04/06/2022

RM_CODE-A

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 – I2

Answers

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


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Time : 3 Hrs. 20 Min.

(*for* NEET-2022)

Test – I2

Answers & Solutions

PHYSICS

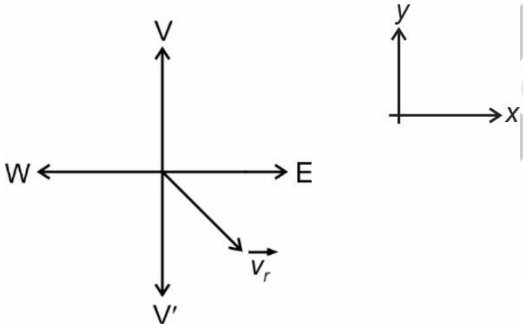
SECTION-A

1. Answer (3)

$$\frac{v^2}{rg} = \frac{(LT^{-1})^2}{L \times LT^{-2}}$$

$$\left[\frac{v^2}{rg}\right] = [M^0L^0T^0]$$

2. Answer (3)



Let $\vec{v}_r = a\hat{i} - b\hat{j}$

$\vec{v}_{rm} = (a-4)\hat{i} - b\hat{j}$ (in first condition)

$a - 4 = 0$

$a = 4$ km/h

$\vec{v}_{rm'} = (a-8)\hat{i} - b\hat{j}$ (in second condition)

$\vec{v}_{rm'} = (4-8)\hat{i} - b\hat{j}$

$= -4\hat{i} - b\hat{j}$

$\tan 30° = \frac{4}{b}$

$\frac{1}{\sqrt{3}} = \frac{4}{b}$

$b = 4\sqrt{3}$

$\vec{v}_{rg} = 4\hat{i} - 4\sqrt{3}\hat{j}$

$|\vec{v}_{rg}| = \sqrt{4^2 + (-4\sqrt{3})^2}$

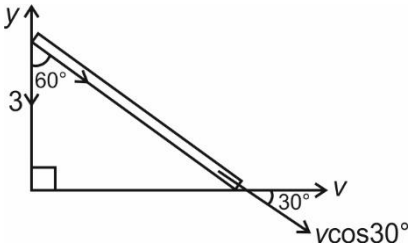
$= 8$ km/h

$v_{rg}\cos\theta = 4$

$\cos\theta = \frac{1}{2}$

$\theta = 60°$

3. Answer (2)



$3\cos 60^o = v\cos 30^o$

$3 \times \frac{1}{2} = v \times \frac{\sqrt{3}}{2}$

$v = \sqrt{3}$ m/s

4. Answer (4)

$f_{S_{max}} = \mu_S N$

$= 0.6 \times 2 \times 10$

$= 12$ N

$F_A = ma$

$= 2 \times 4$

$= 8$ N

$F_A < f_{s_{max}}$

$f = F_A$

$= 8$ N

5. Answer (1)

$T - mg = ma$

$T = 20m$

$P = \vec{T} \cdot \vec{v}$

$500 = 20m \times 10$

$m = 2.5$ kg

6. Answer (1)

$$F = \frac{-dU}{dx}$$

$$-dU = \frac{-4}{x^2}dx$$

$$U_f - U_i = \int_4^2 4x^{-2}dx$$

$$U_i - U_f = 4\left[\frac{1}{x}\right]_4^2$$

$$U_i - U_f = 4\left[\frac{1}{2} - \frac{1}{4}\right]$$

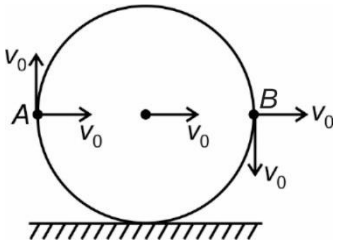
$$(U_i - U_f) = 1$$

Loss of potential = Gain in kinetic energy

$$1 = \frac{1}{2} \times 2 \times v^2$$

$v = 1$ m/s

7. Answer (2)



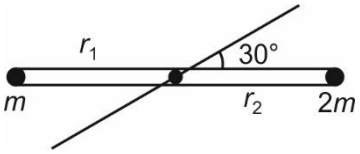
$v_{AB} = 2v_0$

$$\omega_{AB} = \frac{v_{AB}}{2R}$$

$$= \frac{2v_0}{2R}$$

$$= \frac{v_0}{R}$$

8. Answer (2)



$$r_1 = \frac{m \times 0 + 2md}{3m}$$

$$r_1 = \frac{2d}{3}$$

$$r_2 = d - \frac{2d}{3}$$

$$= \frac{d}{3}$$

$$I = m\left(\frac{2d}{3}\sin 30°\right)^2 + 2m\left(\frac{d}{3}\sin 30°\right)^2$$

$$I = \frac{md^2}{9} + \frac{md^2}{18}$$

$$= \frac{3md^2}{18}$$

$$= \frac{md^2}{6}$$

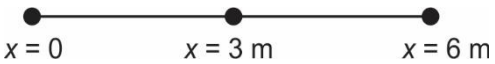
9. Answer (4)

$F = -5x + 15$

$F = -5(x - 3)$

$\Rightarrow$ $x = 3$ is mean position and amplitude

$= 6 - 3 = 3$ m



The time taken to move from $x = 6$ m to $x = 0$ is $\frac{T}{2}$

$$\Rightarrow \quad \frac{T}{2} = \frac{1}{2} \Rightarrow T = 1 \text{ s}$$

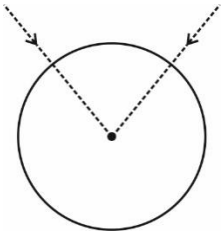
$$\omega = \frac{2\pi}{T} = 2\pi \text{ rad/s}$$

Hence $(x - 3) = 3\cos(2\pi t)$

$x = 3 + 3\cos(2\pi t)$

10. Answer (1)

The gravitational force is towards the centre of the earth. Therefore, separation decreases.



11. Answer (3)

$$L = 10\log\frac{I}{I_0}$$

$$10\log\frac{I}{I_0} = 60$$

$$\log\frac{I}{I_0} = 6$$

$$\frac{I}{I_0} = 10^6$$

$I = 10^{-6}$ W/m^2

Power = IA

$= 2 \times 10^{-6}$

$E = 2 \times 10^{-6} \times 10 \times 60 \times 60$

$= 72$ mJ

12. Answer (1)

When S_1 is closed and S_2 is opened

$$I = \frac{E_P}{3r}$$

$E = Ir_1$

$$E = I \times \frac{I}{2} \times \frac{2r}{I}$$

$$E = \frac{E_P}{3}$$

When S_2 is opened and S_1 is closed

$$I_2 = \frac{E_P}{r_2 + r}$$

$$E = I_2 \times r_2$$

$$= \frac{2E_P r_2}{3(r_2 + r)}$$

$$\frac{E_P}{3} = \frac{2E_P r_2}{3(r_2 + r)}$$

$r_2 + r = 2r_2$

$r_2 = r$

13. Answer (3)

$$U = \frac{1}{2}nfRT$$

$PV = nRT$

$$\frac{U}{V} = \frac{1}{2}\left(\frac{nRT}{V}\right) \times f$$

$$= \frac{1}{2}P \times f$$

$$= \frac{1}{2} \times 4 \times 10^5 \times 3$$

$= 6 \times 10^5$ J/m^3

14. Answer (4)

The first over tone in a closed pipe have frequency $f = \frac{3v}{4l}$.

15. Answer (3)

$y(x, t) = 2.0 \cos (20\pi t - 2\pi \times 0.008x + 2\pi \times 0.35)$

$$\Delta\phi = 2\pi\frac{8 \times 10^{-3}}{10^{-2}} \times 4$$

$\Delta\phi = 6.4\ \pi$

16. Answer (1)

$$\left(\frac{dQ}{dt}\right)_1 = \left(\frac{dQ}{dt}\right)_2$$

$$\frac{K_1 A\Delta T}{l_1} = \frac{K_2 A\Delta T}{l_2}$$

$$\frac{K_1}{K_2} = \frac{l_1}{l_2}$$

$$= \frac{\pi R}{2R} = \frac{\pi}{2}$$

17. Answer (4)

$T = 2\pi\sqrt{\frac{m}{k}}$ remains uncharged

$kx_0 \longleftarrow \square \longrightarrow qE$

Mean position shift rightward.

18. Answer (1)

The latent heat of vaporisation of water is more than latent heat of fusion of ice because on vaporisation much larger increase in volume takes place.

19. Answer (1)

For a body emissivity = absorptivity = 0.2

$$\frac{E_b}{a_b} = \frac{E_B}{a_B}$$

$$\frac{100}{1} = \frac{E_B}{a_B}$$

$\Rightarrow E_B = 0.2 \times 100$

$= 20\ W/m^2$

20. Answer (3)

Cycle-I is clockwise therefore work done will be positive for cycle-I.

21. Answer (2)

$F_{flat} = T \times 2R$

$F_{curved} = T \times \pi R$

$$\frac{F_{flat}}{F_{curved}} = \frac{T \times 2R}{T \times \pi R}$$

$= 2 : \pi$

22. Answer (1)

The stress in the wire = $\dfrac{\text{Tension}}{\text{Area of cross-section}}$

To avoid breaking, this stress should not exceed the breaking stress.

Let the tension in the wire be T.

The equation of motion of the two blocks are

$T - 10\ N = (1\ kg)a$

$20N - T = (2\ kg)a$

Eliminating 'a' from these equations

$$T = \left(\frac{40}{3}\right) N$$

$$\text{Stress} = \frac{(40/3)\ N}{\pi r^2}$$

If the minimum radius needed to avoid breaking is r, $2 \times 10^9 = \dfrac{40/3}{\pi r^2}$

$r = 4.6 \times 10^{-5}$ m

23. Answer (1)

$$\frac{F}{A} = -\eta \frac{dv}{dx}$$

Here F is a tangential force between two layers of liquid it mean $\dfrac{F}{A}$ will be tangential stress.

24. Answer (2)

$\phi = BA$

$\phi = B\pi r^2$

$$\varepsilon = \frac{-d\phi}{dt}$$

$$\varepsilon = B\pi 2r \frac{dr}{dt}$$

$2 \times 10^{-3} = 10^{-3} \times \pi \times 2 \times r \times 10^{-2}$

$$r = \frac{100}{\pi}\ m$$

25. Answer (3)

$$I = \frac{E}{R + nR}$$

$$I_1 = \frac{E}{R + \frac{R}{n}}$$

$I_1 = 5I$

$$\frac{E}{R + \frac{R}{n}} = \frac{5E}{R + nR}$$

$$\frac{nE}{nR + R} = \frac{5E}{R + nR}$$

$n = 5$

26. Answer (1)

Lyman series lie in ultraviolet region of electromagnetic spectrum.

27. Answer (4)

$N = N_0 e^{-\lambda t}$

$$\frac{N}{N_0} = e^{-\lambda t}$$

$$\frac{1}{20} = e^{-\lambda t}$$

$\lambda t = \ln 20$

$$\frac{\ln 2}{5.6} \times t = \ln 20$$

$$t = \frac{\ln 20}{\ln 2} \times 5.6$$

$= 24.2$ days

28. Answer (3)

$I_{max} = \left(\sqrt{I} + \sqrt{4I}\right)^2$

$= 9I$

$$I_{min} = \left(\sqrt{4I} - \sqrt{I}\right)^2$$

$$= I$$

$$\frac{I_{max} - I_{min}}{I_{max}} = \frac{9I - I}{9I}$$

$$= \frac{8}{9}$$

29. Answer (4)

At resonance net potential drop across inductor and capacitor will be zero potential drop will be only across resistor therefore, reading of voltmeter V_1 and V_2 will be non zero.

30. Answer (2)

$$M = \frac{qL}{2m}$$

$$L = \frac{mR^2}{2}\omega$$

$$M = \frac{q}{2m} \times \frac{mR^2}{2}\omega$$

$$= \frac{qR^2\omega}{4}$$

$$= \frac{\sigma\pi R^4\omega}{4}$$

31. Answer (1)

Magnetic susceptibility of diamagnetic material is negative which is independent on temperature.

32. Answer (3)

Field due to $AA' = \frac{\mu_0 i}{4\pi R}$

= Field due to BB'

Field due to $BA = \frac{\mu_0 i}{8R}$

Field due to $CD = -\frac{\mu_0 i}{8R}$

$\therefore$ Net field at $O = \frac{\mu_0 i}{2\pi R}$

33. Answer (3)

Frequency of electric field and magnetic field in the EM wave will be same.

34. Answer (4)

$$\phi = \frac{q_{inside}}{\epsilon_0} = \frac{Q}{8\epsilon_0}$$

35. Answer (4)

$$C = \frac{A\epsilon_0}{d}$$

Capacitance of the plate depends on area of the plate, medium between the plates and distance between the plates.

SECTION-B

36. Answer (3)

$$\mu = \frac{\sin\left(\frac{A+A}{2}\right)}{\sin\left(\frac{A}{2}\right)}$$

$$\Rightarrow \quad \mu = 2\cos\frac{A}{2}$$

$$A = 2\cos^{-1}\left(\frac{\mu}{2}\right)$$

37. Answer (1)

$$M_\infty = \frac{-f_0}{f_e}$$

$$10 = \frac{-f_0}{f_e}$$

$L_\infty = f_0 + f_e$

$110 = 10f_e + f_e$

$f_e = 10$ cm

$$M_D = \frac{-f_0}{f_e}\left(1 + \frac{f_e}{D}\right)$$

$$= 10\left(1 + \frac{10}{25}\right)$$

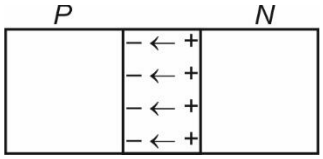
$$= \frac{10 \times 35}{25}$$

$$= 14$$

38. Answer (2)

If a very small opaque disc is placed in the path of monochromatic light. Its geometrical shadow has dark point at the centre surrounded by alternate bright and dark rings.

39. Answer (1)



direction of electric field across barrier will be from *N* type to *P* type therefore force will be in the direction of velocity.

$v^2 = u^2 + 2as$

$$v = \sqrt{v_0^2 + \frac{2eV}{m}}$$

40. Answer (4)

$A = A_1 \cdot A_2$

$A = 100 \times 200$

$= 20000$

41. Answer (1)

$y = y_1 + y_2$

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

$= 1 + 0$

$= 1$

42. Answer (4)

Stopping potential remains same as frequency remains same. Saturation current is directly proportional to intensity of light i.e. $i \propto I \propto \frac{1}{r^2}$.

43. Answer (4)

Nuclear reaction obeys the law of conservation of mass, energy, charge and momentum.

44. Answer (4)

$${}^{238}_{92}U \longrightarrow 2\beta^{+1} + \alpha + {}_{88}X^{234}$$

$N_P + N_n = 234$

$N_P = 88$

$88 + N_n = 234$

$N_n = 234 - 88$

$= 146$

45. Answer (3)

$$\frac{1}{2}mv_0^2 = \frac{q_1 q_2}{4\pi\epsilon_0 r}$$

46. Answer (2)

$M = \rho V$

$$\rho = \frac{M}{V}$$

$$= \frac{87.2}{25}$$

≈ 3.488

$= 3.5 \text{ g cm}^{-3}$

47. Answer (4)

By conservation of linear momentum

$4 \times 300 \times 10^{-3} = (0.8 + 4 \times 10^{-3})\, v$

$1.2 = (0.8 + 0.004)\, v$

$$v = \frac{1.2}{0.804}$$

$$S = \frac{V^2}{2a}$$

$$= \frac{v^2}{2\mu g}$$

$$= \frac{(1.2)2}{(0.804)^2 \times 2 \times 0.3 \times 9.8} = 0.379 \text{ m}$$

48. Answer (1)

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

$$\frac{1}{2u} - \frac{1}{u} = \frac{1}{f}$$

$$-\frac{1}{2u} = \frac{1}{f}$$

$$u = -\frac{f}{2}$$

For 2nd case

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

$$\frac{1}{-2u_1} - \frac{1}{u_1} = \frac{1}{f}$$

$$-\frac{3}{2u_1} = \frac{1}{f}$$

$$u_1 = -\frac{3f}{2}$$

$$(u_1 - u) = \left| -\frac{3f}{2} - \left(-\frac{f}{2} \right) \right|$$

$= f$

49. Answer (2)

$$f = \frac{v}{2\ell}$$

$$v = \sqrt{\frac{T}{\mu}}$$

When stone is immersed in water, then tension in string decrease, therefore, frequency will decrease.

50. Answer (3)

In steady state no current will flow through capacitor.

$2V - V - 3RI = 0$

$I = \left(\frac{V}{3R}\right)$

$V - V_C = 2V - 2R \times \frac{V}{3R}$

$V - V_C = \frac{4V}{3}$

$|V_C| = \frac{V}{3}$

CHEMISTRY

SECTION-A

51. Answer (2)

Molar mass of the gas

$= 1.97 \times 22.4 = 44$ g

$\therefore$ Gas is CO_2

52. Answer (4)

$XeOF_2$; sp^3d, XeF_2; sp^3d, PCl_5; sp^3d and

$SF_6 \rightarrow sp^3d^2$

53. Answer (1)

$W = -P(V_2 - V_1)$

$= -20\ (0.4 - 0.1) \times 100\ J = -600\ J$

54. Answer (3)

Acidic buffer is a mixture of weak acid and its salt with strong base.

55. Answer (4)

Increase in temperature favours endothermic reactions.

56. Answer (3)

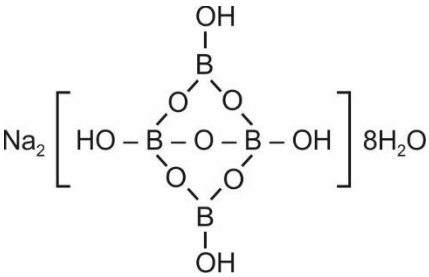
In NO_3^-, N has its highest oxidation state +5.

57. Answer (2)

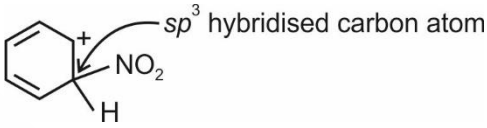
Fullerene contains 12 five membered and 20 six membered ring.

58. Answer (2)

Structure of borax



59. Answer (3)



60. Answer (3)

$$Ph - C \equiv CH \xrightarrow[60^\circ]{Hg^{2+},\ H^+/H_2O} Ph - \underset{\displaystyle OH}{\overset{|}{C}} = CH_2$$

$$\xrightarrow{\text{isomerisation}} Ph - \underset{\displaystyle O}{\overset{\|}{C}} - CH_3 \quad \text{(Ketone)}$$

61. Answer (1)

$\therefore$ % of $N = \frac{1.4 \times \text{meq. of } NH_3}{\text{wt. of compound}}$

$\therefore$ % of $N = \frac{1.4 \times (0.5 \times 2) \times 10}{0.8} = 17.5\%$

62. Answer (1)

Li^+ ion is surrounded by four O^{2-} ion and each O^{2-} ion is surrounded by 8 Li^+.

63. Answer (1)

Acidic nature of alcohols decreases as $CH_3OH > 1^o > 2^o > 3^o$

64. Answer (4)

$$R - C \equiv N \xrightarrow{DIBAL-H} R - CH = NH \xrightarrow{H_2O} RCHO$$

65. Answer (4)

Heating of different calcium salts of carboxylic acids gives mixed products.

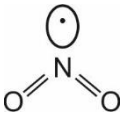
66. Answer (1)

Carbylamine test is given by 1^o amines only.

67. Answer (2)

Caprolactum polymerises to give nylon–6.

68. Answer (3)


has bent structure.

69. Answer (3)

20 volume $H_2O_2 = \frac{20}{11.2}M$

$= \frac{20}{11.2} \times \frac{34}{10} g/100\ mL$ of solution

= 6%

70. Answer (2)

In cement, % of CaO is 50-60%.

% of Al_2O_3 is 5-10%, % of Fe_2O_3 is 1-2%.

71. Answer (3)

B $\rightarrow$ Si shows diagonal relationship.

72. Answer (3)

$+I$ effect $-CH_2^- > -\bar{O} > -CH_3, \overset{\ominus}{O}H$ show –I effect

73. Answer (3)

$$Z = \underset{\text{(at face centre)}}{\frac{1}{2} \times 6} + \underset{\text{(at corners)}}{\frac{1}{8} \times 8} = 4$$

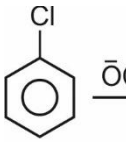
74. Answer (4)

More the reduction potential, lesser will be reducing power.

75. Answer (1)

CdS is a negative colloid.

76. Answer (1)



$CH_2 = CH - Cl \xrightarrow{\bar{O}CH_3}$ No reaction

77. Answer (1)

$\bar{F}$ is weakest while CH_3^- is strongest nucleophile.

78. Answer (3)

Slightly alkaline medium is required for the reaction.

79. Answer (2)

Glucose + HI $\xrightarrow{Red\ P}$ n-Hexane

80. Answer (1)

Sucralose does not contain an amide bonding.

81. Answer (2)

For n = 4, l = 0, 1, 2 and 3 are possible.

For l = 3, m = –3, –2, –1, 0, 1, 2, 3 are possible.

82. Answer (1)

Un	un	nill	ium	
1	1	0		$\Rightarrow 110$

83. Answer (3)

$O_2(16)$: $\sigma 1s^2\ \sigma^* 1s^2\ \sigma 2s^2\ \sigma^* 2s^2 \sigma 2p_z^2$

$$\begin{cases} \pi 2p_x^2 & \begin{cases} \pi^* 2p_x^1 \\ \pi^* 2p_y^1 \end{cases} \\ \pi 2p_y^2 \end{cases}$$

Six electrons are present in ABMO of O_2.

84. Answer (4)

NH_3 forms H-bonding.

85. Answer (2)

$$\Delta S = 2.303 nR \log \frac{V_f}{V_i}$$

$$= 2.303 \times 2 \times 8.314 \times \log \frac{2V}{V} = 11.488 \approx 11.5\ JK^{-1}$$

SECTION-B

86. Answer (3)

For conjugate acid base pair $K_a.K_b = K_w$

$$K_b = \frac{K_w}{K_a} = \frac{10^{-14}}{2 \times 10^{-5}} \Rightarrow 5 \times 10^{-10}$$

87. Answer (3)

Hydrolysis of dialkyl – dichlorosilane followed by condensation polymerisation yields straight chain polymers.

88. Answer (1)

$$4FeCr_2O_4 + 8Na_2CO_3 + 7O_2 \rightarrow 8Na_2CrO_4 + 2Fe_2O_3 + 8CO_2$$

89. Answer (1)

In $[Fe(H_2O)_6]^{3+}$, Fe^{3+} has five unpaired electrons, so it will be paramagnetic.

90. Answer (3)

Cd = 0.005 mg /dm^3 = 0.005 ppm

91. Answer (1)

In phenol and aniline intermolecular H-bonding takes place.

92. Answer (1)

$2H^+(aq) + 2e^- \rightarrow H_2(g)$

$$E = -\frac{0.0592}{2}\log\left[\frac{1}{[H^+]^2}\right] = 0.0591\log[H^+]$$

$= -0.0591$ pH

$= -0.0591 \times 1 = -0.0591$ V

93. Answer (4)

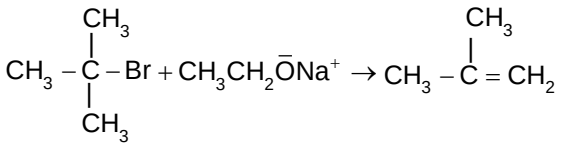
$r_0 \propto a_0 \quad r \propto \frac{a_0}{2^2} = \frac{a_0}{4}$

$$\frac{r_0}{r} = \frac{4}{1}$$

94. Answer (3)

Haemoglobin is a positively charged sol.

95. Answer (1)



Elimination reaction

96. Answer (4)

Cannizzaro reaction.

97. Answer (4)

3° amines do not react with benzene sulphonyl chloride.

98. Answer (4)

Alitame has 2000 times more sweeter than cane sugar.

99. Answer (2)

Ethylene diamine is a bidentate ligand which forms rings. So it is also a chelating ligand.

100. Answer (1)

Colemanite $\rightarrow Ca_2B_6O_{11}$

It is an ore of boron.

BOTANY

SECTION-A

101. Answer (2)

Red algae reproduce asexually by non-motile spore.

Example : *Polysiphonia*, *Porphyra*

102. Answer (1)

The cells of pericycle in monocot plants give rise to lateral roots.

103. Answer (1)

Low concentration of N, S, Mo in many plants delay flowering.

104. Answer (2)

One molecule of nitrogen is converted into two molecules of ammonia.

$N_2+8e^-+8H^+ +16ATP \rightarrow 2NH_3+H_2+16ADP+16P_i$

105. Answer (3)

C_4 plants involve both C_3 and C_4 cycle. 3 ATP are consumed to fix one CO_2 in C_3 cycle and 2 ATP are consumed to fix one CO_2 in C_4 cycle. Hence, total 5 ATP are consumed for every CO_2 fixed in C_4 plants.

106. Answer (1)

In glycolysis, glucose is phosphorylated to glucose - 6 - phosphate by using ATP in the presence of hexokinase.

107. Answer (3)

Conidium is a mode of reproduction in fungi.

108. Answer (1)

The hard outer layer of pollen grain is exine. It is made up of sporopollenin that is one of the most resistant organic material known.

109. Answer (3)

The number of meiotic division required for n number of seeds is

$n + \frac{n}{4}$

$n = 120$

$\therefore \quad 120 + \frac{120}{4} = 150$

110. Answer (1)

Type of gamete formed with given genotype is 2^n.

$\because$ n = Number of heterozygous loci = 2

$\therefore \quad 2^2 = 4$

111. Answer (1)

Lice is present on body surface of host and obtain their nutrition. Hence, lice shows ectoparasitism.

112. Answer (2)

Yellowing of Taj Mahal is reported to be caused by sulphur dioxide.

113. Answer (4)

Swiss cheese is ripened with help of bacterium *Propionibacterium sharmanii*.

114. Answer (3)

During prophase-I, at pachytene stage, crossing over occur between non sister chromatids of the homologous chromosoems.

115. Answer (3)

During G_2 phase tubulin protein are synthesised in preparation for mitosis while cell growth continues.

116. Answer (3)

Splitting of centromere takes place in anaphase II.

117. Answer (2)

Biodiversity increases from poles to equator.

118. Answer (4)

Chipko movement was started in Himalayas in 1974. Women showed enormous bravery in protecting trees from the axe of contractors by hugging them.

119. Answer (1)

Floral formula of the members of Fabaceae family is

$\% \; ♂♀ \; K_{(5)} \, C_{1+2+(2)} \, A_{(9)+1} \, \underline{G}_1$

120. Answer (2)

Marchantia is dioecious.

121. Answer (3)

Water potential of a solution is negative due to presence of solute in them.

122. Answer (2)

Potassium concentration in guard cell helps in opening and closing of stomata.

123. Answer (2)

In non-cyclic photophosphorylation, water is required as external source of electron.

124. Answer (4)

Photophosphorylation takes place in chloroplast not in mitochondria.

125. Answer (2)

Cytoplasm is the site of lactic acid and alcohol fermentation in cell.

126. Answer (2)

Adenine derivative phytohormone is cytokinin. This PGR delays senescence in plants.

127. Answer (3)

RNA polymerase I transcribes (28S, 18S, 5.8S) rRNA.

RNA polymerase II transcribes precursor of mRNA that is hnRNA.

RNA polymerase III transcribes tRNA, 5S rRNA and snRNA.

128. Answer (4)

Endodermis is absent in monocot stem.

129. Answer (3)

Protonema is the juvenile or the first stage in life cycle of mosses which develops directly from a spore.

130. Answer (3)

Sorghum is C_4 plant in which double CO_2 fixation occurs. Rice, potato and wheat are C_3 plants.

131. Answer (3)

For every CO_2 molecule entering Calvin cycle, three molecules of ATP and two molecules of NADPH are required.

132. Answer (1)

Anabaena and *Nostoc* are free-living nitrogen fixing cyanobacteria.

133. Answer (2)

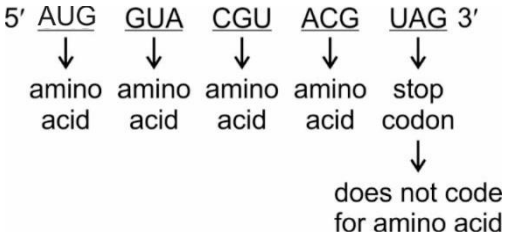
According to given question, stretch of DNA is

3′ TACC ATGCATGC ATC 5′ Template strand

5′ ATGG TACGTACG TAG 3′ Coding strand

Since, template strand is involved in transcription

Hence, the m-RNA produced will be



Hence, total amino acids coded will be 4.

134. Answer (4)

Cuscuta on hedge plants show parasitism.

135. Answer (4)

Both moisture and temperature are most important climatic factor that regulate decomposition.

SECTION-B

136. Answer (1)

Chlorofluorocarbon is mainly responsible for ozone depletion.

137. Answer (3)

Plasmodium is sporozoan and does not have locomotory structure. They are endoparasite.

138. Answer (1)

Primary consumers are first order consumers and they directly feed on producers. They convert plant matter into animal matter.

139. Answer (3)

In gaseous cycle, reservoir pool is atmosphere or hydrosphere.

140. Answer (4)

Nucleolus is present in eukaryotic cells.

141. Answer (4)

Viroids are RNA particles. Viruses have capsid but viroids do not.

142. Answer (3)

Life cycle pattern of *Ectocarpus* and *Volvox* are haplodiplontic and haplontic respectively.

143. Answer (1)

Atlas 66 is a wheat variety having a high protein content has been used as a donor for improving cultivated wheat.

144. Answer (3)

Through meristem culture, we can obtain virus free plant from diseased plant.

145. Answer (3)

Cyclosporine A is an immunosuppressive agent used for organ transplant patients. It is produced by the fungus *Trichoderma polysporum*.

146. Answer (3)

Treatment of waste water is done by the heterotrophic microbes naturally present in sewage.

Sedimented bacterial flocs in settling tank is called activated sludge.

147. Answer (1)

Exponential population growth curve equation is represented by $\frac{dN}{dt} = rN$.

148. Answer (1)

Complex I – NADH dehydrogenase

Complex II – Succinate dehydrogenase

Complex III – Cytochrome bc_1 complex

Complex IV – Cytochrome *c* oxidase complex

149. Answer (1)

Poaceae is family of wheat.

150. Answer (2)

Conidia are produced exogenously in sac fungi.

ZOOLOGY

SECTION-A

151. Answer (3)

A non-competitive inhibitor binds the enzyme at a site distinct from that to which substrate binds.

152. Answer (3)

Most of the amino acids are absorbed by active transport.

153. Answer (2)

Increase in volume of thoracic cavity causes increase in volume of pulmonary cavity leading to reduction in pressure within pulmonary cavity which causes inflow of air.

154 Answer (1)

QRS complex represents ventricular depolarisation.

155. Answer (3)

Thigh muscles are skeletal muscles. Fusiform/spindle shape is a characteristic of smooth muscle fibres.

156. Answer (4)

Blind spot lacks rods and cones.

157. Answer (1)

Nociceptors and algesireceptors respond to pain.

158. Answer (2)

Protein hormones have cell surface receptors. Two or more hormones producing the same effect is synergism.

159. Answer (3)

Osteichthyes have bony endoskeleton.

160. Answer (1)

Seminal vesicles store the sperms and glue them together to form spermatophore.

161. Answer (1)

Euglena shows longitudinal binary fission whereas gemmule formation is seen in sponges.

162. Answer (2)

Capacitation of sperms occur in female genital system.

163. Answer (3)

Since luteal phase is of fixed duration, *i.e.* 14 days, we can assume that ovulation occurs on 20^{th} day, that is when she is most likely to conceive.

164. Answer (4)

ICSI is intra cytoplasmic sperm injection in which fertilisation occurs in the laboratory in petridish.

165. Answer (1)

Natural selection of one type of moth indicates directional selection.

166. Answer (3)

Presence of tail in human child shows atavism.

167. Answer (2)

Gene gun is also called biolistics.

168. Answer (3)

IgG is mainly formed in secondary immune response. IgM is first formed in primary immune response.

169. Answer (3)

The structure represents morphine, whose acetylation product is heroin which is white, odourless, bitter, crystalline compound and is a depressant which is generally snorted.

170. Answer (1)

Hilsa is an edible marine fish.

171. Answer (4)

The causative agent of malaria is *Plasmodium* and vector is female *Anopheles*.

172. Answer (2)

Restriction endonuclease cut DNA at specific positions within the molecule.

173. Answer (2)

Golden rice contains a gene that codes for β–carotene which is a precursor of vitamin A, the deficiency of which causes night blindness.

174. Answer (1)

RNAi involves silencing of RNA so that translation does not occur.

175. Answer (4)

lacZ gene codes for β–galactosidase which gives blue colour with chromogenic substance X–gal. Insertional inactivation of this gene produces white colonies.

176. Answer (1)

The matrix of bone is hard and non-pliable which is rich in calcium salts and collagen fibres.

177. Answer (3)

Sphincter of Oddi is present at the opening of ampulla of Vater into the duodenum.

178. Answer (2)

The word emphysema means 'full of air'. Loss of walls of alveoli reduces the surface area for exchange of gases.

179. Answer (1)

Reptiles, birds and land snails are uricotelic.

180. Answer (2)

Graves' disease is an autoimmune disease that occurs due to hypersecretion of thyroxine.

181. Answer (1)

Pinctada belongs to phylum Mollusca, *Felis* is a mammal, spider belongs to class Arachnida.

182. Answer (3)

Sycon belongs to phylum Porifera, the members of which, contain flagellated canals and spongocoel for the movement of water.

183. Answer (3)

Alary muscles are part of circulatory system of cockroach.

184. Answer (3)

UV rays are non-ionising rays which cause DNA damage leading to neoplastic transformation.

185. Answer (3)

Mucosa associated lymphoid tissue constitutes about 50% of lymphoid tissue in human body.

SECTION-B

186. Answer (2)

The DNA fragments obtained and purified in this way are used for constructing rDNA.

187. Answer (3)

A stirred tank bioreactor facilitates even mixing and oxygen availability throughout the bioreactor. Purification and filtration are parts of downstream processing.

188. Answer (3)

Transgenic plants prevent early exhaustion of fertility of soil.

189. Answer (2)

Compound epithelium is made of more than one layer of cells (multi-layered).

Fibroblasts secrete fibres. Cartilage, bone and blood are various types of specialised connective tissue.

190. Answer (4)

Protein Functions

Collagen – Intercellular ground substance

Trypsin – Enzyme

Insulin – Hormone

Antibody – Fights infections agents

Receptor – Sensory reception (smell, taste *etc*.)

GLUT-4 – Enables glucose transport into cells

191. Answer (1)

Nucleases are present in pancreatic juice.

192. Answer (4)

Blood group 'O' can be donated to persons with any other blood group and hence 'O' group individuals are called 'universal donors'.

193. Answer (3)

Semilunar valves close when ventricular pressure falls. Oxygenated blood is carried by pulmonary vein. First heart sound is produced due to closure of AV valves.

194. Answer (4)

ANF opposes the regulation of RAAS. The wall of the atria of the heart releases ANF in response to an increase in blood volume and pressure. ANF causes vasodilation (dilation of blood vessels) and thereby decreases the blood pressure.

195. Answer (2)

Sutures are fibrous joints and do not allow any movement.

196. Answer (2)

Corpora quadrigemina comprises superior colliculi and inferior colliculi.

197. Answer (1)

After spermiogenesis the sperm heads become embedded in the Sertoli cells, and are finally released from the seminiferous tubules by the process called spermiation.

198. Answer (2)

In vasectomy, a small part of the vas deferens is removed or tied up through a small incision of the scrotum.

199. Answer (1)

Homo habilis – 650 to 800 cc

Homo erectus – 900 cc

Cro-magnon man – 1650 cc

Neanderthal man – 1400 cc

200. Answer (2)

Darwin postulated that evolution was gradual unlike de Vries.

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