: Varieties of Basmati rice in India is in lakhs

Sol.: The diversity of rice in India is one of the richest in the world. There are an estimated 200,000 varieties of rice in India alone.

Basmati rice is distinct for its unique aroma and flavour and 27 documented varieties of Basmati are grown in India.

140. Answer (2)

Hint: It is illegal copying**Sol.:**

- Biopatent gives right to patent holder to control their biological products or processes for a set period of time.
- Bioweapons are disease-causing organisms and toxins to harm or kill animals/plants/humans.

141. Answer (2)

Hint: Solves the problem of night blindness

Sol.: Golden rice is a promising transgenic crop. It contains β -carotene, a precursor of vitamin-A. This crop is developed to overcome the deficiency of vitamin-A. Deficiency of vitamin-A may cause night blindness and skin problems.

142. Answer (2)

Hint: Produced from Tracy, the transgenic sheep.

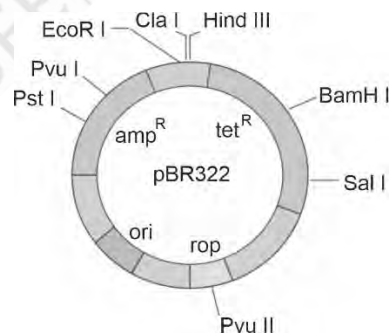
Sol.: Transgenic animals that produce useful biological products can be created by the introduction of the portion of DNA (or genes) which codes for a particular product such as human protein (α -1-antitrypsin) used to treat emphysema. α -lactalbumin is a protein present in human milk.

143. Answer (2)

Hint: pBR322 has amp^R and tet^R genes.

Sol.: *Hind* II is the first discovered restriction enzyme whose functioning depends on a specific nucleotide sequence.

- pBR322 possesses *ori*, *rop*, amp^R and tet^R genes.
- *rop* codes for the proteins involved in the replication of the plasmid.



144. Answer (2)

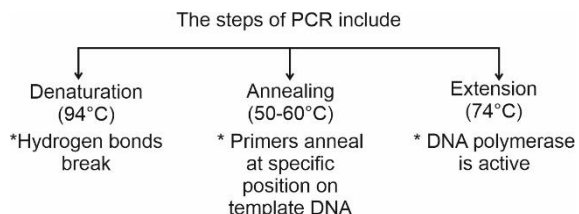
Hint: Histone is a protein.**Sol.:**

DNA ligase	Joins the DNA fragments
DNA polymerase	Extends primers on genomic DNA template
Ribonuclease	Hydrolyses RNA
Protease	Hydrolyses histones (proteins)

145. Answer (1)

Hint: Annealing occurs at 50–60°C.

Sol.:



146. Answer (3)

Hint: Has single recognition site

Sol.: *E. coli* cloning vector pBR322 has restriction sites (*Hind* III, *Eco* RI, *Bam* HI, *Sal* I, *Pvu* I, *Pvu* II, *Pst* I, *Cla* I), *ori* and genes encoding antibiotic resistance (*amp^R* and *tet^R*). *rop* codes for the proteins involved in the replication of the plasmid. *tet^R* contains restriction sites for *Bam*HI and *Sal* I while *amp^R* contains restriction for *Pvu* I and *Pst* I.

147. Answer (3)

Hint: Colonies will be blue coloured.

Sol.: The *lac-Z* gene produces the enzyme β -galactosidase that cleaves the X-gal and produces blue colour. Hence, the recombinants will be visible as blue coloured colonies. The *lac-Z* is inserted within the coding sequence of *amp^R* gene hence, the recombinants will be ampicillin sensitive.

148. Answer (2)

Hint: Polymerase belongs to the class 'Transferases'

Sol.: Amplification of DNA in PCR is achieved by the use of a thermostable DNA polymerase, *i.e.*, *Taq* polymerase, isolated from a bacterium, *Thermus aquaticus*. This enzyme remains active during the high temperature induced denaturation of dsDNA.

It is used in extension step of the PCR cycle.

149. Answer (3)

Hint: Does not belong to the phylum Aschelminthes

Sol.: Specific Bt toxin genes were isolated from *Bacillus thuringiensis* and incorporated into several crop plants, such as cotton. The choice of genes depends upon the crop and the targeted pest, as most Bt toxins are insect-group specific.

The toxin is coded by a gene, named cry. There are a number of them, for example, the proteins encoded by the gene *cryIAc* and *cry IIAb* control the cotton bollworms, that of *cryIAb* controls corn borer.

Roundworms are aschelminths.

150. Answer (3)

Hint: Retroviruses are used as a vector.

Sol.: *Flavr Savr* tomato is genetically engineered for increased shelf life.

Agrobacterium is the natural genetic engineer of plants.

GEAC makes decisions regarding the validity of GM organisms for public services.

151. Answer (3)

Hint: The clinical uses of gene therapy are not limited to treatment of inherited disease.

Sol.: Most cancers results from activation of an oncogene that leads to tumour formation, or inactivation of a gene that normally suppresses formation of tumour.

In both cases, gene therapy could be envisaged to treat the cancer.

152. Answer (2)

Hint: The number of recombinant therapeutics in India is equal to the number of thoracic vertebrate in man.

Sol.: At present, about 30 recombinant therapeutics have been approved for human use the world over. In India, 12 of these are presently being marketed.

153. Answer (1)

Hint: Unpredictable result

Sol.: Genetic modification of organisms can have unpredictable results when such organisms are introduced into the ecosystem.

Indian Basmati was crossed with semi-dwarf varieties and claimed as an invention or novelty.

154. Answer (4)

Hint: Gene-gun is suitable for plants.

Sol.: There are many ways to introduce alien DNA into host cells. In a method known as micro-injection, rDNA is directly injected into the nucleus of an animal cell.

- Biolistics or gene gun method is suitable for plant cells.
- Heat shock method enables the bacteria to take up the recombinant DNA by incubating the cells on ice, followed by placing them briefly at 42°C, and then putting them back on ice.

155. Answer (4)

Hint: Provides resistance against Cotton bollworm**Sol.:**

- Proteins encoded by gene *cry IAc* controls cotton bollworms.
- *Cla* I, *Pst* I and *Bam* HI restriction enzymes have restriction sites within pBR322 vector.

156. Answer (3)

Hint: Bromophenol blue runs faster than the DNA sample.**Sol.:** X-gal or 5-bromo-4-chloro-3-indolyl- β -D-galactopyranoside is cleaved β -galactosidase, a blue coloured precipitate.

Bromophenol blue is used as the tracking dye.

Etbr is an intercalating agent that intercalates with DNA, leading to fluorescence under UV light.

157. Answer (1)

Hint: More than three**Sol.:** Many transgenic animals are designed to increase our understanding of how genes contribute to the development of diseases. These are specially made to serve as model for human diseases so that investigation of new treatments for diseases is made possible. Today transgenic models exist for many human diseases such as cancer, cystic fibrosis, rheumatoid arthritis and Alzheimer's. Similar attempts are being made for treatment of PKU and emphysema. Transgenic mice are being used to test the safety of the polio vaccine.

158. Answer (2)

Hint: Member of this group causes AIDS**Sol.:**

- *Agrobacterium* is a pathogen of several dicot plants.
- Ti plasmid of *Agrobacterium* infects dicot plants.
- In gene therapy, by using a retroviral vector, a functional ADA cDNA is introduced into lymphocytes.
- pBR322 is used as a cloning vector for *E. coli*.

159. Answer (2)

Hint: Exclude conventional methods of diagnosis**Sol.:** Serum and urine analysis are conventional methods of diagnosis, early detection is not possible with them. Recombinant DNA technology, PCR (Polymerase Chain Reaction) and ELISA (Enzyme Linked Immuno-sorbent Assay) are some of the techniques that serve the purpose of early diagnosis.

160. Answer (1)

Hint: Pro-hormone needs to be processed.**Sol.:** In mammals, including humans, insulin is synthesised as a pro-hormone which contains an extra stretch called the C-peptide. The C-peptide is not present in the mature insulin and is removed during maturation into insulin.

161. Answer (4)

Hint: Carbohydrates are organic substances.**Sol.:** The nutrient media for tissue culture must contain a carbon source such as sucrose and also inorganic salts, vitamins, amino acids and growth regulators like auxins, cytokinin, etc.

162. Answer (2)

Hint: RNAi takes place in all the eukaryotic organisms.**Sol.:** A nematode *Meloidogyne incognita* infects roots of tobacco plants and cause a great reduction in yield.The transgenic plant developed with the help of the process called RNAi, can protect itself from this parasite. Using *Agrobacterium* vectors, nematode specific genes were introduced into the host plant.

163. Answer (2)

Hint: Roundworms belong to this group.**Sol.:** Some strains of *Bacillus thuringiensis* produce proteins that kill certain insects such as lepidopterans (tobacco budworm, armyworm), coleopterans (beetles) and dipterans (flies, mosquitoes).

164. Answer (3)

Hint: Used prior autoradiography.**Sol.:** A single stranded DNA or RNA, tagged with a radioactive molecule called probe is allowed to hybridise to its complementary DNA in a clone of cells followed by detection using autoradiography. The clone having the mutated gene will hence not appear on the photographic film, because the probe will not have complementarity with the mutated gene.

165. Answer (2)

Hint: It is an enzyme that belongs to class III.

Sol.: Exonuclease and endonuclease used to hydrolyse phosphodiester bonds.

- Ligases join DNA fragments.
- Proteases break proteins.
- Lipases break lipids.

166. Answer (2)

Hint: Eliminate a genetic sequence in pBR322 that initiates DNA replication.

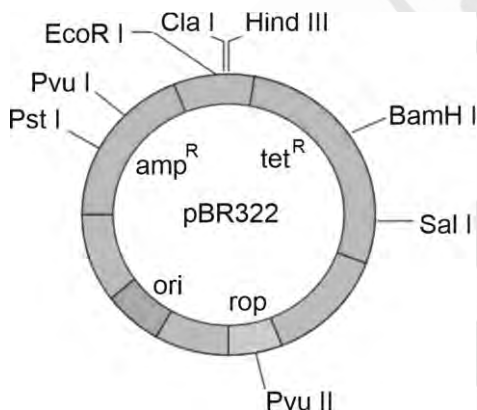
Sol.: The ligation of alien DNA is carried out at a restriction site present in one of the two antibiotic resistant gene. An antibiotic resistance gene help in selecting the transformants and recombinants. Similarly in some plasmids an alternative selectable marker is developed *i.e.*, gene encoding for an enzyme, β -galactosidase.

ori gene is must for initiation of DNA replication.

167. Answer (1)

Hint: Less than 3

Sol.: Restriction site for *Hind* II is not present in pBR322.



168. Answer (1)

Hint: *Eco* RI comes from *Escherichia coli* RY13.

Sol.: Today we know more than 900 restriction enzymes that have been isolated from over 230 strains of bacteria each of which recognise different recognition sequences.

The convention for naming restriction enzymes is the first letter of the name comes from the genus and the second two letters come from the species of the prokaryotic cell from which they were isolated, *e.g.*, *Eco*RI comes from *Escherichia coli* RY 13, the latter 'R' is derived from the name of strain.

169. Answer (3)

Hint: It causes infection by contaminating food and water

Sol.: The construction of the 1st recombinant DNA emerged from the possibility of linking a gene encoding antibiotic resistance with a native plasmid of *Salmonella typhimurium*. Stanley Cohen and Herbert Boyer accomplished this in 1972 by isolating the antibiotic resistance gene by cutting out a piece of DNA from a plasmid which is responsible for conferring antibiotic resistance.

Pseudomonas putida: Used for cleaning oil spills.

Agrobacterium: Natural genetic engineer of plants.

170. Answer (3)

Hint: This is the function of DNA ligase.

Sol.:

The cutting of DNA at specific location became possible with the discovery of the restriction enzymes.

Plasmid can be used as vector to deliver an alien piece of DNA into the host just like the malarial parasite is transferred by mosquito in human body, thus plasmids are also called vectors.

The linking of antibiotic resistance gene with the plasmid vector became possible with the help of ligase enzymes. Lyases are enzymes that catalyse the breaking of chemical bonds.

Transposons are mobile DNA sequences.

171. Answer (1)

Hint: Test-tube baby programme involves IVF.

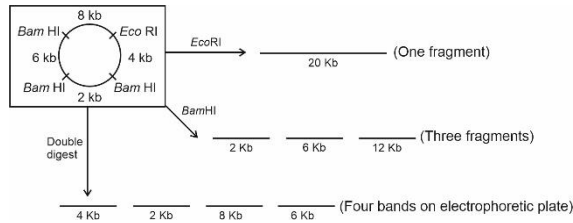
Sol.: Biotechnology deals with techniques of using live organisms or enzymes from organisms to produce products and processes useful to humans. In this sense, making curd, bread or wine, which are all microbe mediated processes, could also be thought as a form of biotechnology.

Many other processes are also included like, *in vitro* fertilisation leading to a 'test-tube' baby, synthesising a gene and using it, developing a DNA vaccine or correcting a defective gene are all part of biotechnology.

172. Answer (2)

Hint: Unequal fragments will be obtained in any case.

Sol.:



173. Answer (3)

Hint: Bioreactors are used for large scale production.

Sol.: If any protein encoding gene expressed in a heterologous host, it is called a recombinant protein. The cells harbouring cloned genes of interest may be grown on a small scale in the lab and can be used for large-scale production.

174. Answer (3)

Hint: Involves exponential phase.

Sol.: Continuous culture system produces a larger biomass leading to higher yields of desired protein. As in a continuous culture system used medium is drained out from one side while fresh medium is added from the other to maintain the cells in their physiologically most active log/exponential phase.

175. Answer (2)

Hint: Equals to the total number of ear ossicles.

Sol.: To produce large quantity of desired products, bioreactors are developed. A bioreactor provides the optimal conditions for achieving the desired product by providing optimum growth conditions like: temperature, pH, substrate, salts, vitamins, oxygen, stirrer, etc.

176. Answer (2)

Hint: Formation of product is intended in upstream processing.

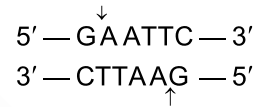
Sol.: After completion of the biosynthetic stage, the product has to be subjected through a series of processes before it is ready for marketing as a finished product. The processes include separation and purification, which are collectively referred to as downstream processing. The product has to be formulated with suitable preservatives. Such formulation has to undergo through clinical trials as in case of drugs. Strict quality control testing for each product is also required.

177. Answer (1)

Hint: *Hind* II is type II restriction enzyme.

Sol.: Restriction enzyme digestion is performed by incubating a purified DNA with restriction enzymes.

Restriction enzymes cut the strand of DNA a little away from the centre of the palindrome sites, but between the same two bases on the opposite strands.



These enzymes are used in genetic engineering to form 'recombinant' molecules of DNA.

178. Answer (2)

Hint: The *lac-Z* gene codes for β -galactosidase.

Sol.:

Column I	Column II
Retrovirus in animal	Transform normal cells into cancerous cells
<i>Agrobacterium tumefaciens</i>	Ti plasmid
<i>lac-Z</i> gene	Blue white screening
<i>EcoRI</i>	Type II restriction enzyme

179. Answer (3)

Hint: Selectable markers help in their identification.

Sol.: Transformation is a procedure through which a piece of DNA is introduced in a host bacterium. Selectable marker helps in identifying and eliminating non-transformant and selectively permitting the growth of transformants.

- Gel electrophoresis is used to separate the digested DNA fragments.
- Spooling is used to isolate long strands of DNA onto a glass rod or wooden stick.

180. Answer (2)

Hint: After 1980

Sol.: In 1997, the first transgenic cow, Rosie, produced human protein enriched milk (2.4 gms/litre). In 1963, the two enzymes responsible for restricting the growth of bacteriophage in *E.coli*.



All India Aakash Test Series for NEET - 2026

TEST - 8 (Code-B)[Click here for Code-A Sol.](#)

Test Date : 08/02/2026

ANSWERS

1. (3)	37. (1)	73. (2)	109. (4)	145. (1)
2. (3)	38. (3)	74. (3)	110. (2)	146. (3)
3. (4)	39. (4)	75. (3)	111. (3)	147. (3)
4. (1)	40. (4)	76. (3)	112. (3)	148. (2)
5. (1)	41. (3)	77. (2)	113. (2)	149. (3)
6. (2)	42. (1)	78. (1)	114. (3)	150. (3)
7. (2)	43. (3)	79. (2)	115. (4)	151. (3)
8. (4)	44. (4)	80. (2)	116. (3)	152. (2)
9. (4)	45. (2)	81. (1)	117. (3)	153. (1)
10. (3)	46. (2)	82. (4)	118. (4)	154. (4)
11. (1)	47. (2)	83. (3)	119. (1)	155. (4)
12. (3)	48. (3)	84. (2)	120. (2)	156. (2)
13. (3)	49. (4)	85. (3)	121. (2)	157. (3)
14. (3)	50. (1)	86. (3)	122. (1)	158. (2)
15. (3)	51. (1)	87. (2)	123. (1)	159. (1)
16. (4)	52. (1)	88. (1)	124. (1)	160. (2)
17. (4)	53. (3)	89. (1)	125. (4)	161. (2)
18. (4)	54. (1)	90. (1)	126. (1)	162. (3)
19. (2)	55. (4)	91. (4)	127. (3)	163. (3)
20. (4)	56. (4)	92. (4)	128. (1)	164. (2)
21. (4)	57. (2)	93. (4)	129. (2)	165. (1)
22. (3)	58. (3)	94. (1)	130. (2)	166. (3)
23. (4)	59. (4)	95. (4)	131. (2)	167. (3)
24. (3)	60. (3)	96. (4)	132. (3)	168. (1)
25. (2)	61. (3)	97. (1)	133. (3)	169. (1)
26. (1)	62. (1)	98. (4)	134. (4)	170. (2)
27. (4)	63. (3)	99. (4)	135. (3)	171. (2)
28. (1)	64. (1)	100. (4)	136. (4)	172. (3)
29. (3)	65. (2)	101. (2)	137. (1)	173. (2)
30. (3)	66. (4)	102. (4)	138. (1)	174. (2)
31. (3)	67. (1)	103. (3)	139. (2)	175. (4)
32. (4)	68. (4)	104. (4)	140. (2)	176. (1)
33. (4)	69. (3)	105. (3)	141. (2)	177. (2)
34. (3)	70. (1)	106. (2)	142. (2)	178. (2)
35. (2)	71. (4)	107. (1)	143. (2)	179. (1)
36. (1)	72. (3)	108. (4)	144. (2)	180. (3)

HINTS & SOLUTIONS**[PHYSICS]**

1. Answer (3)

Hint: de Broglie wavelength = $\lambda = \frac{h}{\sqrt{2mE}}$

Sol.: λ' of electron = $\frac{h}{\sqrt{2m(2E)}}$

where $E = \frac{hc}{\lambda}$

$$\lambda' = \frac{h}{\sqrt{2m \cdot 2 \cdot \frac{hc}{\lambda}}} = \sqrt{\frac{h\lambda}{4mc}}$$

2. Answer (3)

Hint: Use Einstein's photoelectric equation,

$$h\nu = \phi_0 + K.E._{\max}$$

Sol.: $E = \phi_0 + K.E._{\max}$

$$E = 2.5 \times 1.6 \times 10^{-19} + \frac{1}{2} \times 9 \times 10^{-31} \times 10^{12}$$

$$= (4 \times 10^{-19} + 4.5 \times 10^{-19}) \text{ J}$$

$$h\nu = 8.5 \times 10^{-19}$$

$$\nu = \frac{8.5 \times 10^{-19}}{6.63 \times 10^{-34}} = 1.28 \times 10^{15} \text{ Hz}$$

3. Answer (4)

Hint: $e = \frac{l_2 - 3l_1}{2} = 0.6r$

Sol.: For a resonance tube

$$\text{End correction } e = \frac{l_2 - 3l_1}{2}$$

$$e = \frac{78 - 3(24.8)}{2}$$

$$e = 1.8$$

Also, $e = 0.6$ (radius)

$$\text{Radius} = \frac{1.8}{0.6} = 3 \text{ cm}$$

4. Answer (1)

Hint: de-Broglie wavelength, $\lambda = \frac{h}{\sqrt{2mE}}$, $\lambda \propto \frac{1}{\sqrt{m}}$

$$\text{Sol.} \quad \frac{\lambda_P}{\lambda_\alpha} = \sqrt{\frac{m_\alpha}{m_P}} = \sqrt{\frac{4}{1}} = \frac{2}{1}$$

5. Answer (1)

Hint: $I_g G = (I - I_g)S$.

$$\text{Sol.} \quad \frac{I_g}{5} G = \frac{4I_g}{5} \times 0.6$$

$$G = 2.4 \Omega$$

6. Answer (2)

Hint: Zener diode acts as a voltage regulator in given circuit.

Sol.: $V = IR$

Potential difference across $2 \text{ k}\Omega$ resistor = 10 V

$$10 = I(2 \times 10^3)$$

$$I = 5 \times 10^{-3} = 5 \text{ mA}$$

7. Answer (2)

Hint: By Einstein's equation $(K.E.)_{\max} = h\nu - \phi_0$

Sol.: $(K.E.)_{\max} = h\nu - \phi_0$

$$0.6 = h\nu - \phi_0 \quad \dots(i)$$

$$0.9 = 1.4 h\nu - \phi_0 \quad \dots(ii)$$

$$0.6 \times 1.4 = 1.4 h\nu - 1.4 \phi_0$$

$$\underline{0.9 = 1.4 h\nu - \phi_0}$$

$$\underline{-0.06 = -0.4\phi_0}$$

$$\phi_0 = 0.15 \text{ eV}$$

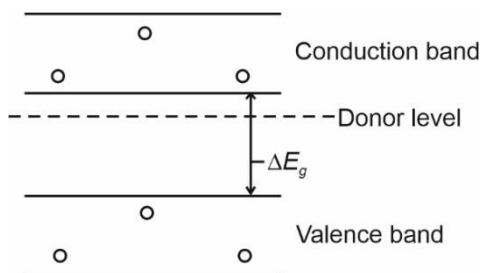
8. Answer (4)

Hint: Diffusion is due to concentration difference.

Sol.: During the formation of pn -junction due to concentration gradient i.e. holes are majority in p -type and electrons are majority carriers in n -type, holes diffuse from p -side to n -side and electrons diffuse from n -side to p -side.

9. Answer (4)

Hint & Sol.:



In case of n type semiconductor, donor energy level is slightly below conduction band and electrons move from donor level to conduction band with a very small supply of energy.

10. Answer (3)

Hint & Sol.: In α -decay, A decreases by 4 and Z decreases by 2

In β^- decay, A remains unchanged and Z increases by 1

In β^+ decay, A remains unchanged and Z decreases by 1.

In γ -decay, A and Z remains unchanged.

11. Answer (1)

Hint & Sol.: Statement I is correct as conductivity increases due to more electron hole pairs are generated with increase in temperature.

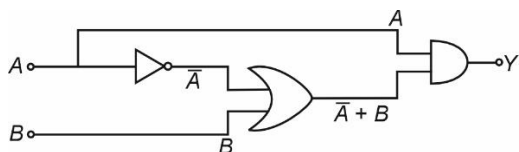
If an electron absorbs a photon of energy $h\nu > E_g$, then it is transferred to conduction band.

12. Answer (3)

Hint & Sol.: NOR and NAND gates are universal gates.

13. Answer (3)

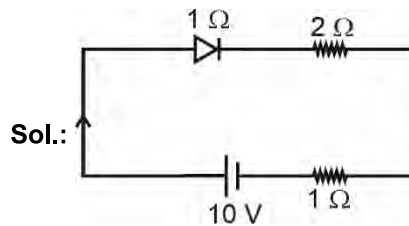
Hint & Sol.:



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

14. Answer (3)

Hint: Diode conducts in forward bias only.



Sol.:

$$I = \frac{10}{4} = 2.5 A$$

15. Answer (3)

Hint: Use Einstein's photoelectric equation $h\nu = h\nu_0 + eV_0$

Sol.: Einstein's photoelectric equation

$$h\nu = h\nu_0 + eV_0$$

$$h\nu - eV_0 = h\nu_0 \quad \dots(1)$$

$$\frac{h\nu}{2} - \frac{eV_0}{3} = h\nu_0 \quad \dots(2)$$

Solving equations (1) and (2), we get

$$h\nu \left[\frac{-1}{6} \right] = \frac{-2}{3} h\nu_0$$

$$\nu_0 = \frac{\nu}{4}$$

16. Answer (4)

Hint & Sol.: B.E. = $(\Delta m) c^2$

i.e. energy equivalence of mass defect.

Binding energy is equal to energy supplied to nucleus to disassociate it into its component.

17. Answer (4)

Hint. $Q_{\text{value}} = (\text{B.E.})_{\text{products}} - (\text{B.E.})_{\text{reactants}}$.

Sol.: Energy needs to be supplied for this nuclear fission to take place because the product being formed are less stable as compared to the reactants.

$$Q_{\text{value}} = 7.07 \times 8 + 7.86 \times 12 - 20 \times 8.03 = -9.72 \text{ MeV}$$

Negative Q value denotes that energy will be absorbed.

18. Answer (4)

Hint: Isotones: Elements having same number of neutrons in their nuclei.

Isobars: Elements having same mass number and different atomic number.

Sol.: ${}^3_1\text{H}$ and ${}^3_2\text{He}$ having same mass number are isobars.

${}^{198}_{80}\text{Hg}$ and ${}^{197}_{79}\text{Au}$ with same neutron number but different atomic number are isotones.

19. Answer (2)

Hint: Impact parameter is the perpendicular distance of the initial velocity vector of the α -particle from centre of nucleus.

Sol.: For a large impact parameter, the α -particle goes nearly undeviated and has a small deflection.

20. Answer (4)

Hint & Sol.: Energy gap for insulators is greater than 3 eV.

21. Answer (4)

Hint & Sol.: Photoelectric effect involves elastic collision between photon and electron and in accordance with energy conservation.

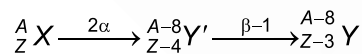
Photoelectric current is directly proportional to intensity of incident light. Einstein explained observations of photoelectric emission on the basis of photon as particles of light.

22. Answer (3)

Hint: In α -decay, mass number A decreases by 4 and atomic number Z decreases by 2.

In β^- -decay, mass number A remains same and atomic number Z increases by +1.

Sol.:



23. Answer (4)

Hint & Sol.: If p-type semiconductor is at higher potential and n-type semiconductor is at lower potential then p-n junction diode is forward biased.

24. Answer (3)

Hint: Wavelength of photon when an electron makes transition is given by, $\frac{1}{\lambda} = Rz^2 \left[\frac{1}{n_1^2} - \frac{1}{n_2^2} \right]$

Sol.: We know, $\frac{1}{\lambda} = Rz^2 \left[\frac{1}{n_1^2} - \frac{1}{n_2^2} \right]; n_1 = 1, n_2 = 2$

$$\Rightarrow \frac{1}{\lambda} \propto z^2 \Rightarrow \frac{1}{\lambda_1} : \frac{1}{\lambda_2} : \frac{1}{\lambda_3} = 1 : 1 : 9$$

$$\Rightarrow \lambda_1 = \lambda_2 = 9\lambda_3$$

25. Answer (2)

Hint: Current through battery, $i = \frac{V - V_d}{R}$

$$\text{Sol.} : 4 \times 10^{-3} = \frac{10 - 0.7}{R}$$

$$\Rightarrow R = \frac{9.3}{4 \times 10^{-3}} = 2325 \Omega$$

26. Answer (1)

Hint: No current will flow through the bulb only when both the switches are in closed position.

Sol.: The truth table will be:

x	y	z
0	0	1
0	1	1
1	0	1
1	1	0

This is the truth table of NAND gate.

27. Answer (4)

Hint & Sol.: Conductivity of pure silicon can be increased by increasing the temperature and by doping with acceptor as well as donor impurities.

28. Answer (1)

Hint: Binding energy per nucleon is the measure of stability.

$$\text{Sol.} : \left(\frac{\text{B.E.}}{\text{nucleon}} \right) P = 5$$

$$\left(\frac{\text{B.E.}}{\text{nucleon}} \right) Q = 16$$

$$\left(\frac{\text{B.E.}}{\text{nucleon}} \right) R = 12$$

$\Rightarrow Q$ is most stable and P is least stable.

29. Answer (3)

Hint & Sol.: Semiconductor in thermal equilibrium follows $n_i^2 = n_e n_h$

30. Answer (3)

Hint: Work function $\phi_0 = h\nu_0$

$$\text{Sol.} : \text{Work function } \phi_0 = h\nu_0 = \frac{6.67 \times 10^{-34} \times 0.72 \times 10^{15}}{1.6 \times 10^{-19}} \text{ eV}$$

$$= 3 \text{ eV}$$

31. Answer (3)

Hint & Sol.: All photons of a particular frequency (ν) or wavelength (λ) have the same energy (E) and momentum (P) whatever the intensity of radiation may be.

32. Answer (4)

Hint & Sol.: We know that radius of orbit, $r \propto \frac{n^2}{Z}$

i.e. the variation would be parabolic.

33. Answer (4)

Hint: Use equation, $E = -Z^2 \frac{(13.6)}{n^2} \text{eV}$

$$\text{Sol.} \quad E = -Z^2 \frac{(13.6)}{n^2} \text{eV}$$

For Li^{+2} , $Z = 3$

And for second excited state $n = 3$

$$E = -(9) \frac{13.6}{9} \text{eV}$$

\therefore Ionisation energy for second excited state of Li^{+2} is 13.6 eV

34. Answer (3)

Hint: Wavelength of emitted photon in an electronic transition is given by $\lambda = \frac{hc}{\Delta E}$

$$\text{Sol.} \quad \lambda = \frac{hc}{\Delta E}$$

$$\lambda_1 = \frac{hc}{\Delta E_1}$$

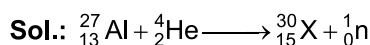
$$\lambda_2 = \frac{hc}{\Delta E_2}$$

$$\frac{\lambda_1}{\lambda_2} = \frac{\Delta E_2}{\Delta E_1} = \frac{\left(\frac{4}{3}E - E\right)}{(3E - E)} = \frac{1}{2}$$

$$= \frac{1}{6}$$

35. Answer (2)

Hint: In a nuclear reaction the mass number and atomic number on both sides would be equal.



36. Answer (1)

$$\text{Hint: } E = \Delta m \times c^2$$

$$\text{Sol.: } E = 0.01585 \times c^2 \times 931$$

$$E = 0.01585 \times 931 = 14.756 \text{ MeV}$$

37. Answer (1)

Hint & Sol.: In forward bias, the net flow of electrons is from n -side to p -side.

38. Answer (3)

$$\text{Hint: Use } \Delta E = h \frac{c}{\lambda}$$

$$\text{Sol.: } E_3 - E_2 = h \frac{c}{\lambda}$$

$$\lambda = \frac{6.64 \times 10^{-34} \times 3 \times 10^8}{13.6 \left[-\frac{1}{9} + \frac{1}{4} \right] \times 1.6 \times 10^{-19}}$$

$$\lambda = 6.59 \times 10^{-7} = 6590 \text{ \AA}$$

39. Answer (4)

Hint & Sol.: For electron emission, incident frequency (ν) should be greater than or equal to threshold frequency (ν_0) or incident wavelength (λ) should be less than or equal to threshold wavelength (λ_0).

40. Answer (4)

Hint & Sol.: The maximum kinetic energy above the threshold frequency of the emitted photoelectrons is a function of frequency of incident radiation but is not a function of intensity.

41. Answer (3)

$$\text{Hint: de Broglie wavelength } \lambda = \frac{h}{p} = \frac{h}{\sqrt{2mE}}$$

$$\text{Sol.: } \lambda = \frac{h}{\sqrt{2mE}}$$

$$\lambda \propto \frac{1}{\sqrt{E}}$$

$$\frac{\lambda_1}{\lambda_2} = \sqrt{\frac{E_2}{E_1}}$$

$$\frac{\lambda}{\lambda/2} = \sqrt{\frac{E_2}{E_1}}$$

$$4E_1 = E_2$$

$$\% \text{ change in energy} = \frac{E_2 - E_1}{E_1} \times 100 = 300\%$$

42. Answer (1)

Hint: Use Einstein's photoelectric equation,

$$K.E._{\max} = h\nu - h\nu_0$$

Sol.: $K.E._{\max} = h\nu - h\nu_0$

$$\frac{1}{2}mv^2 = h[10\nu_0 - \nu_0] \dots(1)$$

$$\frac{1}{2}mv'^2 = h[2\nu_0 - \nu_0] \dots(2)$$

$$\frac{(6 \times 10^6)^2}{v'^2} = \frac{9\nu_0}{\nu_0}$$

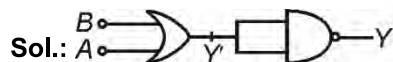
$$v'^2 = \left(\frac{6 \times 10^6}{3}\right)^2 = (2 \times 10^6)^2$$

$$v' = 2 \times 10^6 \text{ units}$$

43. Answer (3)

Hint: Use Boolean Expression

$$\overline{A \cdot A} = \overline{A}$$



$$Y' = A + B$$

$$Y = \overline{Y'} = \overline{A + B}$$

$$= \overline{A + B} = \text{NOR Gate}$$

44. Answer (4)

Hint & Sol.: All nuclear reactions obey mass-energy conservations.

45. Answer (2)

Hint: $\Delta E = h\nu$

Sol.: Series limit for Lyman series

$$n_2 = \infty \text{ to } n_1 = 1$$

$$h\nu_0 = E_{\text{final}} - E_{\text{initial}} = 0 - (-13.6)$$

$$h\nu_0 = 13.6 \text{ eV}$$

Series limit for Balmer series

$$n_2 = \infty \text{ to } n_1 = 2$$

$$h\nu = 0 - (-3.4) = 3.4 \text{ eV}$$

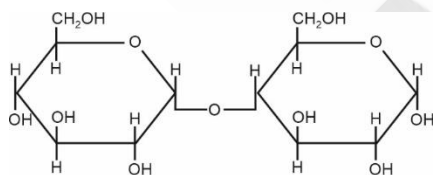
$$v = \frac{\nu_0}{4}$$

[CHEMISTRY]

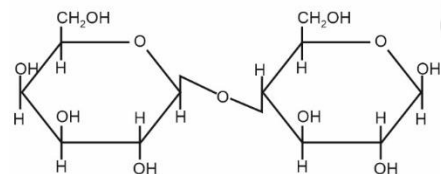
46. Answer (2)

Hint: Maltose is composed of two α -D-glucose units.

Sol.:



Maltose



Lactose

47. Answer (2)

Hint: Keratin and myosin are fibrous proteins.

Sol.: Albumins and Insulin are globular proteins.

48. Answer (3)

Hint: Molecule without any symmetry will be chiral and optically active.

Sol.: Glycine does not contain chiral centre. Therefore it is an achiral molecule.

49. Answer (4)

Hint: Vitamin A, D, E and K are fat soluble.

Sol.: Vitamin B and Vitamin C are water soluble.

50. Answer (1)

Hint & Sol.: Glucose reacts with Br_2 water to form Gluconic acid.

51. Answer (1)

Hint: Nucleoside is formed by attachment of nitrogenous base with pentose sugar.

Sol. RNA contains uracil instead of thymine.

52. Answer (1)

Hint: Glutamic acid, Aspartic acid, Cystine and Tyrosine are non-essential amino acids.

Sol.: Arginine, Isoleucine and threonine are essential amino acids.

53. Answer (3)

Hint: Vitamin A deficiency causes Xerophthalmia.**Sol.:** Vitamin B₁ → Beri beriVitamin B₂ → Cheilosis

Vitamin D → Rickets

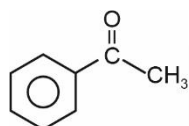
54. Answer (1)

Hint: Glucose has aldehyde group so it is an aldohexose.**Sol.:** Glucose does not form the hydrogen sulphite addition product with NaHSO₃.

55. Answer (4)

Hint: Amylose constitutes about 15-20% of Starch.**Sol.:** Amylopectin constitutes about 80-85% of starch.

56. Answer (4)

Hint: Compound with $\text{CH}_3 - \overset{\text{O}}{\parallel}{\text{C}} -$ gives positive Iodoform test.**Sol.:**  gives positive Iodoform test.

57. Answer (2)

Hint: $\text{H}^+ + \text{OH}^- \rightarrow \text{H}_2\text{O}$; $\Delta H = -57.1 \text{ kJ mol}^{-1}$ **Sol.:** Heat evolved on neutralisation of 1 mol NaOH with 1 mol HCl is nearly 57.1 kJ/mol

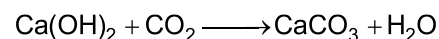
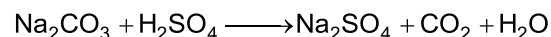
58. Answer (3)

Hint: $[\text{Fe}(\text{SCN})]^{2+} \rightarrow$ Blood red**Sol.:** $\text{Fe}_4[\text{Fe}(\text{CN})_6]_3 \cdot x\text{H}_2\text{O} \rightarrow$ Prussian blue

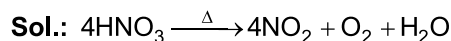
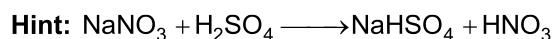
59. Answer (4)

Hint: Colloidal particles ranges from 1-1000 nm.**Sol.:** Lyophilic sols are reversible sols.

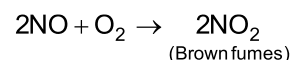
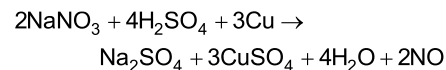
60. Answer (3)

Hint: CO₂ gas is evolved when CO₃²⁻ is present in salt.**Sol.:**

61. Answer (3)



On addition of Cu turnings.



62. Answer (1)

Hint:

Percentage purity

$$= \frac{\text{Mass of pure substance}}{\text{Mass of sample}} \times 100$$

Sol.: 10 mL of 0.1 N KMnO₄ correspond to= 0.001 eq. KMnO₄

0.001 eq. Mohr's salt is reacted.

$$\begin{aligned} \text{Mass of Mohr's salt} &= 0.001 \times 392 \\ &= 0.392 \text{ g} \end{aligned}$$

$$\% \text{ purity} = \frac{0.392}{0.98} \times 100 = 40\%$$

63. Answer (3)

Hint: Generally coupling reaction with benzene diazonium salt produces coloured dye.**Sol.:** β-Naphthol reacts with Benzene diazonium salt to produce scarlet red dye.

64. Answer (1)

Hint: Metal salts impart characteristic colour to the flame test.**Sol.:**Cu²⁺ → Green flame with blue centreSr²⁺ → Crimson redBa²⁺ → Apple greenCa²⁺ → Brick red

65. Answer (2)

Hint: PbCrO₄ is insoluble in water and it forms a yellow ppt.**Sol.:**

66. Answer (4)

Hint: Al^{3+} , Ni^{2+} , Ca^{2+} and Cu^{2+} belongs to group III, IV, V and II respectively in qualitative analysis of cations.

Sol.: $\text{Al}^{3+} \rightarrow \text{NH}_4\text{OH}$ in presence of NH_4Cl

$\text{Ni}^{2+} \rightarrow \text{H}_2\text{S}$ in presence of NH_4OH

$\text{Ca}^{2+} \rightarrow (\text{NH}_4)_2\text{CO}_3$ in presence of NH_4OH

$\text{Cu}^{2+} \rightarrow \text{H}_2\text{S}$ gas in presence of dil. HCl .

67. Answer (1)

Hint: HF forms intermolecular H-Bonds.

Sol.: Due to H-bonding the Boiling point order is $\text{HF} > \text{HI} > \text{HBr} > \text{HCl}$

68. Answer (4)

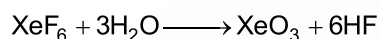
Hint : Cl_2 gets disproportionated in basic medium.

Sol.: $2\text{NaOH} + \text{Cl}_2 \xrightarrow{\text{(cold and dilute)}} \text{NaOCl} + \text{NaCl} + \text{H}_2\text{O}$

69. Answer (3)

Hint: XeF_2 , XeF_4 and XeF_6 are colourless crystalline solids.

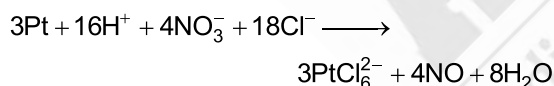
Sol.:



70. Answer (1)

Hint: When three parts of concentrated HCl and one part of concentrated HNO_3 are mixed, aqua regia is formed.

Sol.:



71. Answer (4)

Hint: $\text{Cl}_2 + \text{H}_2\text{O} \longrightarrow 2\text{HCl} + \text{O}$

Sol.: HCl reacts with finely powdered iron to form FeCl_2 because liberation of H_2 prevents formation of FeCl_3 .

72. Answer (3)

Hint: Due to small size of fluorine atom, there are strong inter electronic repulsion so fluorine has less negative electron gain enthalpy than that of Cl .

Sol.:

Element	$\Delta_{\text{eg}}\text{H}/(\text{kJ mol}^{-1})$
F	-333
Cl	-349
Br	-325
I	-296

73. Answer (2)

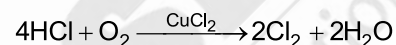
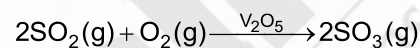
Hint: Xe forms various compounds with F_2 under appropriate experimental conditions.

Sol.: $\text{Xe}(\text{g}) + 2\text{F}_2(\text{g}) \xrightarrow[1:5 \text{ ratio}]{873\text{K}, 7\text{bar}} \text{XeF}_4(\text{s})$

74. Answer (3)

Hint: $\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightleftharpoons 2\text{NH}_3(\text{g})$, catalyst is used Iron oxide with small amounts of K_2O and Al_2O_3 .

Sol.: $4\text{NH}_3 + 5\text{O}_2 \xrightarrow[500\text{K}, 9 \text{ bar}]{\text{Pt/Rh gauge}} 4\text{NO}(\text{g}) + 6\text{H}_2\text{O}$



75. Answer (3)

Hint: Due to resonance, two oxygen-oxygen bond lengths are identical in ozone molecule.

Sol.: $\text{O}_3 \longrightarrow \text{O}_2 + \text{O}$

Formation of O_3 from O_2 is endothermic process.

76. Answer (3)

Hint: In group 16 hydrides (E - H) bond dissociation enthalpy decreases down the group.

Sol.: Due to decrease in bond dissociation enthalpy, acidic character increases.

77. Answer (2)

Hint : Gypsum $\rightarrow \text{CaSO}_4 \cdot 2\text{H}_2\text{O}$

Sol.: Epsom salt $\rightarrow \text{MgSO}_4 \cdot 7\text{H}_2\text{O}$

Baryte $\rightarrow \text{BaSO}_4$

Galena $\rightarrow \text{PbS}$

78. Answer (1)

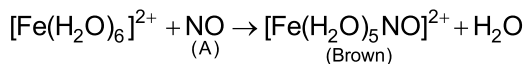
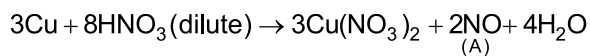
Hint: White phosphorus is insoluble in water but soluble in CS_2 .

Sol.: Red phosphorus is insoluble in water as well as in CS_2 .

79. Answer (2)

Hint: $[\text{Fe}(\text{H}_2\text{O})_5(\text{NO})]^{2+}$ is brown coloured complex.

Sol.:



80. Answer (2)

Hint: NH_3 has high boiling point due to H-Bonding.

Sol.:

Compound **Boiling Point/K**

NH_3 238.5

PH_3 185.5

AsH_3 210.6

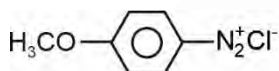
SbH_3 254.6

BiH_3 290

81. Answer (1)

Hint: Electron donating group at para position stabilise benzene diazonium salt by +R effect or +I effect.

Sol.: Due to +M effect of $-\text{OCH}_3$ group in

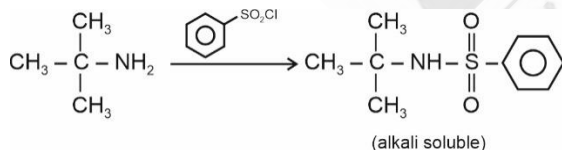


It is most stable.

82. Answer (4)

Hint: Product of reaction of 1° amine with Hinsberg's reagent is alkali soluble.

Sol.:



83. Answer (3)

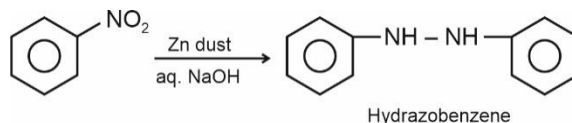
Hint : Oxygen in hydroxyl group of Butan-1-ol is more electronegative than the nitrogen in the NH_2 group of butan-1-amine.

Sol.: The difference in electronegativity leads to stronger intermolecular H-bonding between butan-1-ol and water molecules as compared to butan-1-amine and water.

84. Answer (2)

Hint: Nitrobenzene gives different products in alkaline medium.

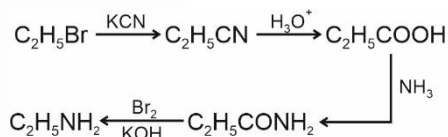
Sol.:



85. Answer (3)

Hint: Cyanide on complete hydrolysis gives carboxylic acid.

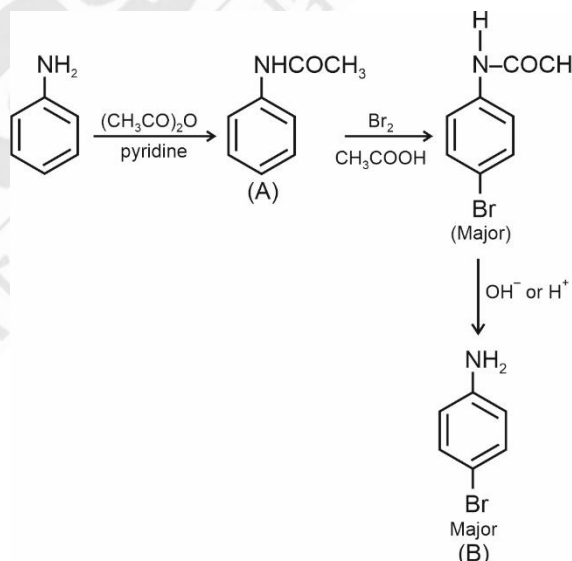
Sol.:



86. Answer (3)

Hint: For the formation of monosubstituted aniline derivative, the activating effect of $-\text{NH}_2$ group should be controlled.

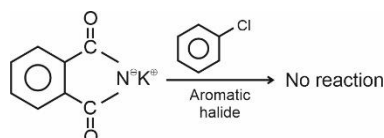
Sol.:



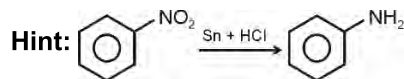
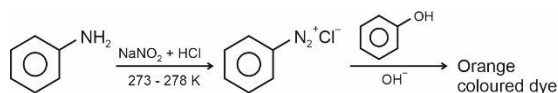
87. Answer (2)

Hint: Aromatic 1° amine cannot be prepared by Gabriel phthalimide synthesis.

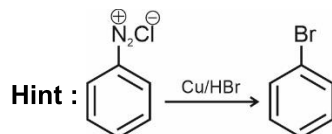
Sol.:



88. Answer (1)

**Sol.:**

89. Answer (1)

**Sol.:** The given reaction is known as Gattermann reaction.

90. Answer (1)

Hint: Smaller the value of pK_b , stronger is the base.

Sol.: Amine	pK_b value
Benzenamine	9.38
Methanamine	3.38
N-Methylmethanamine	3.27
N, N-Dimethylmethanamine	4.22

[BOTANY]

91. Answer (4)

Hint: For a small area the value of slope of regression (z) lies between 0.1 - 0.2.**Sol.:** The relationship between species richness and area is a straight line on a log scale.

92. Answer (4)

Hint: Scandinavian countries like Norway have low ecological diversity.**Sol.:** Sarguja and Bastar are sacred groves located in Madhya Pradesh.

93. Answer (4)

Hint: National parks and biosphere reserves are *in-situ* conservation.**Sol.:** Gene banks are a method of *ex-situ* conservation.

94. Answer (1)

Hint: Ecosystem was compared to the aeroplane in rivet popper hypothesis.**Sol.:** Rivets on the wings of aeroplane represent, "key species" in an ecosystem.

95. Answer (4)

Hint: The slope of regression is much steeper for large areas.**Sol.:** The value of 'Z' for large areas like entire continents is 0.6 - 1.2.

96. Answer (4)

Hint: Aquariums have low productivity.**Sol.:** Croplands such as sugarcane fields are the most productive ecosystems.

97. Answer (1)

Hint: Many of the microbial species cannot be cultured.**Sol.:** Microscopy alone will not be able to distinguish microorganisms.

98. Answer (4)

Hint: Fragmentation is the process of eating and pulverization of detritus into fine particles.**Sol.:** Key industry animals are first order consumers. Fragmentation is performed by earthworms.

99. Answer (4)

Hint: Organism X can be a Hawk or parasites.**Sol.:** Therefore, the pyramid of number will be inverted or spindle shaped when 'X' is considered parasites or hawk respectively.

100. Answer (4)

Hint: Pyramid of biomass in an aquatic ecosystem is generally inverted**Sol.:** Pyramid of number in a tree ecosystem can be inverted or spindle shaped.

101. Answer (2)

Hint: Loss of biodiversity leads to decreased ecosystem stability and services.**Sol.:** There is more opportunity of disease emergence, due to loss of biodiversity.

102. Answer (4)

Hint & Sol.: Higher plants as well as higher animals both show sexual reproduction hence this is not a major reason for more diversification of animals than plants.

103. Answer (3)

Hint: Lichens share the least proportion in biodiversity.

Sol.: B – Angiosperm

E – Fungi

A – Algae

C – Mosses

D – Lichens

104. Answer (4)

Hint & Sol.: Herbivores are accommodated in the ecological pyramids.

105. Answer (3)

Hint: Net primary productivity is the available biomass for consumption to heterotrophs (T_2).

Sol.: Net primary productivity is less than the GPP (Gross Primary Productivity). It is GPP-Respiratory loss.

106. Answer (2)

Hint: Plants account for nearly 22% of the total species

Sol: Number of angiosperms is not more than the total number of species of fungi, lichens, algae and ferns taken together.

107. Answer (1)

Hint: India is among the 12 mega diversity regions of the world.

Sol.: India has only 2.4% of the world's land area and possesses 8.1% species diversity of the world.

108. Answer (4)

Hint: According to IUCN Red list (2004), birds are least vulnerable to extinction.

Sol.: Amphibians as a group are the most vulnerable to extinction as these organisms require both land and aquatic habitat.

109. Answer (4)

Hint: African catfish is posing threat to our rivers.

Sol.: Introduction of the Nile perch into the lake Victoria led to the extermination of a unique assemblage of more than 200 species of cichlid fishes.

110. Answer (2)

Hint: Decomposers are saprophytic organisms which feed on dead remains of plants and animals.

Sol.: They secrete digestive enzymes, which convert complex organic substances into simpler ones.

111. Answer (3)

Hint & Sol.: The rate of production of organic matter by the consumers is called secondary productivity.

112. Answer (3)

Hint: Species, more susceptible to extinction generally occupy higher trophic level in the food chain.

Sol.: Species having high reproductive rate and occupying lower trophic levels are generally less susceptible to extinction.

113. Answer (2)

Hint: Edward Wilson - Popularized the term biodiversity.

Sol.: Robert May estimated the global species diversity to be about 7 million.

114. Answer (3)

Hint: Organisms at A, B and D can be herbivore or omnivore.

Sol.: A – Sparrow (Omnivore)

B – Insect (Herbivore)

C – Frog (Carnivore)

D – Mice (Omnivore)

115. Answer (4)

Hint: Light availability decreases with depth in oceans.

Sol.: Nitrogen is the most limiting nutrient in the marine ecosystem.

116. Answer (3)

Hint: The World Summit (2002) was held in Johannesburg, South Africa.

Sol.: The Earth Summit (1992) was held in Rio de Janeiro, Brazil.

117. Answer (3)

Hint: Broadly utilitarian ecosystem services do not have a direct economic benefit.

Sol.: Coir, Drugs, furniture, fruit, dyes are narrowly utilitarian services.

118. Answer (4)

Hint: Wild life sanctuaries are *in-situ* conservation method.

Sol.: (i) Buffer zone, which is sandwiched between transition and core zone is generally an area marked for research and educational activities.

(ii) Thylacine is a carnivorous marsupial that became extinct from Australia.

119. Answer (1)

Hint: Primary productivity can be expressed in terms of weight or energy.

Sol.: Primary productivity of the ecosystem is expressed as $(\text{gm m}^{-2}) \text{yr}^{-1}$ or $(\text{kcal m}^{-2}) \text{yr}^{-1}$

120. Answer (2)

Hint: Ecological pyramids don't accommodate food webs as they only assume simple food chains.

Sol.: In terrestrial ecosystems, a much larger fraction of energy flows through DFC than through GFC. NPP is available for both herbivores and decomposers.

121. Answer (2)

Hint: Stratification is a structural aspect of the ecosystem.

Sol.: Stratification is the vertical distribution of different species occupying different levels.

122. Answer (1)

Hint & Sol.: Habitat loss and fragmentation is the most important cause of biodiversity loss among the "Evil Quartet".

123. Answer (1)

Hint: Variation seen within a species is due to genetic diversity.

Sol.: Variation in potency and concentration of reserpine produced by *Rauwolfia vomitoria* is due to genetic diversity.

124. Answer (1)

Hint: Standing crop is expressed in terms of fresh or dry weight.

Sol.: Standing crop is the amount of living material present in different trophic levels at a given time.

125. Answer (4)

Hint: Availability of solar radiations, soil moisture, temperature and nutrients are abiotic factors affecting magnitude of primary productivity.

Sol.: The plant factor affecting the magnitude of primary productivity is photosynthetic capacity of the producers.

126. Answer (1)

Hint: GFC is the major conduit of energy in an aquatic ecosystem

Sol.: In parasitic or auxilliary food chain, parasites are present at the top trophic levels and therefore the size of the organism does reduce.

127. Answer (3)

Hint: Rivet popper hypothesis explains the effect of reduction in biodiversity in the ecosystem.

Sol.: Rivet popper hypothesis was proposed by Paul Ehrlich.

128. Answer (1)

Hint: Food web is a network of interconnected food chains

Sol.: Food web provide stability to the ecosystem as food chains are interconnected at different trophic levels in a biotic community, providing diverse food options.

129. Answer (2)

Hint: Cryopreservation is the preservation of gametes of threatened species in a viable and fertile condition.

Sol.: (i) Sacred groves – Last refuge of large number of rare and threatened plants.

(ii) Endemism – Species confined to a region and not found anywhere else.

(iii) Co-extinction – Seen in obligate associations

130. Answer (2)

Hint: Decomposition of detritus is slow if it contains tannins, cellulose and phenolics.

Sol.: The factor which contributes to a faster rate of decomposition is tropical humid environment, and presence of aeration.

131. Answer (2)

Hint: Transfer of energy across the trophic levels follows the 10% law.

Sol.:

Grass $\xrightarrow{10\%}$ Grasshopper $\xrightarrow{10\%}$ Snake $\xrightarrow{\quad}$ Eagle
 $\left(\begin{smallmatrix} 200 \text{ J} \\ T_1 \end{smallmatrix} \right)$ $\left(\begin{smallmatrix} 20 \text{ J} \\ T_2 \end{smallmatrix} \right)$ $\left(\begin{smallmatrix} 2 \text{ J} \\ T_3 \end{smallmatrix} \right)$ $\left(\begin{smallmatrix} 0.2 \text{ J} \\ T_4 \end{smallmatrix} \right)$

132. Answer (3)

Hint & Sol.: Annual productivity of the oceans is 55 billion tons.

133. Answer (3)

Hint: Productivity and energy flow are functional aspects of the ecosystem.

Sol.: Species composition is not a functional aspect of the ecosystem but a structural aspect of the ecosystem.

134. Answer (4)

Hint: Temperate areas have undergone frequent glaciations in the past.

Sol.: Tropical communities receive more sunlight over the year and therefore they are more productive and can support wider range of species.

135. Answer (3)

Hint: Anthropogenic ecosystem has little diversity and no self-regulatory mechanism.

Sol.: Anthropogenic ecosystems have a simple food chain

[ZOOLOGY]

136. Answer (4)

Hint: Also called GMO

Sol.: Animals that have had their DNA manipulated to possess and express an extra (foreign) gene are known as transgenic animals. Genetically identical copy of a cell, tissue or organism created through asexual reproduction or artificial methods is called clone.

137. Answer (1)

Hint: Nutritionally a more balanced product.

Sol.: In 1997, the first transgenic cow, Rosie produced human protein-enriched milk (2.4 gms/litre). The milk contained the human alpha-lactalbumin and was nutritionally a more balanced product for human babies than natural cow milk.

138. Answer (1)

Hint: Vaccine for infantile paralysis

Sol.: Many transgenic animals have been produced like rabbits, pigs, sheep, cows and fishes. Over 95 per cent of all the existing transgenic animals are mice.

- Transgenic mice are being used to test the safety of the polio vaccine.
- There is no vaccine for AIDS/HIV.

139. Answer (2)

Hint: Varieties of Basmati rice in India is in lakhs

Sol.: The diversity of rice in India is one of the richest in the world. There are an estimated 200,000 varieties of rice in India alone.

Basmati rice is distinct for its unique aroma and flavour and 27 documented varieties of Basmati are grown in India.

140. Answer (2)

Hint: It is illegal copying

Sol.:

- Biopatent gives right to patent holder to control their biological products or processes for a set period of time.
- Bioweapons are disease-causing organisms and toxins to harm or kill animals/plants/humans.

141. Answer (2)

Hint: Solves the problem of night blindness

Sol.: Golden rice is a promising transgenic crop. It contains β -carotene, a precursor of vitamin-A. This crop is developed to overcome the deficiency of vitamin-A. Deficiency of vitamin-A may cause night blindness and skin problems.

142. Answer (2)

Hint: Produced from Tracy, the transgenic sheep.

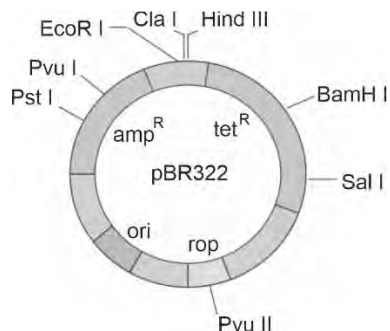
Sol.: Transgenic animals that produce useful biological products can be created by the introduction of the portion of DNA (or genes) which codes for a particular product such as human protein (α -1-antitrypsin) used to treat emphysema. α -lactalbumin is a protein present in human milk.

143. Answer (2)

Hint: pBR322 has amp^R and tet^R genes.

Sol.: *Hind* II is the first discovered restriction enzyme whose functioning depends on a specific nucleotide sequence.

- pBR322 possesses *ori*, *rop*, amp^R and tet^R genes.
- *rop* codes for the proteins involved in the replication of the plasmid.



144. Answer (2)

Hint: Histone is a protein.

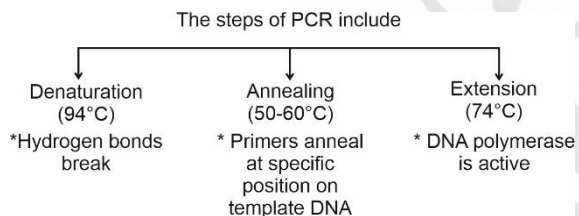
Sol.:

DNA ligase	Joins the DNA fragments
DNA polymerase	Extends primers on genomic DNA template
Ribonuclease	Hydrolyses RNA
Protease	Hydrolyses histones (proteins)

145. Answer (1)

Hint: Annealing occurs at 50–60°C.

Sol.:



146. Answer (3)

Hint: Has single recognition site

Sol.: *E. coli* cloning vector pBR322 has restriction sites (*Hind* III, *Eco* RI, *Bam* HI, *Sal* I, *Pvu* I, *Pvu* II, *Pst* I, *Cla* I), *ori* and genes encoding antibiotic resistance (*amp*^R and *tet*^R). *rop* codes for the proteins involved in the replication of the plasmid. *tet*^R contains restriction sites for *Bam*HI and *Sal* I while *amp*^R contains restriction for *Pvu* I and *Pst* I.

147. Answer (3)

Hint: Colonies will be blue coloured.

Sol.: The *lac-Z* gene produces the enzyme β -galactosidase that cleaves the X-gal and produces blue colour. Hence, the recombinants will be visible as blue coloured colonies. The *lac-Z* is inserted within the coding sequence of *amp*^R gene hence, the recombinants will be ampicillin sensitive.

148. Answer (2)

Hint: Polymerase belongs to the class 'Transferases'

Sol.: Amplification of DNA in PCR is achieved by the use of a thermostable DNA polymerase, *i.e.*, *Taq* polymerase, isolated from a bacterium, *Thermus aquaticus*. This enzyme remains active during the high temperature induced denaturation of dsDNA.

It is used in extension step of the PCR cycle.

149. Answer (3)

Hint: Does not belong to the phylum Aschelminthes

Sol.: Specific Bt toxin genes were isolated from *Bacillus thuringiensis* and incorporated into several crop plants, such as cotton. The choice of genes depends upon the crop and the targeted pest, as most Bt toxins are insect-group specific. The toxin is coded by a gene, named *cry*. There are a number of them, for example, the proteins encoded by the gene *cry*I*Ac* and *cry* II*Ab* control the cotton bollworms, that of *cry*I*Ab* controls corn borer.

Roundworms are aschelminths.

150. Answer (3)

Hint: Retroviruses are used as a vector.

Sol.: *Flavr Savr* tomato is genetically engineered for increased shelf life.

Agrobacterium is the natural genetic engineer of plants.

GEAC makes decisions regarding the validity of GM organisms for public services.

151. Answer (3)

Hint: The clinical uses of gene therapy are not limited to treatment of inherited disease.

Sol.: Most cancers results from activation of an oncogene that leads to tumour formation, or inactivation of a gene that normally suppresses formation of tumour.

In both cases, gene therapy could be envisaged to treat the cancer.

152. Answer (2)

Hint: The number of recombinant therapeutics in India is equal to the number of thoracic vertebrate in man.

Sol.: At present, about 30 recombinant therapeutics have been approved for human use the world over. In India, 12 of these are presently being marketed.

153. Answer (1)

Hint: Unpredictable result**Sol.:** Genetic modification of organisms can have unpredictable results when such organisms are introduced into the ecosystem.

Indian Basmati was crossed with semi-dwarf varieties and claimed as an invention or novelty.

154. Answer (4)

Hint: Gene-gun is suitable for plants.**Sol.:** There are many ways to introduce alien DNA into host cells. In a method known as micro-injection, rDNA is directly injected into the nucleus of an animal cell.

- Biolistics or gene gun method is suitable for plant cells.
- Heat shock method enables the bacteria to take up the recombinant DNA by incubating the cells on ice, followed by placing them briefly at 42°C, and then putting them back on ice.

155. Answer (4)

Hint: Provides resistance against Cotton bollworm**Sol.:**

- Proteins encoded by gene *cry IAc* controls cotton bollworms.
- *Cla* I, *Pst* I and *Bam* HI restriction enzymes have restriction sites within pBR322 vector.

156. Answer (2)

Hint: After 1980**Sol.:** In 1997, the first transgenic cow, Rosie, produced human protein enriched milk (2.4 gms/litre). In 1963, the two enzymes responsible for restricting the growth of bacteriophage in *E.coli*.

157. Answer (3)

Hint: Selectable markers help in their identification.**Sol.:** Transformation is a procedure through which a piece of DNA is introduced in a host bacterium. Selectable marker helps in identifying and eliminating non-transformant and selectively permitting the growth of transformants.

- Gel electrophoresis is used to separate the digested DNA fragments.
- Spooling is used to isolate long strands of DNA onto a glass rod or wooden stick.

158. Answer (2)

Hint: The *lac-Z* gene codes for β -galactosidase.**Sol.:**

Column I	Column II
Retrovirus in animal	Transform normal cells into cancerous cells
<i>Agrobacterium tumefaciens</i>	Ti plasmid
<i>lac-Z</i> gene	Blue white screening
<i>Eco</i> RI	Type II restriction enzyme

159. Answer (1)

Hint: *Hind* II is type II restriction enzyme.**Sol.:** Restriction enzyme digestion is performed by incubating a purified DNA with restriction enzymes.

Restriction enzymes cut the strand of DNA a little away from the centre of the palindrome sites, but between the same two bases on the opposite strands.



These enzymes are used in genetic engineering to form 'recombinant' molecules of DNA.

160. Answer (2)

Hint: Formation of product is intended in upstream processing.**Sol.:** After completion of the biosynthetic stage, the product has to be subjected through a series of processes before it is ready for marketing as a finished product. The processes include separation and purification, which are collectively referred to as downstream processing. The product has to be formulated with suitable preservatives. Such formulation has to undergo through clinical trials as in case of drugs. Strict quality control testing for each product is also required.

161. Answer (2)

Hint: Equals to the total number of ear ossicles.**Sol.:** To produce large quantity of desired products, bioreactors are developed. A bioreactor provides the optimal conditions for achieving the desired product by providing optimum growth conditions like: temperature, pH, substrate, salts, vitamins, oxygen, stirrer, etc.

162. Answer (3)

Hint: Involves exponential phase.

Sol.: Continuous culture system produces a larger biomass leading to higher yields of desired protein.

As in a continuous culture system used medium is drained out from one side while fresh medium is added from the other to maintain the cells in their physiologically most active log/exponential phase.

163. Answer (3)

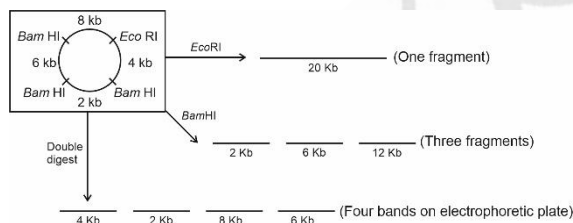
Hint: Bioreactors are used for large scale production.

Sol.: If any protein encoding gene expressed in a heterologous host, it is called a recombinant protein. The cells harbouring cloned genes of interest may be grown on a small scale in the lab and can be used for large-scale production.

164. Answer (2)

Hint: Unequal fragments will be obtained in any case.

Sol.:



165. Answer (1)

Hint: Test-tube baby programme involves IVF.

Sol.: Biotechnology deals with techniques of using live organisms or enzymes from organisms to produce products and processes useful to humans. In this sense, making curd, bread or wine, which are all microbe mediated processes, could also be thought as a form of biotechnology.

Many other processes are also included like, *in vitro* fertilisation leading to a 'test-tube' baby, synthesising a gene and using it, developing a DNA vaccine or correcting a defective gene are all part of biotechnology.

166. Answer (3)

Hint: This is the function of DNA ligase.

Sol.:

The cutting of DNA at specific location became possible with the discovery of the restriction enzymes.

Plasmid can be used as vector to deliver an alien piece of DNA into the host just like the malarial parasite is transferred by mosquito in human body, thus plasmids are also called vectors.

The linking of antibiotic resistance gene with the plasmid vector became possible with the help of ligase enzymes. Lyases are enzymes that catalyse the breaking of chemical bonds.

Transposons are mobile DNA sequences.

167. Answer (3)

Hint: It causes infection by contaminating food and water

Sol.: The construction of the 1st recombinant DNA emerged from the possibility of linking a gene encoding antibiotic resistance with a native plasmid of *Salmonella typhimurium*. Stanley Cohen and Herbert Boyer accomplished this in 1972 by isolating the antibiotic resistance gene by cutting out a piece of DNA from a plasmid which is responsible for conferring antibiotic resistance.

Pseudomonas putida: Used for cleaning oil spills.

Agrobacterium: Natural genetic engineer of plants.

168. Answer (1)

Hint: EcoRI comes from *Escherichia coli* RY13.

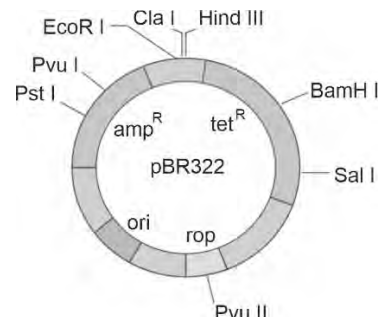
Sol.: Today we know more than 900 restriction enzymes that have been isolated from over 230 strains of bacteria each of which recognise different recognition sequences.

The convention for naming restriction enzymes is the first letter of the name comes from the genus and the second two letters come from the species of the prokaryotic cell from which they were isolated, e.g., EcoRI comes from *Escherichia coli* RY 13, the latter 'R' is derived from the name of strain.

169. Answer (1)

Hint: Less than 3

Sol.: Restriction site for *Hind* II is not present in pBR322.



170. Answer (2)

Hint: Eliminate a genetic sequence in pBR322 that initiates DNA replication.

Sol.: The ligation of alien DNA is carried out at a restriction site present in one of the two antibiotic resistant gene. An antibiotic resistance gene help in selecting the transformants and recombinants. Similarly in some plasmids an alternative selectable marker is developed *i.e.*, gene encoding for an enzyme, β -galactosidase.

ori gene is must for initiation of DNA replication.

171. Answer (2)

Hint: It is an enzyme that belongs to class III.

Sol.: Exonuclease and endonuclease used to hydrolyse phosphodiester bonds.

- Ligases join DNA fragments.
- Proteases break proteins.
- Lipases break lipids.

172. Answer (3)

Hint: Used prior autoradiography.

Sol.: A single stranded DNA or RNA, tagged with a radioactive molecule called probe is allowed to hybridise to its complementary DNA in a clone of cells followed by detection using autoradiography. The clone having the mutated gene will hence not appear on the photographic film, because the probe will not have complementarity with the mutated gene.

173. Answer (2)

Hint: Roundworms belong to this group.

Sol.: Some strains of *Bacillus thuringiensis* produce proteins that kill certain insects such as lepidopterans (tobacco budworm, armyworm), coleopterans (beetles) and dipterans (flies, mosquitoes).

174. Answer (2)

Hint: RNAi takes place in all the eukaryotic organisms.

Sol.: A nematode *Meloidogyne incognita* infects roots of tobacco plants and cause a great reduction in yield.

The transgenic plant developed with the help of the process called RNAi, can protected itself from this parasite. Using *Agrobacterium* vectors, nematode specific genes were introduced into the host plant.

175. Answer (4)

Hint: Carbohydrates are organic substances.

Sol.: The nutrient media for tissue culture must contain a carbon source such as sucrose and also inorganic salts, vitamins, amino acids and growth regulators like auxins, cytokinin, *etc.*

176. Answer (1)

Hint: Pro-hormone needs to be processed.

Sol.: In mammals, including humans, insulin is synthesised as a pro-hormone which contains an extra stretch called the C-peptide. The C-peptide is not present in the mature insulin and is removed during maturation into insulin.

177. Answer (2)

Hint: Exclude conventional methods of diagnosis

Sol.: Serum and urine analysis are conventional methods of diagnosis, early detection is not possible with them. Recombinant DNA technology, PCR (Polymerase Chain Reaction) and ELISA (Enzyme Linked Immuno-sorbent Assay) are some of the techniques that serve the purpose of early diagnosis.

178. Answer (2)

Hint: Member of this group causes AIDS

Sol.:

- *Agrobacterium* is a pathogen of several dicot plants.
- Ti plasmid of *Agrobacterium* infects dicot plants.
- In gene therapy, by using a retroviral vector, a functional ADA cDNA is introduced into lymphocytes.
- pBR322 is used as a cloning vector for *E. coli*.

179. Answer (1)

Hint: More than three

Sol.: Many transgenic animals are designed to increase our understanding of how genes contribute to the development of diseases. These are specially made to serve as model for human diseases so that investigation of new treatments for diseases is made possible. Today transgenic models exist for many human diseases such as cancer, cystic fibrosis, rheumatoid arthritis and Alzheimer's. Similar attempts are being made for treatment of PKU and emphysema. Transgenic mice are being used to test the safety of the polio vaccine.

180. Answer (3)

Hint: Bromophenol blue runs faster than the DNA sample.

Sol.: X-gal or 5-bromo-4-chloro-3-indolyl- β -D-galactopyranoside is cleaved β -galactosidase, a blue coloured precipitate.

Bromophenol blue is used as the tracking dye.

Etbr is an intercalating agent that intercalates with DNA, leading to fluorescence under UV light.




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