



Corporate Office : Aakash Tower, 8, Pusa Road, New Delhi-110005, Phone : 011-47623456

MM : 720

## REVISION TEST SERIES

Time : 3 Hrs. 20 Min.

(for NEET-2022)

### Test - 10

#### Answers

1. (4)	41. (4)	81. (3)	121. (2)	161. (3)
2. (1)	42. (1)	82. (2)	122. (3)	162. (3)
3. (1)	43. (3)	83. (1)	123. (3)	163. (3)
4. (4)	44. (3)	84. (4)	124. (3)	164. (1)
5. (2)	45. (4)	85. (4)	125. (4)	165. (4)
6. (4)	46. (4)	86. (2)	126. (2)	166. (4)
7. (1)	47. (2)	87. (2)	127. (3)	167. (4)
8. (2)	48. (4)	88. (2)	128. (3)	168. (2)
9. (2)	49. (3)	89. (3)	129. (2)	169. (1)
10. (2)	50. (3)	90. (2)	130. (2)	170. (4)
11. (1)	51. (1)	91. (2)	131. (1)	171. (1)
12. (4)	52. (2)	92. (2)	132. (1)	172. (4)
13. (1)	53. (2)	93. (4)	133. (2)	173. (4)
14. (3)	54. (1)	94. (1)	134. (2)	174. (1)
15. (4)	55. (4)	95. (3)	135. (4)	175. (4)
16. (3)	56. (2)	96. (4)	136. (2)	176. (4)
17. (1)	57. (2)	97. (3)	137. (4)	177. (3)
18. (1)	58. (4)	98. (1)	138. (4)	178. (3)
19. (1)	59. (4)	99. (4)	139. (1)	179. (1)
20. (3)	60. (3)	100. (4)	140. (4)	180. (3)
21. (2)	61. (3)	101. (2)	141. (4)	181. (1)
22. (3)	62. (3)	102. (2)	142. (2)	182. (2)
23. (4)	63. (3)	103. (2)	143. (3)	183. (2)
24. (4)	64. (4)	104. (3)	144. (4)	184. (1)
25. (1)	65. (1)	105. (2)	145. (2)	185. (3)
26. (4)	66. (1)	106. (3)	146. (2)	186. (2)
27. (3)	67. (3)	107. (3)	147. (4)	187. (4)
28. (2)	68. (3)	108. (2)	148. (4)	188. (4)
29. (3)	69. (3)	109. (3)	149. (2)	189. (2)
30. (4)	70. (2)	110. (2)	150. (1)	190. (3)
31. (3)	71. (2)	111. (3)	151. (4)	191. (4)
32. (2)	72. (3)	112. (2)	152. (2)	192. (1)
33. (4)	73. (2)	113. (2)	153. (2)	193. (4)
34. (4)	74. (2)	114. (2)	154. (2)	194. (2)
35. (3)	75. (3)	115. (4)	155. (4)	195. (1)
36. (2)	76. (3)	116. (2)	156. (2)	196. (3)
37. (4)	77. (3)	117. (4)	157. (3)	197. (4)
38. (4)	78. (2)	118. (3)	158. (3)	198. (1)
39. (2)	79. (3)	119. (1)	159. (1)	199. (4)
40. (2)	80. (1)	120. (2)	160. (1)	200. (3)



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### Test - 10

### Answers & Solutions

#### PHYSICS

##### SECTION-A

1. Answer (4)

$$[x] = [Ay] = [B]$$

$$[Cz] = [M^0 L^0 T^0] \Rightarrow [C] = [z^{-1}]$$

2. Answer (1)

Area of  $a - t$  graph =  $v - u$  $a - t$  graph

$$\frac{1}{2}(2)(u) = v - 0$$

$$4 \text{ ms}^{-1} = v$$

3. Answer (1)

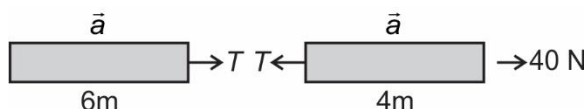
Galileo's law of odd numbers

4. Answer (4)

$$\text{Average angular velocity} = \frac{2\pi/3 + 2\pi/3}{3+2}$$

$$\Rightarrow \frac{4\pi}{15} \text{ rad/s}$$

5. Answer (2)



$$a = \frac{F}{m} = \frac{40}{40} = 1 \text{ m/s}^2$$

$$T = (4 \times 6) \times 1 = 24 \text{ N}$$

6. Answer (4)

$$w = \int \vec{F} \cdot d\vec{r} = \int_{(1,2)}^{(2,1)} y^2 x dx + x^2 y dy$$

$$= \frac{1}{2} \int_{1,2}^{2,1} d(x^2 y^2) = 0$$

7. Answer (1)

$$Y = 2\gamma(1 + \sigma)$$

$$3\gamma = 2 \times \gamma(1 + \sigma)$$

$$1 + \sigma = 1.5$$

$$\sigma = 0.5$$

8. Answer (2)

In metric system, Fahrenheit is smallest unit.

9. Answer (2)

$$\frac{kQ}{r} = V$$

$$V' = \frac{k(64Q)}{4r}$$

$$= \frac{16kQ}{r}$$

$$n = 16$$

10. Answer (2)

$$\text{K.E.} = \frac{1}{2} kA^2 - \frac{1}{2} k \left[ \frac{A}{2} \right]^2 \frac{\text{K.E.}}{\text{P.E.}} = \frac{\frac{1}{2} kA^2 \cos^2 \omega t}{\frac{1}{2} kA^2 \sin^2 \omega t}$$

$$= \frac{3}{8} kA^2 = \cot^2 \left( \frac{2\pi}{T} \right) \left( \frac{T}{12} \right)$$

$$\text{P.E.} = \frac{1}{2} k \frac{A^2}{4} = \cot^2 \left( \frac{\pi}{6} \right)$$

$$\frac{\text{K.E.}}{\text{P.E.}} = \frac{3}{1} = 3 : 1$$

11. Answer (1)

$$\frac{GmM}{R^n} = \frac{mv^2}{R}$$

$$\Rightarrow V = \sqrt{\frac{GM}{R^{n-1}}}$$

$$T = \frac{2\pi R}{v} = \frac{2\pi R}{\sqrt{GM}} R^{\left(\frac{n-1}{2}\right)} \propto R^{\frac{n+1}{2}}$$

12. Answer (4)

As per symmetry  $l_1 = l_2 = l_3$

$\Rightarrow$  ratio = 2 : 1

13. Answer (1)

$$\begin{aligned} A &= \sqrt{4^2 + 3^2 + 2(4)(3)\cos\left(\frac{\pi}{3}\right)} \\ &= \sqrt{4^2 + 3^2 + 12} = \sqrt{16 + 9 + 12} \\ &= \sqrt{37} \end{aligned}$$

14. Answer (3)

$$P\sqrt{T} = \text{constant}$$

$$\frac{PV}{T} = \text{constant} \Rightarrow T = \frac{PV}{\text{constant}}$$

$$P^{3/2}V^{1/2} = \text{Constant}$$

$$PV^{1/3} = \text{Constant}$$

$$C = \frac{f}{2}R + \frac{R}{1-x} \quad \left(x = \frac{1}{3}\right)$$

$$= \frac{3}{2}R + \frac{R}{1-1/3} = \frac{3R}{2} + \frac{3R}{2} = 3R$$

15. Answer (4)

$$T_1 = 546 + 273 = 819 \text{ K}$$

$$T_2 = 273 \text{ K}$$

$$\frac{T_1}{T_2} = 3$$

$$\frac{E_1}{E_2} = \left(\frac{T_1}{T_2}\right)^4$$

16. Answer (3)

$$\frac{\frac{1}{2}I\omega^2}{\frac{1}{2}mv^2} = \frac{9}{25}$$

$$\frac{\frac{1}{2}mk^2(v^2/R^2)}{\frac{1}{2}mv^2} = \frac{9}{25} \Rightarrow k = \frac{3R}{5}$$

17. Answer (1)

$$T_1 = 2\pi\sqrt{\frac{m}{3k}}$$

$$T_2 = 2\pi\sqrt{\frac{m}{(k/3)}}$$

18. Answer (1)

$$\text{The minimum time taken} = \frac{200}{2} = 100 \text{ s.}$$

19. Answer (1)

$$\phi_{s_1} = \frac{2Q}{\epsilon_0}, \phi_{s_2} = \frac{3Q}{\epsilon_0}, \phi_{s_3} = \frac{3Q}{\epsilon_0}$$

20. Answer (3)

$$i_{5\Omega} = \frac{18}{2} = 9 \text{ A}$$

$$V = 9 \times 5 = 45 \text{ V}$$

21. Answer (2)

$$\cos\phi = \frac{R}{Z}$$

$$\frac{1}{2} = \frac{R}{Z} \text{ and } \frac{1}{4} = \frac{R}{Z'}$$

$$\Rightarrow Z' = 2Z$$

$$\% \text{ increase in } Z, \frac{Z' - Z}{Z} = 100\%$$

22. Answer (3)

B due to straight wires will cancel out.

$$\Rightarrow B \text{ circular section} = \frac{\mu_0 i}{4R}$$

23. Answer (4)

The susceptibility of a diamagnetic material is independent of the temperature.

24. Answer (4)

$$\therefore e \propto \frac{-Ldi}{dt}$$

$\frac{di}{dt}$  is slope for  $i$  vs  $t$  graph.

25. Answer (1)

Average of electric field is zero over a cycle in a plane electromagnetic wave.

26. Answer (4)

Virtual image can be seen by an observer and can be photographed.

27. Answer (3)

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

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

$$\frac{1}{n} - 1 = \frac{u}{f} \Rightarrow u = f \left( \frac{1-n}{n} \right)$$

28. Answer (2)

Angular position of first dark fringe is  $\frac{\lambda}{2d}$

$$\alpha = \frac{\theta}{2} = \frac{1}{2} \left( \frac{\lambda}{d} \right) = \left( \frac{4000 \times 10^{-10}}{2 \times 10^{-3}} \right) \pi \times \frac{180^\circ}{\pi}$$

$$\frac{1}{2} = 0.018^\circ$$

29. Answer (3)

Momentum of both masses will be same in magnitude.

$$\text{Since } \lambda = \frac{h}{p}$$

$\therefore$  de-Broglie wavelength of the masses will be same.

30. Answer (4)

Largest wavelength of Lyman series is  $1215.7 \text{ \AA}$ . The series lies in ultraviolet region.

31. Answer (3)

The binding energy per nucleon is practically independent of mass number for nuclei of middle mass number ( $30 < A < 170$ ).

Also, binding energy per nucleon is lower for both light nuclei ( $A < 30$ ) and heavy nuclei ( $A > 170$ ).

32. Answer (2)

In reverse bias potential barrier will increase.

33. Answer (4)

$$P_{\text{H-atom}} = P_{\text{photon}} = \frac{E_{\text{radiated}}}{c}$$

$$= \frac{13.6 \left\{ \frac{1}{n_1^2} - \frac{1}{n_2^2} \right\}}{c} \text{ eV}$$

$$1.6 \times 10^{-27} v = \frac{13.6 \left\{ 1 - \frac{1}{6^2} \right\} \times 1.6 \times 10^{-19}}{3 \times 10^8}$$

$$v = 4.407 \text{ m/s}$$

34. Answer (4)

$$R = 10 \Omega$$

$$X_L = 0.2 \times 200 = 40 \Omega$$

$$\cos(\theta) = \frac{1}{\sqrt{2}} = \frac{R}{Z}$$

$$\Rightarrow |(X_L - X_C)| = R$$

$$\Rightarrow (40 - X_C) = 10 \Rightarrow X_C = 30 \Omega$$

$$\text{or } X_C - 40 = 10 \Rightarrow X_C = 50 \Omega$$

35. Answer (3)

$$T_2 = \sqrt{T_1 T_3}$$

$$= \sqrt{400 \times 100} = 200 \text{ K}$$

## SECTION-B

36. Answer (2)

$$V_{\text{common}} = \frac{C_1 V_1 + C_2 V_2}{C_1 + C_2}$$

$$= \frac{2 \times 40 + 4 \times 20}{2 + 4} = \frac{160}{6} \Rightarrow \frac{80}{3}$$

$$\Delta u = \frac{1}{2} C_1 V_1^2 + \frac{1}{2} C_2 V_2^2 - \frac{1}{2} (C_1 + C_2) (V_{\text{common}})^2$$

$$= \frac{1}{2} \times 2 \times 40^2 \times 10^{-6} + \frac{1}{2} \times 4 \times 20^2 \times 10^{-6}$$

$$- \frac{1}{2} (6) \left( \frac{80}{3} \right)^2 \times 10^{-6}$$

$$= 266.67 \mu\text{J}$$

37. Answer (4)

$$\frac{60}{100} P_{\text{input}} = \frac{20 \times 10 \times 10}{10}$$

$$\Rightarrow 333.33 \text{ W} = P_{\text{input}}$$

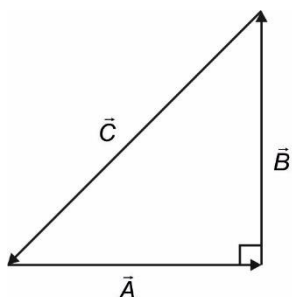
38. Answer (4)

$$\left( \frac{dv}{dx} \right)_{x=2\text{m}} = \frac{2}{1} = 2 \text{ s}^{-1}$$

$$(a)_{x=2\text{ m}} = \frac{v dv}{dx} = 4 \text{ m/s}^2$$

$$(P)_{x=2\text{ m}} = mav = 2 \times 4 \times 2 = 16 \text{ W}$$

39. Answer (2)



40. Answer (2)

$$T = 2\pi\sqrt{\frac{l}{g}} = 2\text{ s}; \quad g = \frac{GM}{R^2}$$

$$g' = g/2$$

$$\Rightarrow T' = 2\sqrt{2} \text{ s}$$

41. Answer (4)

$$\begin{aligned} \text{Area} &= \pi \left( \frac{30-10}{2} \right) \left( \frac{30-10}{2} \right) \times 10^3 \times 10^{-3} \\ &= \pi \times 10 \times 10 \\ &= 100 \pi \text{ J} \end{aligned}$$

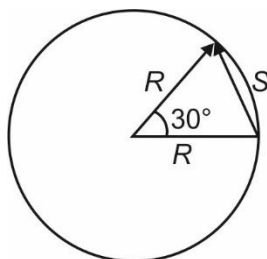
42. Answer (1)

$$\ln y = A \sin(\omega t - kx)$$

$$v = \frac{\omega}{k}$$

$$v = \frac{8}{1/4} = 32 \text{ m/s}$$

43. Answer (3)



$$\begin{aligned} S &= \sqrt{R^2 + R^2 - 2R^2 \cos 30^\circ} \\ &= R\sqrt{2(\sqrt{1 - \cos 30^\circ})} \\ &= 2R \sin 15^\circ \end{aligned}$$

44. Answer (3)

$$R_{\text{eq}} = \frac{(n-1)R \times R}{(n-1)R + R} = \frac{(n-1)}{n} R$$

45. Answer (4)

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

$$P' = \left( \frac{3}{4} - 1 \right) \left\{ \frac{1}{R_1} - \frac{1}{R_2} \right\} = -\frac{1}{4} \left\{ \frac{1}{R_1} - \frac{1}{R_2} \right\} = -\frac{P}{8}$$

46. Answer (4)

Electric field produced due to time varying magnetic fields are non-conservative in nature.

In E.M. waves, the oscillating electric and magnetic fields are in phase.

47. Answer (2)

For coplanar forces

$$(\vec{A} \times \vec{B}) \cdot \vec{C} = 0$$

48. Answer (4)

$$l_1 - l = \frac{T_1 l}{AY} \quad \dots(i)$$

$$l_2 - l = \frac{T_2 l}{AY} \quad \dots(ii)$$

$$(ii) \div (i)$$

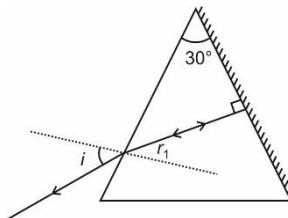
$$\begin{aligned} \frac{l_2 - l}{l_1 - l} &= \frac{T_2}{T_1} \\ \Rightarrow \frac{T_2 l_1 - l_2 T_1}{T_2 - T_1} &= l \end{aligned}$$

49. Answer (3)

$$F \propto q_1 q_2 \quad (q_1 = Q - q_2)$$

This will be maximum when  $q_1 = q_2 = \frac{Q}{2}$

50. Answer (3)



$$r_2 = 0$$

$$\Rightarrow r_1 + r_2 = 30^\circ$$

$$r_1 = 30^\circ$$

$$1 \times \sin 45^\circ = \mu \sin(30^\circ)$$

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

**CHEMISTRY****SECTION-A**

51. Answer (1)

8 g of  $H_2 = 4$  moles of  $H_2 = 4 \times N_A$  molecules64 g of  $O_2 = 2$  moles of  $O_2 = 2 \times N_A$  molecules3 moles of  $H_2O = 3 \times N_A$  molecules11.2 L of  $CO_2$  at STP = 0.5 moles of  $CO_2 = 0.5 \times N_A$  molecules.

52. Answer (2)

For multi-electron system,

Higher is the  $(n + \ell)$  value of an orbital, higher will be its energy.For same  $(n + \ell)$  value, orbital with higher  $n$  value has higher energy.

53. Answer (2)

If the reaction is reversed, the value of equilibrium constant is reciprocated. Also, if the reaction is multiplied by a factor  $(n)$  then the value of equilibrium constant becomes

$$K'_C = (K_C)^n$$

54. Answer (1)

For first order reaction

$$t = \frac{2.303}{k} \log \frac{[A_0]}{[A_t]}$$

$$= \frac{2.303}{0.693} \log \frac{x}{\frac{x}{32}}$$

$$= \frac{2.303 \times 5}{0.693} \times 5 \log 2$$

$$= 24.9 \approx 25 \text{ min}$$

55. Answer (4)



56. Answer (2)

Molecular orbital configuration of  $O_2^+$   
(15 electrons)

$$\sigma 1s^2 \sigma^* 1s^2 \sigma 2s^2 \sigma^* 2s^2 \sigma 2p_z^2 \left\{ \begin{array}{l} \pi 2p_x^2 \\ \pi 2p_y^2 \end{array} \right\} \left\{ \begin{array}{l} \pi^* 2p_x^1 \\ \pi^* 2p_y^0 \end{array} \right\}$$

$$\text{Bond order} = \frac{1}{2} [N_b - N_a]$$

$$= \frac{1}{2} (10 - 5)$$

$$= 2.5$$

57. Answer (2)

Let the mass of  $O_2$  and  $CH_4$  be  $w$  gram each

$$x_{O_2} = \frac{\frac{w}{32}}{\frac{w}{32} + \frac{w}{16}}$$

$$= \frac{1}{3}$$

58. Answer (4)

Kinetic energy is a function of temperature only.

59. Answer (4)

Work and heat are path functions.

60. Answer (3)

$$\Delta U = q + w$$

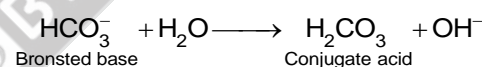
$$= +20J + (-10J)$$

$$= 10J$$

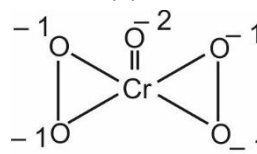
61. Answer (3)

The value of  $l$  can be 0 to  $(n - 1)$ 

62. Answer (3)



63. Answer (3)



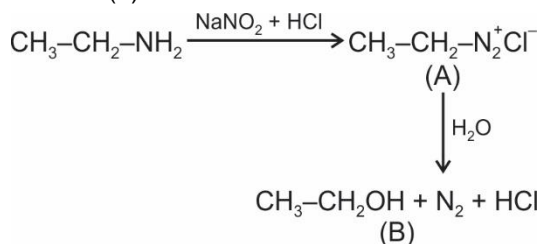
$$x + 4(-1) + (-2) = 0$$

$$x = +6$$

64. Answer (4)

 $NH_3$ ,  $HF$  and  $H_2O$  are electron rich hydrides.

65. Answer (1)



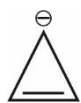
66. Answer (1)

Element	$\Delta_f H$ (kJ/mol)
B	801
Al	577
Ga	579

67. Answer (3)

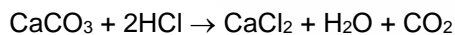
 $\text{CO}_2$  : Acidic $\text{Al}_2\text{O}_3$  : Amphoteric $\text{CO}$  : Neutral $\text{Na}_2\text{O}$  : Basic

68. Answer (3)

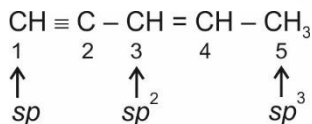
 $4\pi$  electrons : Antiaromatic $4\pi$  electrons : Antiaromatic $6\pi$  electrons : Aromatic

Non aromatic

69. Answer (3)

 $\text{CaCO}_3$  reacts with dilute acid to liberate  $\text{CO}_2$ .

70. Answer (2)



71. Answer (2)

% of nitrogen in the organic compound

$$= \frac{1.4 \times 20 \times 0.5 \times 2}{1} = 28\%$$

72. Answer (3)

 $-\text{OH}$ ,  $-\text{NH}_2$ ,  $-\text{CH}_3$  are o, p-directing groups.

73. Answer (2)

$$\Delta G = \Delta H - T\Delta S$$

At equilibrium,  $\Delta G = 0$ 

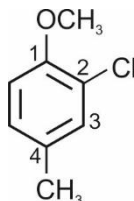
$$\therefore \Delta H = T\Delta S$$

$$T = \frac{\Delta H}{\Delta S} = \frac{37500 \text{ J mol}^{-1}}{150 \text{ J K}^{-1} \text{ mol}^{-1}} = 250 \text{ K}$$

74. Answer (2)

 $\text{NaHCO}_3$  is baking soda $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$  is washing soda $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$  is gypsum. $\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}$  is plaster of paris.

75. Answer (3)



2-chloro-4-methylanisole

76. Answer (3)

 $-\text{OH}$  has + M effect, it increases the stability of the carbocation.

77. Answer (3)

1 molal aq. solution means 1 mol of solute is dissolved in 1000 g of  $\text{H}_2\text{O}$ 

$$\text{Number of moles of } \text{H}_2\text{O} = \frac{1000}{18} = 55.55 \text{ mol}$$

$$x_{\text{solute}} = \frac{1}{1 + 55.55} = 0.0177$$

78. Answer (2)

$$t_{\frac{1}{2}} = \frac{0.693}{k} = \frac{0.693}{6.93 \times 10^{-6}} = 1 \times 10^5 \text{ s}$$

79. Answer (3)

$$\text{Unit of rate constant} = \frac{(\text{Mol L}^{-1})^{1-n}}{\text{s}}$$

For second order reaction,  $n = 2$ 

$$\begin{aligned} \therefore \text{Unit of } k &= \frac{(\text{Mol L}^{-1})^{1-2}}{\text{s}} \\ &= (\text{Mol L}^{-1})^{-1} \text{ s}^{-1} \\ &= \text{L Mol}^{-1} \text{ s}^{-1} \end{aligned}$$

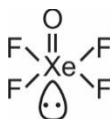
80. Answer (1)

 $\text{TiO}_2$  sol,  $\text{Al}_2\text{O}_3 \cdot x\text{H}_2\text{O}$  and haemoglobin are positively charged sol.

81. Answer (3)

Constituents of brass : Cu – 60% and Zn – 40%

82. Answer (2)



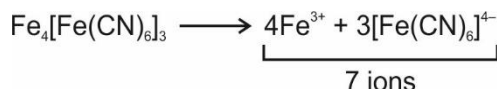
square pyramidal



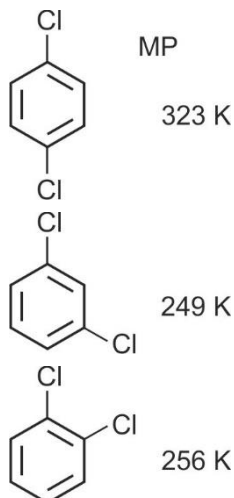
83. Answer (1)

For 10 moles of  $\text{I}^-$ , 2 moles of  $\text{MnO}_4^-$  is required.For 1 mol of  $\text{I}^-$ ,  $\frac{2}{10}$  moles of  $\text{MnO}_4^-$  is required

84. Answer (4)



85. Answer (4)



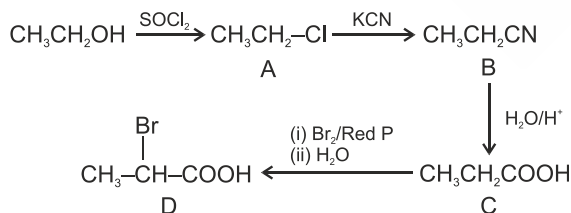
Para – isomer has high melting point than o and m isomer because of symmetry.

**SECTION-B**

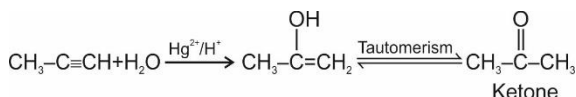
86. Answer (2)

The reaction in which alkyl halide reacts with sodium in dry ether to give hydrocarbon containing double the number of carbon atoms present in the halide is known as Wurtz reaction.

87. Answer (2)

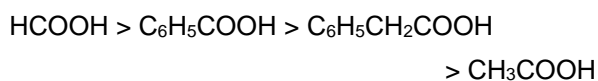


88. Answer (2)

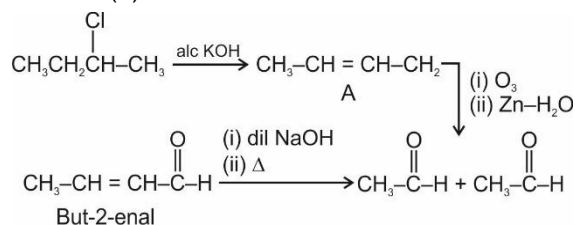


89. Answer (3)

Order of acidic character is



90. Answer (2)



91. Answer (2)

Since, the reducing group of glucose and fructose are involved in glycosidic bond formation.

$\therefore$  Sucrose is a non-reducing sugar.

92. Answer (2)

Scurvy (bleeding gum) is caused by the deficiency of vitamin C (ascorbic acid).

93. Answer (4)

Aliphatic polyesters (PHBV) are bio-degradable polymers.

94. Answer (1)

Seldane is an antihistamines

Cimetidine is an antacid

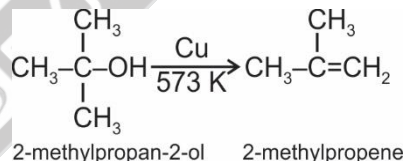
Chlordiazepoxide is a tranquilizer

Salvarsan is an antibiotic

95. Answer (3)

More stable the carbocation is, more will be the reactivity of the alkyl halide towards  $\text{S}_{\text{N}}1$  reaction.

96. Answer (4)



97. Answer (3)

NO irritates the nose and throat and their high concentration cause headache, chest pain, dryness of throat and cough.

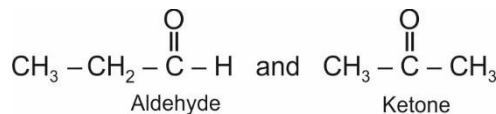
98. Answer (1)

The IUPAC name of element with atomic number 110 is ununnilium.

99. Answer (4)

Surface tension is defined as the force acting per unit length. Perpendicular to the line drawn on the surface of liquid.

100. Answer (4)



are functional group isomers



**BOTANY****SECTION-A**

101. Answer (2)

Museum preserves plants as well as animals.

102. Answer (2)

Prions cause mad cow disease which consist of abnormally folded protein.

103. Answer (2)

Phloem fibres are made up of schlerenchymatous cells and they are dead cells.

104. Answer (3)

Monocot stem does not have endodermis, pith and pericycle.

105. Answer (2)

All tissue on the innerside of the endodermis such as pericycle, vascular bundles and pith constitute the stele.

106. Answer (3)

RER helps in protein synthesis  
SER helps in lipid synthesis.

107. Answer (3)

Peroxisomes is not the part of endomembrane system.

108. Answer (2)

$$\begin{array}{ccccccc} G_1 & \rightarrow & S & \rightarrow & G_2 & \rightarrow & MI \rightarrow MII \\ 24 \text{ pg} & & 48 \text{ pg} & & 48 \text{ pg} & & 24 \text{ pg} \quad 12 \text{ pg} \end{array}$$

109. Answer (3)

Pteridophytes are vascular cryptogams and its main plant body is sporophyte and is differentiated into true root, stem and leaf.

110. Answer (2)

Agar-agar is commercially produced by red algae *Gelidium* and *Gracilaria*.

111. Answer (3)

In active transport, molecules move against the concentration gradient.

112. Answer (2)

Nitrogenase enzyme is a Mo-Fe protein and catalyse conversion of atmospheric nitrogen to ammonia.

113. Answer (2)

The deficiency symptom tend to appear first in young tissue when elements are relatively immobile and are not transported out of mature organ.

114. Answer (2)

ATP formation takes place in both cyclic and non cyclic photophosphorylation.

115. Answer (4)

DNA replication takes place in S phase which comes before G<sub>2</sub> phase.

116. Answer (2)

Mango: Order → Sapindales.

117. Answer (4)

Herbarium has dried and preserved specimens.

118. Answer (3)

Fungi have chitinous cell wall.

Morels and truffles are edible sac fungi.

119. Answer (1)

PEP is 3C compound found in mesophyll cells in C<sub>4</sub> plants. It is primary CO<sub>2</sub> acceptor in C<sub>4</sub> plants.

120. Answer (2)

Calvin cycle occur in an photosynthetic plant whether they have C<sub>3</sub> or C<sub>4</sub> pathway.

121. Answer (2)

Nucellus is located within integument and MMC are part of sporophyte and are diploid (2n). functional megaspore and female gametophyte are haploid (n)

122. Answer (3)

Parents  $I^A i$  ×  $I^B i$

Gametes  $(I^A i)$   $(I^B i)$

Offspring  $I^A I^B$ ,  $I^A i$ ,  $I^B i$ ,  $ii$

Blood group AB A B O

123. Answer (3)

In *lac* operon, structural gene transcribe mRNA for polypeptide synthesis.

124. Answer (3)

Pusa sawani is a variety of okra resistant to shoot and fruit borer.

125. Answer (4)

Habitat loss and fragmentation is a major cause that drives plants and animal to extinction.

126. Answer (2)

ABA is stress hormone which promotes dormancy and reduces transpiration.

127. Answer (3)

Cell wall acts as barrier for entry of macro molecules only.

128. Answer (3)

Chromatin contains DNA, RNA, histones and non-histone proteins.

129. Answer (2)

In most common type of endosperm development, the primary endosperm nucleus undergoes successive nuclear divisions to give rise to free nuclei.

130. Answer (2)

Turner's syndrome is due to monosomy of sex chromosome and the chromosome complement is  $44 + XO$ . Cystic fibrosis is a Mendelian disorder.

131. Answer (1)

Single cell protein is not only obtained from unicellular microorganisms but also from multicellular microorganisms.

132. Answer (1)

Regulator gene (*i*-gene) shows constitutive expression.

133. Answer (2)

Statins are blood-cholesterol lowering agents.

134. Answer (2)

Male bee carries out mating act with *Ophrys* flower.

*Ophrys* flower resembles female bee.

135. Answer (4)

FOAM is a citizen group called Friends of Arcata Marsh.

### SECTION-B

136. Answer (2)

On the basis of sequence of 16S ribosomal RNA genes, Carl Woese clustered all the organisms into 3 domains.

137. Answer (4)

Systematics includes taxonomy and phylogeny.

138. Answer (4)

Bryophyte have haploid main plant body.

139. Answer (1)

Members of deuteromycetes are majorly decomposers, they mainly reproduce by conidia and lack perfect stage in their life.

140. Answer (4)

T.O. Diener, for the first time discovered viroids.

141. Answer (4)

In spermatophytes (seed producing plants) multicellular female gametophyte is retained within megasporangium.

142. Answer (2)

In *Bougainvillea*, thorns are modifications of stem (axillary buds). In cactus, spines are modification of leaves.

143. Answer (3)

In racemose inflorescence, flowers are arranged in acropetal manner.

144. Answer (4)

C symbol is used for corolla and K is used for calyx. So,  $K_{(5)}$  represents gamosepalous condition.

145. Answer (2)

Steller's sea cow is an extinct species native to Russia.

146. Answer (2)

A classical example of point mutation is sickle cell anaemia.

147. Answer (4)

Total number of genotypes =  $3^3 = 27$

Total number of phenotypes =  $(2 \times 3 + 1) = 7$

148. Answer (4)

*Trichoderma* species are free living fungi that are very common in the root ecosystem and are effective against several plant pathogens.

149. Answer (2)

Tropical environments are less seasonal, relatively more constant and predictable.

150. Answer (1)

A population growth in a habitat with limited resources show initially a lag phase, followed by phases of acceleration then deceleration and finally an asymptote.

**ZOOLOGY****SECTION-A**

151. Answer (4)

*Cucumaria* belongs to phylum Echinodermata. Most distinct features are presence of water vascular system and calcareous endoskeleton.

*Echinus* is an enterocoelomate (echinoderm).

152. Answer (2)

Oxyntic cells - HCl and intrinsic factor

Bile pigments - Biliverdin and bilirubin

Lysozyme - Paneth cells of crypts of Lieberkühn

Scurvy - Deficiency of vitamin C (Ascorbic acid)

153. Answer (2)

In constipation, the faeces are retained within the colon as bowel movements occur irregularly.

Diarrhoea reduces the absorption of food. Vomiting is ejection of stomach contents through the mouth.

154. Answer (2)

Pneumoconiosis and asbestosis are occupational respiratory disorders.

155. Answer (4)

Individuals with blood group O are considered as universal donors as they lack antigen A and B on RBC's surface.

RBC's in individual having O<sup>-</sup> blood group also lack (Rh) D antigen.

156. Answer (2)

ANF (Atrial natriuretic factor) opposes the regulation by RAAS.

157. Answer (3)

Gliding joint – Between carpals

Saddle joint – Between carpals and metacarpals of thumb

158. Answer (3)

In light, photoreceptors cells are hyperpolarised.

159. Answer (1)

Simple goitre and cretinism is due to hypothyroidism while Addison's disease is due to deficiency of both glucocorticoids and mineralocorticoids.

160. Answer (1)

	Chromosome number in Gamete	Chromosome number in Meocyte
Human beings	23	46
Fruit fly	4	8
Butterfly	190	380

161. Answer (3)

LH surge induces ovulation and triggers corpus luteum to release progesterone.

162. Answer (3)

Norplant is an implant

Nirodh: Condom

Gossypol: Male contraceptive

163. Answer (3)

*Brachiosaurus* : Early long necked plant eater (herbivore) and quadruped with a long tail.

*Stegosaurus* : Herbivore, plate backed and spikes at the end of the tail.

164. Answer (1)

*Australopithecines* essentially ate fruits.

165. Answer (4)

Malignant malaria caused by *P. falciparum* is the most serious one and can be fatal.

Sporozoites are stored in the salivary gland of female *Anopheles* mosquito.

166. Answer (4)

Antitoxin (a preparation containing antibodies to the toxin) is an example of artificial passive immunity.

167. Answer (4)

In MOET, a cow is administered with FSH-like hormone to induce superovulation. They produce 6-8 eggs per cycle.

The fertilized eggs at 8-32 cells stages are recovered non-surgically and transferred to surrogate mothers.

168. Answer (2)

Plasmid is an autonomously replicating, closed circular, double stranded, extra chromosomal DNA.

169. Answer (1)

*Taq* polymerase is extracted from *Thermus aquaticus*.

170. Answer (4)

Agarose is a matrix used in gel electrophoresis.

171. Answer (1)

*Paurometabolus* i.e. 13 times moulting, 13 chambered heart and uricotelic mode of excretion are seen in cockroach.

172. Answer (4)

C-peptide chain is not present in mature insulin which is removed during maturation.

173. Answer (4)

Chitinous exoskeleton is present in arthropods like *Limulus*, a living fossil.

174. Answer (1)

Ligaments attach bone to bone.

175. Answer (4)

Both smooth and skeletal muscle fibres are unbranched, lack intercalated discs and have actin and myosin filaments. However, smooth muscle fibres are non-striated while skeletal muscle fibres are striated in appearance.

176. Answer (4)

Peptidoglycan is a heteropolysaccharide made up of NAG and NAM.

177. Answer (3)

Increase in  $H^+$  ions decreases pH (acidic pH) and shifts the oxygen dissociation curve to the right side.

178. Answer (3)

Thrombocytes are cell fragments produced from megakaryocytes and are involved in coagulation of blood.

179. Answer (1)

Minimum amount of urea is carried by renal vein.

180. Answer (3)

The proximity between the Henle's loop and vasa recta, as well as counter current in them help in maintaining an increasing osmolarity towards the inner medullary interstitial i.e. from 300 mOsmolL<sup>-1</sup> cortex to about 1200 mOsmolL<sup>-1</sup> in inner medulla.

181. Answer (1)

Arthritis : Inflammation of joints

Muscular dystrophy is a genetic disorder

182. Answer (2)

Cornea is composed of dense connective tissue and is the most sensitive part of eye.

183. Answer (2)

Thymosin is produced from thymus gland and plays major role in differentiation of T-lymphocytes.

184. Answer (1)

Thymine (T) is replaced by uracil (U) in RNA that base pairs with adenine.

Guanine is a purine.

185. Answer (3)

The substances which have teratogenic effect on developing embryo. Teratogenic effect is maximum during organogenesis.

#### SECTION-B

186. Answer (2)

Flightless birds lack functional wings.

187. Answer (4)

Earthworm, leech and tapeworm are hermaphrodites/bisexual animals.

188. Answer (4)

Bartholin's gland is a female accessory gland.

189. Answer (2)

Prolactin is primarily involved in lactation. oestrogen-progesterone ratio increases during parturition.

190. Answer (3)

LH surge triggers ovulation. Corpus luteum secretes progesterone which is essential for maintenance of endometrium.

191. Answer (4)

Chancroid is a STI caused by *Haemophilus ducrei*.

192. Answer (1)

Analogous structures exhibit convergent evolution. Species occurring in different geographical areas are called allopatric.

193. Answer (4)

Pomfrets is an edible marine fish.

194. Answer (2)

Smaller the fragment size, the farther it moves from the cathode.

195. Answer (1)

Bioprospecting refers to exploring molecular, genetic and species level diversity for products of economic importance.

196. Answer (3)

Foetal ejection reflex triggers release of oxytocin from maternal pituitary.

197. Answer (4)

Miller in his experiment took a gaseous mixture of methane, ammonia and hydrogen in ratio of 2 : 1 : 2 respectively.

198. Answer (1)

Inbreeding refers to mating of more closely individuals within same breed for 4 – 6 related generations.

**Out-crossing** involves mating of animals within the same breed but having no common ancestors on either side of their pedigree up to 4 – 6 generations.

**Cross-breeding** : In this method superior males of one breed are mated with superior female of another breed.

**Interspecific hybridisation** : In this method, male and female animals of two different related species are mated.

199. Answer (4)

'X'-GIFT

'Y' - *in vivo*

200. Answer (3)

Chordates possess ventral heart whereas non-chordates have dorsal heart (if present).

□ □ □

