



Aakash

Medical | IIT-JEE | Foundations

Corporate Office: AESL, 3rd Floor, Incuspaze Campus-2, Plot no. 13, Sector-18, Udyog Vihar, Gurugram, Haryana-122015

FINAL TEST SERIES for NEET-2025

MM : 720

Test - 14

Time : 180 Mins.

Answers

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

Hints and Solutions

PHYSICS

(1) Answer : (4)

Solution:

Potential energy oscillates with twice the frequency that of the displacement.

(2) Answer : (2)

Solution:

$$11f_1 = 4f_2$$

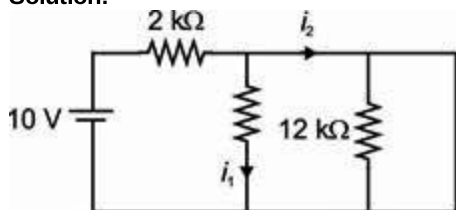
$$11 \times \frac{v}{4\ell_1} = 4 \frac{v}{2\ell_2}$$

(3) Answer : (2)

Solution:When amplitude of component waves are equal, amplitude of resultant, $R = 2A \cos\left(\frac{\phi}{2}\right)$

$$\text{Amplitude, } R = 2A \cos \frac{\pi}{6} = 2A \times \frac{\sqrt{3}}{2} = \sqrt{3}A$$

(4) Answer : (4)

Solution:

$$i_1 = 0$$

$$i_2 = \frac{10}{2 \times 10^3} = 5 \text{ mA}$$

(5) Answer : (1)

Solution:Rate of flow of heat \propto temperature difference

$$\frac{4}{Q} = \frac{10}{10}$$

$$Q = 4 \text{ J/s}$$

(6) Answer : (3)

Solution:

$$\frac{^{\circ}\text{C} - 0}{100 - 0} = \frac{K - 273}{373 - 273}$$

$$\frac{\Delta^{\circ}\text{C}}{100} = \frac{\Delta K}{100}$$

$$\Delta^{\circ}\text{C} = \Delta K$$

So change is 27 K

(7) Answer : (2)

Solution:

$$I_1 \omega_1 = I_2 \omega_2$$

$$\Rightarrow \omega_2 = \frac{I \omega}{\left(\frac{5}{4}\right) I} = \frac{4}{5} \omega$$

$$\% \text{ change} = \frac{\left(-\frac{\omega}{5}\right) \times 100}{\omega} = -20\%$$

(8) Answer : (1)

Solution:The P - V plot of an isobaric process is straight line parallel to volume axis.

(9) Answer : (3)

Solution:

$$\vec{v}_{rg} = \vec{v}_{rm} + \vec{v}_{mg}$$

$$v_{rg} = \sqrt{v_{rm}^2 + v_{mg}^2}$$

(10) Answer : (1)

Solution:

$$y = ax - \frac{bx^2}{2}$$

$$y = x \tan \theta \left[1 - \frac{x}{R} \right]$$

$$y = ax \left[1 - \frac{bx}{2a} \right]$$

So, $R = \frac{2a}{b}$

(11) Answer : (3)

Solution:

At point C, slope is maximum and slope of position-time plot gives velocity.

(12) Answer : (3)

Solution:

Static as well as kinetic friction does not depend on area of contact and limiting friction depends on normal reaction.

(13) Answer : (4)

Solution:

$$V_{r.m.s} = \sqrt{\frac{3RT}{M}}$$

$$V_0 = \sqrt{\frac{3RT_0}{M}}$$

$$V_1 = \sqrt{\frac{3RT_1}{M}}$$

$$\frac{V_1}{V_0} = \sqrt{\frac{T_1}{T_0}}$$

$$\sqrt{\frac{T_1}{T_0}} = \frac{1}{2}$$

$$T_1 = \frac{T_0}{4}$$

(14) Answer : (3)

Solution:

At equilibrium

$$F_{ST} = mg$$

$$\Rightarrow 2(T)l = mg \Rightarrow T = \frac{mg}{2l} = \frac{1.5 \times 10^{-2}}{60 \times 10^{-2}}$$

$$\Rightarrow T = 0.025 \text{ N m}^{-1}$$

(15) Answer : (2)

Solution:

Acceleration due to gravity inside the earth $g' = \frac{GM}{R^3} r$

Acceleration due to gravity outside the earth $g' = \frac{GM}{R^2 \left(1 + \frac{h}{R}\right)^2}$

(16) Answer : (1)

Solution:

A	B	Y
1	1	0
0	0	1
1	0	1
0	1	1

→ This is truth table of NAND gate

(17) Answer : (4)

Solution:



$Y = \frac{\text{Stress}}{\text{Strain}} \Rightarrow$ Slope of given graph is inversely proportional to young's modulus.

(18) Answer : (1)

Solution:

Velocity has unit and dimension of m/s and $[LT^{-1}]$ respectively, all other are dimensionless.

(19) Answer : (2)

Solution:

Maximum % error in $P = \frac{1}{2}[2 + 2 + (4 \times 2)] + 3$
 $= 9\%$

(20) Answer : (2)

Solution:

$$m_1 = 2 \text{ kg and } v_1 = \left(\frac{m_1 - m_2}{m_1 + m_2} \right) u_1 = \frac{u_1}{4}$$

$$m_2 = 1.2 \text{ kg}$$

(21) Answer : (4)

Solution:

$$W = \Delta k + \Delta U,$$

$$1600 = \left(\frac{1}{2} (10)v^2 \right) + (10 \times 10 \times 10) \Rightarrow 5v^2 = 600 ,$$

$$v^2 = 120 \Rightarrow v = 2\sqrt{30} \text{ m/s}$$

(22) Answer : (4)

Solution:

For rotational equilibrium, the body should have net torque to be equal to zero. A body can have net torque as zero even if net force is non-zero.

(23) Answer : (2)

Solution:

$$X_{\text{cm}} = \frac{4 \times 1 + 6 \times 3}{10} = 2.2 = \frac{11}{5}$$

$$Y_{\text{cm}} = \frac{4 \times 2 + 6 \times 4}{10} = 3.2$$

(24) Answer : (1)

Solution:

Since it falls with uniform velocity, then the forces should balance each other.

$$\Rightarrow mg = i \times l \times B$$

$$\text{Also } i = \frac{\epsilon}{R}, \text{ where } \epsilon = BlV_0$$

$$\Rightarrow mg = \frac{BlV_0}{R} l \times B$$

$$\Rightarrow mg = \frac{B^2 l^2 V_0}{R}$$

(25) Answer : (3)

Solution:

The waves, $Z_1 = a \cos (Kx - \omega t)$ and $Z_2 = a \cos (Kx + \omega t)$ will superimpose to give the standing wave.

(26) Answer : (2)

Solution:

$$E_{\text{ind}} = B \times l \times v$$

$$\Rightarrow E_{\text{ind}} = 4 \times 5 \cos 53^\circ \times 2$$

$$= 4 \times 3 \times 2 = 24 \text{ V}$$

(27) Answer : (1)

Solution:

$$U = \frac{1}{2} CV^2 = \frac{1}{2} \times 4 \times 10^{-6} \times 20 \times 20$$

$$= 800 \times 10^{-6} = 8 \times 10^{-4}$$

(28) Answer : (3)

Solution:

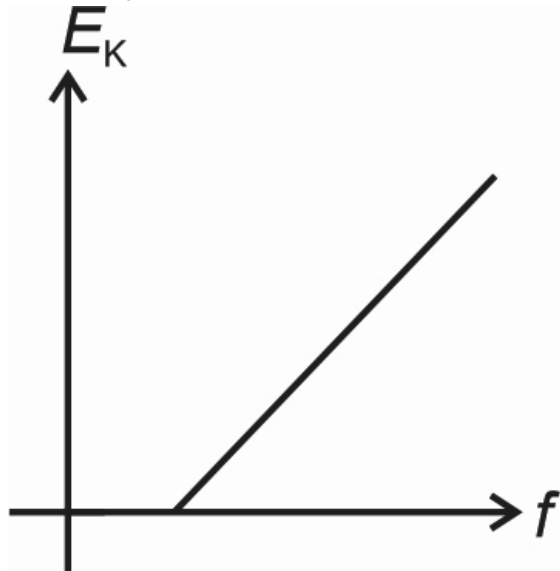
During charging of battery, the terminal potential difference is greater than emf.

An ideal battery has zero internal resistance.

(29) Answer : (3)

Solution:

$$E_K = hf - \phi_0$$



(30) Answer : (3)

Solution:

The change in pressure showed be transmitted undiminished.

$$\Rightarrow \Delta P = \frac{12 \times 10}{800 \times 10^{-4}} = \rho \times g \times h$$

$$\Rightarrow h = \frac{3}{20} \text{ m}$$

$$\Rightarrow h = 15 \text{ cm}$$

(31) Answer : (1)

Solution:

At resonance, $\omega L = \frac{1}{\omega C}$

$$\Rightarrow \omega^2 = \frac{1}{LC}$$

$$\Rightarrow \omega = \frac{1}{\sqrt{LC}}$$

$$\Rightarrow 2\pi f_r = \frac{1}{\sqrt{LC}}$$

$$\Rightarrow f_r = \frac{1}{2\pi\sqrt{LC}}$$

$$\text{If } L \rightarrow \frac{L}{2},$$

then C should be made $2C$ for same f_r .

(32) Answer : (4)

Solution:

$$\text{Since, } \frac{5}{10} = \frac{10}{20}$$

It is a condition of balanced Wheatstone bridge.

$$R_{eq} = \frac{15 \times 30}{45} = 10 \Omega$$

$$V = iR \Rightarrow 5 = i \times 10$$

$$\Rightarrow i = 0.5 \text{ A}$$

(33) Answer : (3)

Solution:

$$\text{For first surface } \rightarrow \frac{1.5}{v} - \frac{1.4}{u} = \frac{1.5-1.4}{R}$$

$$\text{For second surface } \rightarrow \frac{1.6}{v'} - \frac{1.5}{v} = \frac{1.6-1.5}{-R}$$

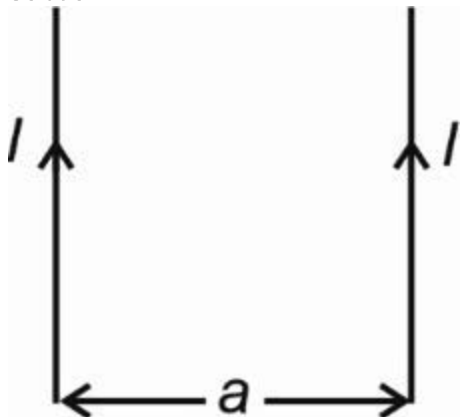
$$\Rightarrow \frac{1.6}{v'} - \frac{1.4}{u} = \frac{1}{R} [0.1 - 0.1]$$

$$\text{Put, } u = \infty \Rightarrow \frac{1.6}{f} = \frac{1}{R} [\text{Zero}]$$

$$\Rightarrow f \rightarrow \infty$$

(34) Answer : (3)

Solution:



$$B = \frac{\mu_0 I}{2\pi a}$$

$$\Rightarrow dF = \frac{\mu_0 I}{2\pi a} \times I \times dl$$

$$\Rightarrow \frac{dF}{dl} = \frac{\mu_0 I^2}{2\pi a}$$

(35) Answer : (2)

Solution:

$$\vec{\tau} = \vec{M} \times \vec{B}$$

$$\Rightarrow \tau = MB \sin \theta$$

Since loop is perpendicular to field, hence angle between magnetic moment and external magnetic field will either be zero or 180° , hence torque acting on loop will be zero.

(36) Answer : (2)

Solution:

According to Bohr's model, $mvr = \frac{n\hbar}{2\pi}$

(37) Answer : (2)

Solution:

Minimum wavelength denotes maximum energy.

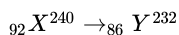
$$\Rightarrow \frac{1}{\lambda} = Rz^2 \left[\frac{1}{2^2} - \frac{1}{\infty} \right]$$

$$\frac{1}{\lambda} = R \left[\frac{1}{4} \right]$$

$$\Rightarrow \frac{1}{\lambda_{\min}} = \frac{R}{4} \Rightarrow \lambda_{\min} = \frac{4}{R}$$

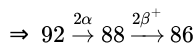
(38) Answer : (3)

Solution:



\Rightarrow Difference in mass number = 8

\Rightarrow number of α particles = 2



(39) Answer : (1)

Solution:

$$\frac{N_s}{N_p} = 10 = \frac{V_s}{V_p}$$

$$\frac{V_s}{20} = 10 \Rightarrow V_s = 200 \text{ V}$$

(40) Answer : (3)

Solution:

$$\lambda = \frac{h}{p} \text{ and } k = \frac{p^2}{2m} \Rightarrow p = \sqrt{2mk}$$

$$\lambda \times \sqrt{k} = \lambda' \times \sqrt{9k}$$

$$\Rightarrow \lambda \times \sqrt{k} = \lambda' \times 3\sqrt{k}$$

$$\Rightarrow \lambda' = \frac{\lambda}{3}$$

$$\Rightarrow \% \text{ Change} = \frac{2\lambda}{3\lambda} \times 100 = \frac{2}{3} \times 100 = 66.6\%$$

(41) Answer : (3)

Solution:

$$\vec{E} = -\frac{\partial V}{\partial x} \hat{i} - \frac{\partial V}{\partial y} \hat{j} - \frac{\partial V}{\partial z} \hat{k}$$

$$\vec{E} = -4x \hat{i}$$

$$= -8 \hat{i} \text{ V/m}$$

(42) Answer : (2)

Solution:

The electric potential at point, A and B is non-zero but zero at point C.

(43) Answer : (1)

Solution:

We know that, $J = \frac{i}{A}$ and $A_G < A_H$

$$\Rightarrow J_G > J_H$$

$$J = \sigma E, \text{ since } J_G > J_H$$

$$\Rightarrow E_G > E_H \text{ as conductivity is property of the material.}$$

$$V_d = \mu E \quad \bullet \quad (V_d)_G > (V_d)_H$$

(44) Answer : (3)

Solution:

$$\bullet \text{ For third bright fringe, } y = \frac{3\lambda D}{d} = \frac{3 \times \lambda \times 1}{0.2 \times 10^{-3}}$$

$$\Rightarrow \lambda = \frac{7.5 \times 10^{-3} \times 0.2 \times 10^{-3}}{3} = 500 \text{ nm}$$

(45) Answer : (2)

Solution:

$$\frac{1}{v} - \frac{1}{u} = \frac{1}{f} \Rightarrow \frac{1}{v} - \frac{1}{-30} = \frac{1}{20}$$

$$\Rightarrow \frac{1}{v} = \frac{1}{20} - \frac{1}{30} = \frac{1}{60} \Rightarrow v = 60 \text{ cm}$$

CHEMISTRY

(46) Answer : (2)

Hint:

Angular nodes = ℓ

Solution:

Angular nodes (ℓ) Radial nodes ($n - \ell - 1$)

$$4p \quad 1 \qquad 4 - 1 - 1 = 2$$

$$5p \quad 1 \qquad 5 - 1 - 1 = 3$$

$$4s \quad 0 \qquad 4 - 0 - 1 = 3$$

$$4f \quad 3 \qquad 4 - 3 - 1 = 0$$

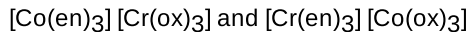
(47) Answer : (2)

Hint:

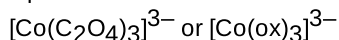
$[\text{PtCl}_2(\text{NH}_3)_2]$ shows geometrical isomerism.

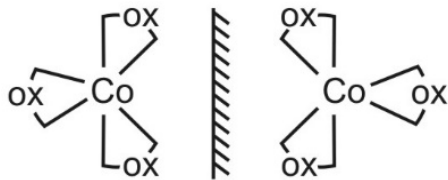
Solution:

Coordination isomerism :



Optical isomerism :

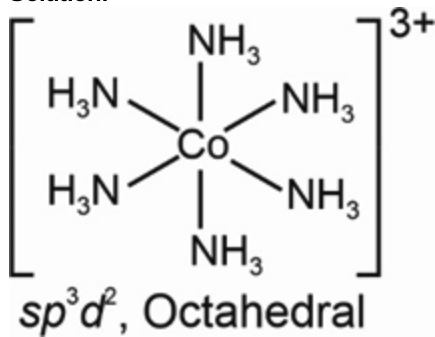




Ionisation isomerism
 $[\text{Cr}(\text{NH}_3)_5\text{Cl}]\text{Br}$ and $[\text{Cr}(\text{NH}_3)_5\text{Br}]\text{Cl}$

(48) Answer : (1)

Solution:



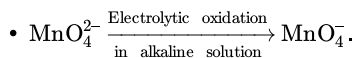
(49) Answer : (2)

Hint:

Manganate ion (MnO_4^{2-}) is tetrahedral in shape and green in colour.

Solution:

• One unpaired electron is present in MnO_4^{2-} ion hence it is paramagnetic in nature.

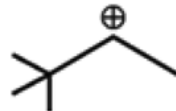


(50) Answer : (4)

Hint:

α -Hydrogen with respect to +ve charge should be present.

Solution:



Ph α -hydrogen with respect to +ve charge is absent. So, no hyperconjugation.

(51) Answer : (2)

Hint:

CH_3OH , Methanol is also known as "wood spirit".

Solution:

The commercial alcohol is made unfit for drinking by mixing in it some copper sulphate (to give it a colour) and pyridine (a foul smelling liquid). It is known as denaturation of alcohol.

(52) Answer : (3)

Solution:

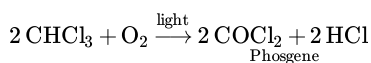
O_3 is bent, and ClO_2 is used as bleaching agent for paper pulp.

(53) Answer : (4)

Hint:

Oxidation of chloroform forms carbonyl chloride.

Solution:



(54) Answer : (2)

Hint:

For the reaction, $\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3$

$$\text{Rate of reaction} = -\frac{d[\text{N}_2]}{dt} = -\frac{1}{3}\frac{d[\text{H}_2]}{dt} = \frac{1}{2}\frac{d[\text{NH}_3]}{dt}$$

Solution:

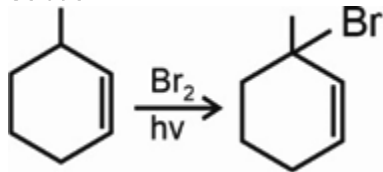
$$-\frac{1}{3} \frac{d[\text{H}_2]}{dt} = \frac{1}{2} \frac{d[\text{NH}_3]}{dt}$$

$$\frac{1}{3} \times \frac{2}{1} = \frac{1}{2} \frac{d[\text{NH}_3]}{dt}; \left[\frac{-d[\text{H}_2]}{dt} = \frac{4g}{h} = \frac{2 \text{ mol}}{h} \right]$$

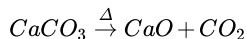
$$\frac{d[\text{NH}_3]}{dt} = \frac{4 \text{ mol}}{3 \text{ h}}$$

Rate of change of NH_3 in g/h

$$= \frac{4}{3} \times 17 = 22.7 \text{ g/h}$$

(55) Answer : (2)**Solution:****(56) Answer : (1)****Solution:**

Unu (101)	→	Mendelevium
Unb (102)	→	Nobelium
Unt (103)	→	Lawrencium
Unq (104)	→	Rutherfordium

(57) Answer : (4)**Hint:****Solution:**

$$\text{Mole of CO}_2 \text{ produced} = \frac{20}{44} = \frac{10}{22}$$

$$\text{Mole of CaCO}_3 \text{ decomposed} = \frac{10}{22}$$

$$\text{Mass of CaCO}_3 \text{ decomposed} = \frac{10}{22} \times 100 = 45.45 \text{ g}$$

$$\% \text{ purity of CaCO}_3 = \frac{45.45}{50} \times 100 = 90.9\%$$

(58) Answer : (4)**Hint:**

$$\text{Solubility of gas} \propto \frac{1}{\text{Temperature}}$$

Solution:

• K_H is a function of nature of the gas. Higher the value of K_H at a given pressure, the lower is the solubility of the gas in the liquid.

• Solubility of gases in liquids decreases with increase in temperature.

∴ Statement I is incorrect while statement II is correct.

(59) Answer : (4)**Solution:**

Reaction	→	Reagents
Hoffman degradation reaction	→	$\text{Br}_2 - \text{NaOH}$
Clemenson reduction	→	Zn-Hg/Conc. HCl
Cannizzaro reaction	→	$\text{Conc. KOH/ } \Delta$
Reimer-Tieman reaction	→	$\text{CHCl}_3, \text{NaOH/ H}_3\text{O}^{\oplus}$

(60) Answer : (2)**Solution:**

Graphite is thermodynamically most stable allotrope of carbon.

(61) Answer : (2)

Solution:

Zn^{2+} , Ni^{2+} , Co^{2+} belong to group IVth, Fe^{3+} belong to IIIrd group.

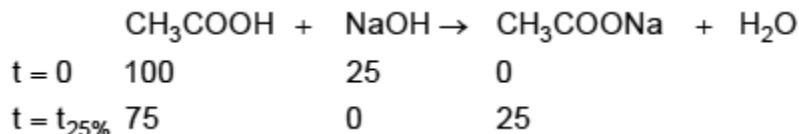
(62) Answer : (3)

Hint:

On neutralisation of weak acid with strong base, a buffer solution will be obtained if acid is present in excess.

Solution:

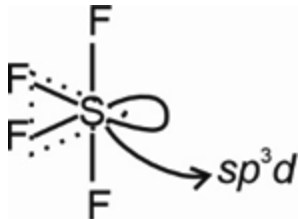
On 25% neutralisation of CH_3COOH



Here mixture of CH_3COONa and CH_3COOH will make acidic buffer solution

(63) Answer : (1)

Solution:

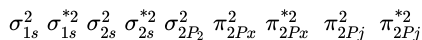


The geometry of SF_4 is Trigonal bipyramidal and shape is see-saw.

(64) Answer : (2)

Solution:

Electronic configuration of O_2^{2-} is



(65) Answer : (3)

Hint:

$$\Delta G^\circ = -nFE_{cell}^\circ$$

Solution:

$$E_{cell}^\circ = E_R^\circ - E_L^\circ$$

$$= (0.80 + 0.76) V$$

$$= 1.56 V$$

$$\Delta G^\circ = -2 \times F \times 1.56 = -3.12 F$$

(66) Answer : (2)

Solution:

Partial reduction of acid chloride to aldehyde is known as Rosenmund reduction.

(67) Answer : (2)

Hint:

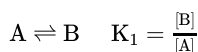
Platinum gauge is used as catalyst in Ostwald's process.

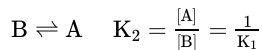
Solution:

Process	Catalyst
Contact process	V_2O_5
Deacon's process	$CuCl_2$
Haber's process	Iron oxide
Ostwald's process	Pt

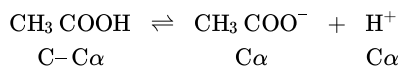
(68) Answer : (3)

Solution:



**(69) Answer :** (1)**Solution:**The possible number of orbitals in a shell of 'n' is n^2 .

$$n = 5, n^2 = 25$$

(70) Answer : (3)**Hint:**

$$K_a = \frac{[\text{CH}_3\text{COO}^-][\text{H}^+]}{[\text{CH}_3\text{COOH}]}$$

$$= \frac{C\alpha^2}{1-\alpha} \simeq C\alpha^2$$

Solution:

$$\Lambda_{\text{CH}_3\text{COOH}}^\circ = \Lambda_{\text{H}^+}^\circ + \Lambda_{\text{CH}_3\text{COO}^-}^\circ$$

$$= 350 + 50$$

$$= 400 \text{ S cm}^2 \text{ mol}^{-1}$$

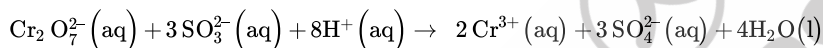
$$\alpha = \frac{\Lambda_m}{\Lambda_m^\circ} = \frac{4}{400} = 0.01$$

$$K_a = C\alpha^2 = 0.1 \times (0.01)^2$$

$$= 10^{-5}$$

(71) Answer : (3)**Hint:**

Calculate the increase and decrease in oxidation number and make them equal.

Solution:

So, a = 1, b = 3; c = 8

 $\therefore a : b : c = 1 : 3 : 8$ **(72) Answer :** (3)**Solution:**

100 g Hemoglobin contains = 0.34 g of Iron

2.8 g Hemoglobin will contains = $\frac{0.34 \times 2.8}{100}$

$$\text{No. of Fe atoms} = \frac{0.34 \times 2.8}{100 \times 56} \times 6.022 \times 10^{23}$$

$$= 17 \times 10^{-5} \times 6.022 \times 10^{23}$$

$$= 102.07 \times 10^{18}$$

$$= 1.02 \times 10^{20}$$

(73) Answer : (2)**Hint:**

Lesser is the bond dissociation enthalpy stronger is the acidic nature of hydrides of group 16 elements.

Solution:**Hydride $\Delta_{\text{diss}} H(\text{kJ mol}^{-1})$** H₂O 463H₂S 347

Correct order of reducing property:

H₂Te > H₂Se > H₂S**(74) Answer :** (4)**Hint:**Al₂O₃ reacts both with acid and base.**Solution:****Compounds Chemical nature**

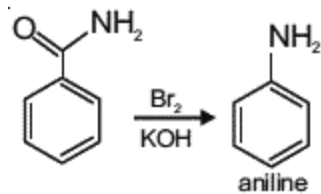
NO Neutral

Al_2O_3	Amphoteric
Na_2O	Basic
SO_2	Acidic

(75) Answer : (2)

Hint:

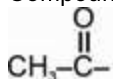
Hoffmann bromamide degradation of benzamide

Solution:

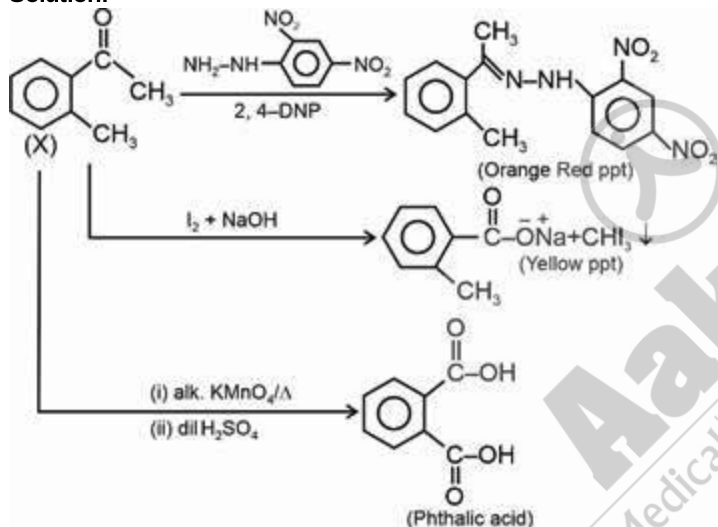
(76) Answer : (3)

Hint:

Compound containing



group gives positive Iodoform test.

Solution:

(77) Answer : (2)

Hint:Due to lanthanide contractions, Tm^{3+} has the smallest size among the given ions.**Solution:**

Ion Radii/pm

La^{3+}	106
Eu^{3+}	95
Ho^{3+}	89
Tm^{3+}	87

(78) Answer : (3)

Solution:

For spontaneous process

$$\Delta G < 0$$

$$\Delta H - T\Delta S < 0$$

$$T\Delta S > \Delta H$$

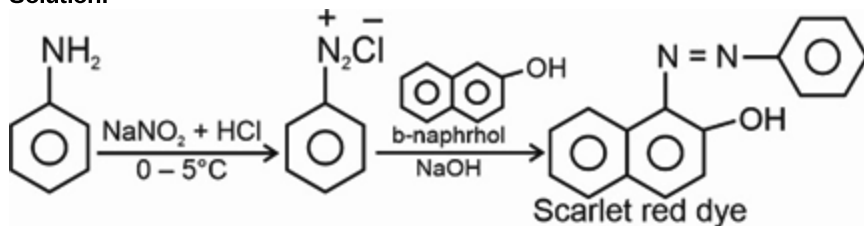
$$T > \frac{\Delta H}{\Delta S}$$

$$T > \frac{170 \times 10^3}{170}$$

$T > 1000\text{ K}$

(79) Answer : (4)

Solution:

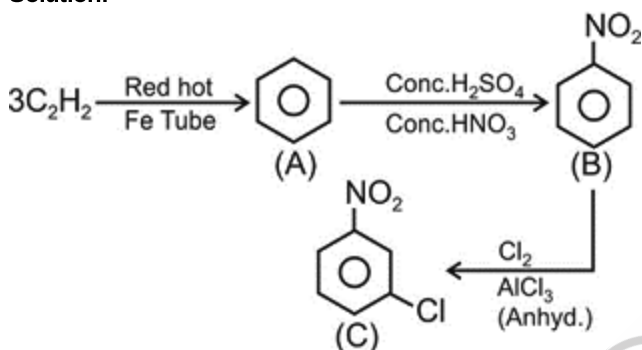


(80) Answer : (2)

Hint:

$-\text{NO}_2$ is a meta directing group.

Solution:



(81) Answer : (3)

Hint:

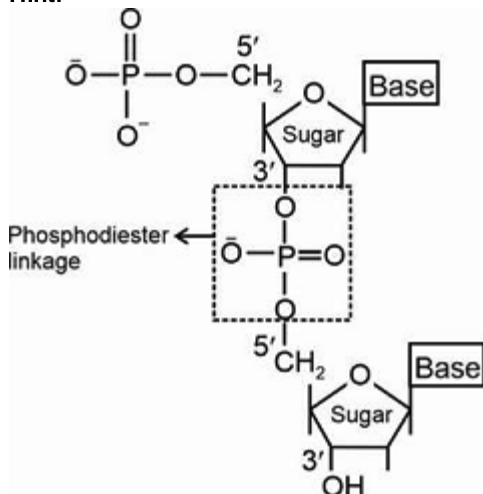
In cis isomer, two methyl group are on same side, in trans isomer two methyl group are on opposite side of double bond.

Solution:

- cis form is more polar
- trans form has zero dipole moment so it is non-polar
- trans form has higher melting point
- cis form has higher boiling point

(82) Answer : (3)

Hint:



Solution:

Nucleotides are joined together by phosphodiester linkage between 5' and 3' carbon atoms of the pentose sugar.

(83) Answer : (4)

Solution:

NF_3 ($\mu = 0.23\text{ D}$) has lesser dipole moment than NH_3 ($\mu = 1.47\text{ D}$).

(84) Answer : (4)

Hint:

CO forms a stable complex with haemoglobin.

Solution:

Zeolites are widely used as a catalyst in petrochemical industries for cracking of hydrocarbons and isomerisation.

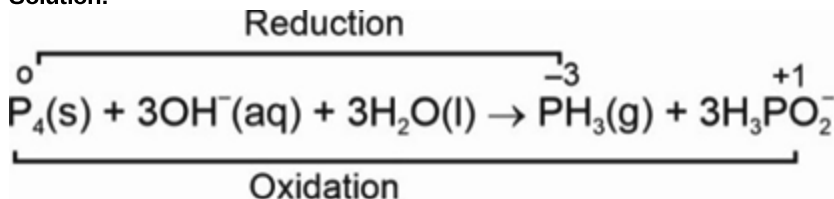
The highly poisonous nature of CO arises due to its ability to form a complex with haemoglobin which is about 300 times more stable than the oxygen-haemoglobin complex.

Being heavy and non-supporter of combustion CO_2 is used as fire extinguisher.

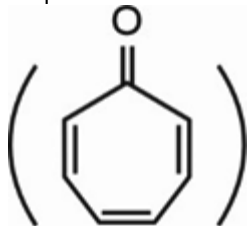
(85) Answer : (4)**Solution:**

Vinyl halide will not give SN^1 reaction because (1) Due to formation of unstable carbocation.

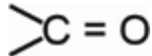
(2) Due to partial double bond character in C – X bond.

(86) Answer : (3)**Solution:****(87) Answer :** (2)**Solution:**

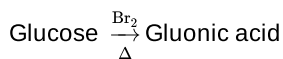
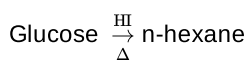
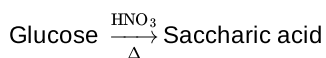
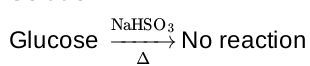
Tropone



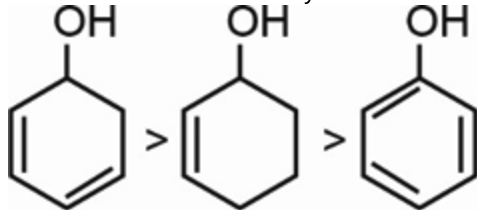
is an aromatic with 6π electrons. π -electrons of



is not involved in aromaticity.

(88) Answer : (1)**Solution:****(89) Answer :** (2)**Solution:**

Correct order of rate of Dehydration is

**(90) Answer :** (1)**Solution:**

Number of unpaired electrons, $\text{Mn}^{2+} = 5$, $\text{Cr}^{2+} = 4$, $\text{V}^{2+} = 3$.

Magnetic moment is proportional to the number of unpaired electrons.

Biology

(91) Answer : (4)

Solution:

- (i) One of the disadvantages of the artificial system was that it gave equal weightage to vegetative and sexual characters and as vegetative characters are more easily affected by the environment they are more prone to changes.
 (ii) Winged pollens are found in *Pinus*

(92) Answer : (1)

Solution:

- Succinyl CoA is converted to succinate by enzyme succinate thiokinase and this will lead to the production of GTP/ATP from GDP/ADP. It is a substrate level phosphorylation.
- Conversion of α -ketoglutarate to succinyl CoA is an oxidative decarboxylation reaction.
- Conversion of 1,3-bisphosphoglyceric acid to 3-phosphoglyceric acid is a substrate level phosphorylation reaction in glycolysis.
- Fructose-6-Phosphate to fructose-1-6-bisphosphate is a pacemaker reaction of glycolysis

(93) Answer : (3)

Solution:

Habitat was not the main criteria for classification used by R.H. Whittaker.

(94) Answer : (4)

Hint:

The alleles for starch grain size in pea plant show incomplete dominance.

Solution:

Dominance is not an autonomous feature of a gene or the product that it has information for. It depends as much on the gene product and production of a particular phenotype from this product as it does on the particular phenotype that we choose to examine, in case more than one phenotype is influenced by the same gene.

(95) Answer : (4)

Solution:

Auxins are responsible for xylem differentiation and cell division.

(96) Answer : (3)

Solution:

The large shield shaped cotyledon of maize is called scutellum.

(97) Answer : (2)

Solution:

Z represents the slope of line or regression coefficient in the species area relationship equation.

(98) Answer : (2)

Solution:

$$\begin{matrix} c & \rightarrow & b & \rightarrow & a & \rightarrow & d \\ \text{(Zygotene)} & & \text{(Pachytene)} & & \text{(Anaphase I)} & & \text{(Telophase I)} \end{matrix}$$

(99) Answer : (3)

Solution:

In prokaryotic cells, the DNA in nucleoid is organised in large loops held by proteins.

Prokaryotes do not have a defined nucleus, but the DNA is not scattered throughout the cell.

In eukaryotes, negatively charged DNA is wrapped around the positively charged histone octamer to form nucleosome.

(100) Answer : (4)

Solution:

Distance between the two genes is directly proportional to the frequency of recombination. The genes for white eye color and miniature wings were loosely linked and showed 37.2% recombinant types.

(101) Answer : (2)

Hint:

Gamete are haploid cells.

Solution:

A - Metaphase I

B - Anaphase I

C - Prophase I

(102) Answer : (2)

Solution:

Wine is an alcoholic beverage with the least percentage of alcohol.

(103) Answer : (2)**Solution:**

During lactic acid fermentation in bacteria, all of the following are formed except CO₂.

(104) Answer : (2)**Solution:**

Dicot roots have diarch to tetrarch vascular bundles, endodermis with suberin deposition and cortex with many several layers of thin walled parenchymatous cells with intercellular spaces.

(105) Answer : (1)**Solution:**

Turner's syndrome has chromosome complement of 44 + XO.

(106) Answer : (4)**Solution:**

Left atrium and right ventricle are included in pulmonary circulation.

(107) Answer : (3)**Solution:**

Pleurobrachia and *Ctenoplana* are ctenophores. They are exclusively marine with tissue level of body organisation.

(108) Answer : (4)**Solution:**

Thyroid hormones control metabolism of carbohydrates, proteins and fats. They also regulate BMR and support the process of red blood cell formation *i.e.* erythropoiesis.

(109) Answer : (2)**Hint:**

Ions travel across connexons in an electrical synapse.

Solution:

Impulses travel faster across electrical synapses than chemical synapses as cleft size is narrower in case of electrical synapse. Connexons connect pre and post synaptic membranes and permit passage of ions but not neurotransmitters. Bidirectional movement is possible in case of electrical synapses.

(110) Answer : (1)**Solution:**

The frog excretes urea and thus is an ureotelic animal. Mammals are also ureotelic.

Special venous connection present between kidney and lower parts of the body is called renal portal system.

Renal portal system is absent in *Homo sapiens*.

(111) Answer : (3)**Solution:**

Karl Ernst von Baer disapproved the proposal of Ernst Haeckel.

(112) Answer : (1)**Solution:**

Fertilization can only occur if the ovum and sperms are transported simultaneously to the ampullary region.

(113) Answer : (4)**Hint:**

Antivenom are preformed antibodies.

Solution:

When readymade antibodies are directly given to protect the body against foreign agent, it is called passive immunity.

Anti-tetanus serum (ATS) administered after injury and anti-venom administered after snake bite are examples of artificial passive immunity.

(114) Answer : (3)**Solution:**

3 strands obtained : 2 of 5 kb each and 1 of 10 kb.

On performing gel electrophoresis, only 2 bands will be visible (as both 5 kb bands will overlap one another.)

(115) Answer : (3)**Solution:**

Rosie produced human protein enriched milk in the year 1997. First gene therapy was given in 1990. In 1997, an American company got patent rights of Basmati rice through US patent and trademark office.

(116) Answer : (3)

Solution:

The given figure is of a monocot seed, where:

A- Pericarp, B- Endosperm, C- Coleoptile, D- Scutellum

(117) Answer : (2)

Hint:

In eukaryotes the monocistronic structural genes have interrupted coding sequences.

Solution:

Split genes are present in eukaryotes. Expressed sequences are known as exons.

(118) Answer : (3)

Solution:

Endemism is not a cause of biodiversity loss.

(119) Answer : (3)

Solution:

Self incompatibility is a phenomena, which promotes outbreeding.

(120) Answer : (1)

Solution:

In C₄ plants, RuBisCO is absent in mesophyll cells.

(121) Answer : (2)

Solution:

In the mitochondria, ATP synthesis take place in space towards the matrix.

(122) Answer : (2)

Solution:

Members of chrysophytes are found in fresh water as well as in marine environments. They are microscopic and float passively in water currents. Most of them are photosynthetic. In diatoms, the cell wall is embedded with silica and is indestructible.

(123) Answer : (4)

Solution:

Test cross is cross of individual showing dominant phenotype with recessive parent.

(124) Answer : (3)

Solution:

Pericycle is made up of thick walled parenchymatous cells.

(125) Answer : (3)

Solution:

Flagella is a surface structure in which 9 + 2 arrangement of microtubules are found.

(126) Answer : (3)

Solution:

The existence of tRNA was postulated by Francis Crick.

(127) Answer : (4)

Solution:

In racemose inflorescence, the main axis shows continuous growth, whereas cymose inflorescence has limited growth which generally terminates into a flower.

(128) Answer : (3)

Solution:

Both the words in a biological names, when handwritten are underlined separately.

(129) Answer : (2)

Solution:

Some amino acids are coded by more than one codon, hence the code is degenerate.

(130) Answer : (3)

Solution:

The first stage in gametophyte of a moss is called protonema, which is a creepy branched and frequently filamentous stage

(131) Answer : (4)

Solution:

- A – Efferent arteriole
 B – Glomerulus lined by endothelium
 C – Henle's loop – minimum reabsorption occurs in its ascending limb

(132) Answer : (3)**Solution:**

In humans, each artery and vein consists of three layers; tunica intima, tunica media and tunica externa. In arteries, tunica media is thicker as compared to veins. Thus, former has a wider lumen as compared to latter. Pulmonary vein carries oxygenated blood to the heart and pulmonary artery carries deoxygenated blood to the lungs.

(133) Answer : (4)**Solution:**

Aves and mammals are homeotherms having bony endoskeleton and exhibit internal fertilisation while members of class Reptilia, Amphibia and super class Pisces are ectotherms.

(134) Answer : (4)**Hint:**

Pregnancy hormone

Solution:

Progesterone stimulates the formation of alveoli and milk secretion in mammary glands.

(135) Answer : (4)**Solution:**

The recombinants will remain resistant to both ampicillin and tetracycline as restriction site of *Cla* I is not present within any antibiotic resistance gene in pBR322.

(136) Answer : (1)**Solution:**

DNA is negatively charged and moves towards anode.

(137) Answer : (1)**Solution:**

In myelinated nerve fibres, depolarisation occurs at the site where myelin sheath is absent, i.e., nodes of Ranvier.

(138) Answer : (1)**Solution:**

- pO₂ in lung alveoli - 104 mm Hg
 pO₂ of oxygenated blood in systemic artery - 95 mm Hg
 pCO₂ of deoxygenated blood in systemic vein - 45 mm Hg
 pO₂ of deoxygenated blood in systemic vein - 40 mm Hg
 pCO₂ of oxygenated blood in systemic artery - 40 mm Hg

(139) Answer : (2)**Solution:**

Nucleotide is made up of pentose sugar, nitrogenous base and phosphate group. Example → uridylic acid and cytidylic acid.

(140) Answer : (2)**Solution:**

Number of DNA duplexes obtained from one DNA duplex after 8 PCR cycles = $(2)^n = (2)^8 = 256$

(141) Answer : (2)**Solution:**

RNA interference is a part of cellular defense in all eukaryotic organisms. It is a post-transcriptional method.

(142) Answer : (3)**Solution:**

Steroidal oral pills inhibit ovulation and implantation as well as alter the quality of cervical mucus to prevent/retard entry of sperms. IUDs increase phagocytosis of sperms within the uterus.

(143) Answer : (2)**Solution:**

Polysaccharides and nucleic acids contain glycosidic bond in their structures. Adenylic acid is a nucleotide. Cholesterol is a lipid. Collagen and insulin are proteins.

(144) Answer : (3)**Solution:**

Compound epithelium covers the dry surface of skin.

Squamous epithelium is found in inner wall of blood vessels and air sacs of lungs and are involved in functions like forming a diffusion boundary.

(145) Answer : (2)

Solution:

Cortisol is a glucocorticoid and is a steroidal or hydrophobic hormone
Cortisol produces anti-inflammatory reactions and suppresses the immune response.

(146) Answer : (4)

Solution:

In dense regular connective tissue, the collagen fibres are present in rows between many parallel bundles of fibres.
Example-tendons and ligaments.
Adipose tissue – Loose connective tissue
Bone and cartilage – Specialised connective tissue.

(147) Answer : (1)

Solution:

The adult echinoderms are radially symmetrical but their larvae are bilaterally symmetrical. *Echinus* is an echinoderm.
Balanoglossus is a hemichordate.
Pinctada is a mollusc.

(148) Answer : (4)

Solution:

The hindbrain is not a part of limbic system. Inner parts of cerebral hemisphere and a group of associated deep structures like amygdala, hippocampus, etc. along with hypothalamus, are involved in the regulation of sexual behaviour, expression of emotional reactions (e.g. excitement, pleasure, rage and fear).

(149) Answer : (4)

Solution:

The diffusion membrane is made up of three major layers namely, the squamous epithelium of alveoli, the endothelium of alveolar capillaries and the basement substance (composed of a thin basement membrane supporting the squamous epithelium and the basement membrane surrounding the single layer endothelial cells of capillaries) in between them.

(150) Answer : (2)

Solution:

Monocytes and lymphocytes are agranulocytes.
Lymphocytes = 20-25 per cent of total WBCs
Monocytes = 6-8 per cent total WBCs
• Agranulocytes = 26-33 per cent total WBCs

(151) Answer : (4)

Solution:

'X' is collecting duct while 'Y' is glomerulus.
Glomerulus is a tuft of capillaries formed by afferent arteriole and is the site primarily responsible for causing ultrafiltration. A number of 'X' converge and open into renal pelvis.

(152) Answer : (4)

Solution:

Anisotropic band or dark band, in a partially contracted muscle fibre consists of both actin and myosin proteins, and 'M'-line.
'Z'-line is present in isotropic band.

(153) Answer : (3)

Solution:

Nervous system of a cockroach consists of series of fused, segmentally arranged ganglia joined by paired longitudinal connectives on ventral side.

(154) Answer : (2)

Solution:

Component	% of the total cellular mass
Water	70-90
Proteins	10-15
Carbohydrates	3
Lipids	2
Nucleic acids	5-7
Ions	1

(155) Answer : (4)

Solution:

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

(156) Answer : (3)

Solution:

In *Monstera*, roots arising from any parts other than the radicle are found. These roots are known as adventitious roots.

(157) Answer : (3)

Solution:

Heterotrophic bacteria use organic matter from other sources but autotrophic bacteria do not.

Aerobic, heterotrophic bacteria and fungi are useful in sewage treatment. Masses of these are known as flocs.

Photoautotrophic bacteria do not require organic matter from others.

(158) Answer : (2)

Solution:

Separation of sister chromatids happens in anaphase of mitosis but does not take place in anaphase I of meiosis.

(159) Answer : (3)

Hint:

Repetitive sequences are stretches of DNA sequences that are repeated many times.

Solution:

Polymorphism in DNA sequence is the basis of genetic mapping of human genome as well as of DNA fingerprinting.

Chromosome 1 has most genes (2968), and the Y has the fewest (231). Repetitive sequences are thought to have no direct coding functions, but they shed light on chromosome structure, dynamics and evolution.

(160) Answer : (3)

Solution:

Gemmae are asexual buds of liverworts.

(161) Answer : (3)

Solution:

Root hair are formed from region of maturation

In rose, ovary is perigynous.

(162) Answer : (1)

Solution:

(i) The mycelium is branched and septate.

(ii) Ascomycetes members are known to have a sexual cycle and they have sex organs.

(163) Answer : (2)

Solution:

Addition of carbohydrates in lipid molecules is termed as glycosidation of lipids. It occurs in Golgi apparatus.

(164) Answer : (2)

Solution:

Bulliform cells present in adaxial surface of leaf.

(165) Answer : (2)

Solution:

Sun \rightarrow Grass \rightarrow Grasshopper \rightarrow Frog \rightarrow Snake
200 J 20 J 2 J 0.2 J

(166) Answer : (3)

Solution:

Polynucleotide phosphorylase is Severo Ochoa enzyme.

It was helpful in polymerising RNA in a template independent manner.

(167) Answer : (4)

Solution:

Haplo-diploid method of sex determination is followed by Honey bees.

(168) Answer : (3)

Solution:

(i) Joseph Priestley – Bell Jar experiments

(ii) Julius von Sachs – Production of glucose by plants

(iii) T.W. Engelmann – Action spectrum of photosynthesis

(iv) Cornelius van Niel – Hydrogen from a suitable oxidisable compound reduces carbon dioxide to carbohydrates.

(169) Answer : (1)**Hint:**

Cytokinin(CK) helps in production of new leaves.

Solution:

Cytokinin enhances chloroplast production in leaves. It delays senescence by controlling protein synthesis.

(170) Answer : (3)**Solution:**

Phenylketonuria is caused due to mutation in a single gene.

(171) Answer : (1)**Solution:**

Cretaceous period is categorized under Mesozoic era.

Palaeozoic era includes Permian, Carboniferous, Devonian and Silurian period.

(172) Answer : (1)**Solution:**

Ascariasis	Faeco-oral route
Chikungunya	Vector borne (<i>Aedes</i>)
Cancer	Non-infectious disease
Pneumonia	Air borne

(173) Answer : (3)**Solution:**

Neither white winged moth nor dark winged moth were completely wiped off during pre or post industrialisation period.

(174) Answer : (1)**Solution:**

Neural signals through sympathetic nerves and adrenal medullary hormones (adrenaline and noradrenaline or epinephrine and norepinephrine) increases the rate of heart and thus cardiac output. On the other hand, parasympathetic neural signals (another component of ANS) decrease the rate of heart beat, speed of conduction of action potential and thereby the cardiac output.

(175) Answer : (1)**Solution:**

Oxytocin released from maternal pituitary forms a positive feedback loop. Oxytocin acts on uterine muscles and causes stronger uterine contractions, which in turn stimulates further secretion of oxytocin.

(176) Answer : (3)**Solution:**

Use of condoms has increased in recent years due to their additional benefit of protecting the users from contracting STIs and AIDS.

(177) Answer : (2)**Solution:**

All the parasitic members of phylum Platyhelminthes do not possess hooks and suckers. In annelids, neural system consists of paired ganglia connected by lateral nerves to a double ventral nerve cord.

(178) Answer : (1)**Solution:**

Fibrous joints do not allow any movement. The two halves of pelvic girdle meet ventrally to form pubic symphysis containing fibrous cartilage.

(179) Answer : (4)**Hint:**

The gene which helps in identifying and eliminating non-transformants

Solution:Transformation is a process through which a foreign piece of DNA is introduced into a host bacterium. Generally genes encoding resistance against antibiotics such as ampicillin, chloramphenicol, tetracycline, etc., are considered useful selectable markers for *E. coli*. The sites which are used by restriction enzymes for their action are called cloning sites.**(180) Answer :** (2)**Solution:**

Hydrolases are biochemical catalysts that use water to break a chemical bond. Isomerases catalyse interconversion of optical, geometric or positional isomers. Oxidoreductases are enzymes which catalyse the oxidation-reduction between two substrates S and S'.