# All India Aakash Test Series for Medical-2016

click here for code-B solutions

## TEST - 9 (Code-A)

**Test Date : 03-04-2016**

## ANSWERS

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

# Hints to Selected Questions

## [PHYSICS]

1. Answer (2)

2. Answer (3)

$$R = \frac{PQ}{\pi r^2}$$

$$R\% = I\% + 2r\%$$

$$= \left(\frac{1}{100} + 2 \times \frac{0.02}{1}\right) 100$$

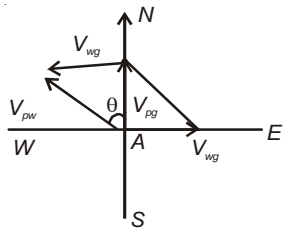
3. Answer (3)

4. Answer (3)

$$v_x = 1 \text{ m/s} \quad v_y = 2 \text{ m/s}, \quad \tan\theta = \frac{v_y}{v_x}$$

$$y = \tan\theta - \frac{1}{2} g \frac{x^2}{v_x^2}$$

5. Answer (3)




$$\vec{V}_{pg} \sin\theta = \vec{V}_{wg}$$

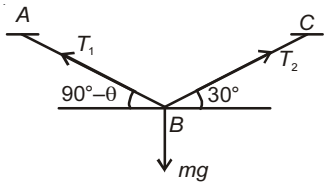
$$40 \sin\theta = 20$$

$$\theta = 30°$$

6. Answer (4)

*P* will be the maximum height.

7. Answer (1)

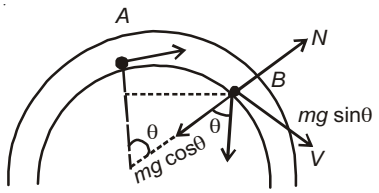



$$\frac{T_1}{\sin 120°} = \frac{Mg}{\sin(60° + \theta)}$$

$(T_1)_{min}$ where $\sin(60° + \theta) = 1$

$\theta = 30°$

8. Answer (3)

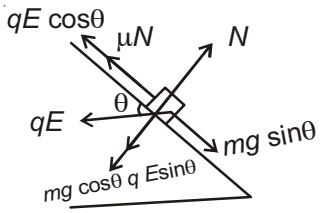



Between *A* and *B*

$$mg(R - R\cos\theta) + 0 = \frac{1}{2}mv^2$$

$$mg\cos\theta - N = \frac{mv^2}{R}, \quad N = 0$$

9. Answer (1)




$$N = mg\cos\theta + qE\sin\theta$$

$$mg\sin\theta = \mu N + qE\cos\theta$$

10. Answer (2)

$V_{12}$ is uniform along – *y* axis.

$$\vec{V}_{12} = \left(u_1\cos 37°\,\hat{i} + u_1\sin 37°\,\hat{j}\right) - \left(u_2\cos 53°\,\hat{i} + u_2\sin 53°\,\hat{j}\right)$$

$$= \left(u_1\cos 37° - u_2\cos 53°\right)\hat{i} + \left(u_1\sin 37° - u_2\sin 53°\right)\hat{j}$$

$$u_1\cos 37° - u_2\cos 53° = 0$$

$$u_1\left(\frac{4}{5}\right) = u_2\left(\frac{3}{5}\right)$$

$$4u_1 = 3u_2$$

11. Answer (4)

12. Answer (1)

13. Answer (2)

14. Answer (3)

15. Answer (3)

$C = C_v - \frac{R}{u-1}$, $PV^n$ = constant

$P = \frac{K}{T} \quad \left(\frac{PV}{T} = \text{constant}\right)$

$P^2V = K$

$PV^{\frac{1}{2}} = K$

16. Answer (4)

$mV_0 = 2m\,v$

$\frac{1}{2}(2m)v^2 = \frac{1}{2}K\,x^2$

17. Answer (3)

18. Answer (3)

$A_1V_1 = A_2V_2$

19. Answer (2)

$f' = f\left(\frac{V - V_w + V_o}{V - V_w - V_s}\right)$

20. Answer (2)

21. Answer (1)

22. Answer (4)

$\vec{P}_i = mv\,\hat{i}$

$\vec{P}_i = m\frac{v}{\sqrt{3}}\,\hat{j} + m\vec{v}$

$\vec{P}_i = \vec{P}_f$

23. Answer (1)

$5 - 10i = 2 + i\ x = 4$

24. Answer (2)

25. Answer (1)

$\frac{1}{2}\,5\,(12)^2 \times 10^{-6} + 120 \times 12 \times 10^{-6}$

$= \frac{1}{2}\,5\,(12)^2 \times 10^{-6} +$ Heat

26. Answer (4)

$\frac{0 + 693}{10} = \frac{2.3}{t}\log\left(\frac{64\,N_0}{N_0}\right)$

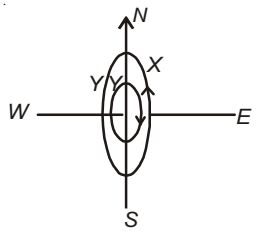
27. Answer (2)

28. Answer (2)

$\lambda = \frac{h}{\sqrt{3kTm}}$

29. Answer (1)

30. Answer (3)




$M = NiA$

$M = m\,x - m_y$

31. Answer (3)

32. Answer (4)

33. Answer (2)

$V_{rms} = \sqrt{\left(\frac{200}{\sqrt{2}}\right)^2 + \left(\frac{100}{\sqrt{2}}\right)^2 + \left(\frac{50}{\sqrt{2}}\right)^2}$

34. Answer (2)

$\frac{I}{0} = \frac{f}{u+f} = \frac{f}{-1.5+1}$

$\frac{I}{2} = \frac{1}{-.5}$

$I = -4$ cm

35. Answer (1)

36. Answer (4)

$-eV = \frac{1}{2}\,m\,[v^2 - u^2]$

37. Answer (2)

No. of fission $= \frac{10^3}{200 \times 1.6 \times 10^{-3}}$

38. Answer (2)

39. Answer (4)

$S_1 + S_2 = 0$

$(\mu - 1) A_1 + (\mu - 1) A_2 = 0$

40. Answer (1)

41. Answer (4)

42. Answer (1)

43. Answer (3)

$\gamma$ – ray is E.M. radiation

44. Answer (4)

$f_o + f_e = 60$

$f_o + f_e + 10 = V_o + f_e$

$V_o = 65, \; f_o = 55$

$$\frac{1}{V_o} - \frac{1}{u_o} = \frac{1}{f_o}$$

45. Answer (1)

$E = B C$

# [CHEMISTRY]

46. Answer (2)

Number of gram equivalents of oxygen = number of gram equivalents of aluminium

$$\Rightarrow \quad \frac{w}{8} = \frac{1.35}{9}$$

$$\Rightarrow \quad w = 1.2 \text{ g}$$

47. Answer (1)

Basicity of $H_3PO_2$ is one

48. Answer (3)

$$\frac{1}{\lambda} = R\left[\frac{1}{n_1^2} - \frac{1}{n_2^2}\right](Z)^2$$

$$\frac{1}{\lambda} = R\left[\frac{1}{(2)^2} - \frac{1}{(4)^2}\right](2)^2$$

Divide and multiply by $(4)^2$

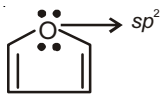
$$\frac{1}{\lambda} = R\left[\frac{1}{(4)^2} - \frac{1}{(8)^2}\right](4)^2$$

49. Answer (4)

50. Answer (1)

Cr belongs to 6th group

51. Answer (3)




52. Answer (4)

F–Be–F

53. Answer (3)

$V_c = 3 b$

54. Answer (2)

1 mole NaOH + 1 mole HF give 68 kJ/mole

55. Answer (2)

$$A + B \rightleftharpoons B$$

$$\Delta G^\circ = \Sigma \Delta G_p^\circ - \Sigma \Delta G^\circ R$$

$$= -500 - [-100 + (-200)]$$

$$= -500 + 300$$

$$= -200$$

$$\Delta G^\circ = -2.303 \text{ RT Log } K_e$$

$$-200000 = -2.303 \times 8.31 \times T \log 10^3$$

$$T = 3483.4 \text{ K}$$

56. Answer (2)

$K_p$ and total pressure remain constant

57. Answer (4)

$$\overset{+7}{MnO_4^-} + 5I^- \rightarrow \frac{5}{2} I_2 + Mn^{2+}$$

58. Answer (2)

Fact

59. Answer (1)

60. Answer (1)

$$\begin{matrix} COOH \\ | \\ COOH \end{matrix} \xrightarrow[\Delta]{\text{Conc. } H_2SO_4} CO + CO_2 + H_2O$$

61. Answer (2)

62. Answer (4)

Correct according to IUPAC rules

63. Answer (3)

 will not show tautomerism

64. Answer (3)

It is dissymmetric

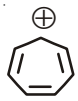
65. Answer (2)

Acidic character $\propto$ – I

66. Answer (3)

Fact

67. Answer (1)

 is aromatic

68. Answer (2)

$$FeCl_3 + NaSCN \longrightarrow \underset{\text{Blood red}}{Fe(SCN)_3} + NaCl$$

69. Answer (3)

$CH_3-\underset{\underset{Cl}{|}}{\overset{\overset{CH_3}{|}}{CH}}-CH-CH_3$, the total reactivity.

is $2 \times 3.8 = 7.6$ for 2° - carbon atom

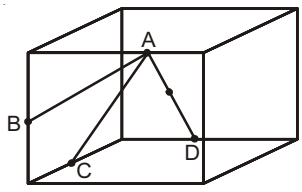
70. Answer (1)

$$CH_3-\underset{\underset{CH_3}{|}}{C}=CH_2 \xrightarrow[Zn/H_2O]{O_3} CH_3-\underset{\underset{CH_3}{|}}{C}=O + HCHO$$

71. Answer (2)

$SO_2$ is reducing agent

72. Answer (4)




$AB = \frac{a}{\sqrt{2}}$, $AD = \sqrt{2a}$ , $AC = a\sqrt{\frac{3}{2}}$

73. Answer (2)

$\Delta P = 100$ m

$\frac{\Delta P}{P^\circ_A} = \frac{100}{700} = \frac{1}{7} = X_B$

$\therefore \Delta T_b = K_b \times m$

$= K_b \times \left(\frac{X_B}{1-X_B} \times \frac{1000}{M_A}\right)$

$= 10\left(\frac{\frac{1}{7}}{1-\frac{1}{7}} \times \frac{1000}{167}\right)$

$= 10$ K

74. Answer (3)

$$E_{red} = E^\circ_{red} + \frac{0.059}{n} \log \frac{P_{Cl_2}}{[Cl^-]^2} .$$

75. Answer (4)

For zero order reaction

$t_1 + t_2 + t_3 = 10 + 5 + 2.5 = 17.5$ s.

76. Answer (4)

Argyrol is Ag sol (–ve)

77. Answer (2)

$$Ag_2S + 4NaCN \rightarrow 2Na[Ag(CN)_2] + Na_2S .$$

78. Answer (4)

Ionic $PCl_5$ is $[PCl_4]^+ [PCl_6]^-$

79. Answer (4)

Fact

80. Answer (4)

All are correct

81. Answer (3)

$Fe^{3+}$ has $d^5$ system

82. Answer (3)

Ionization and linkage both isomerism are possible.

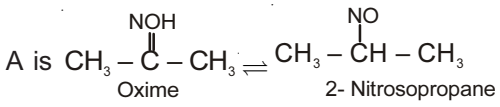
83. Answer (4)

$C_6H_5Cl$ has partial double bond character.

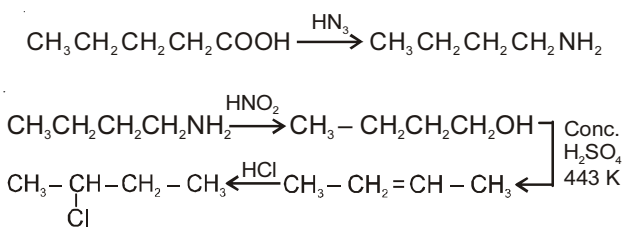
84. Answer (4)

Fact

85. Answer (3)



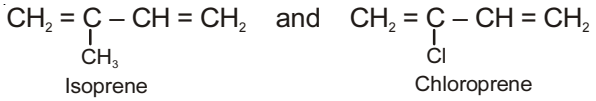

86. Answer (1)




87. Answer (4)

$Br_2$ (aq) forms saccharic acid from glucose but not from fructose.

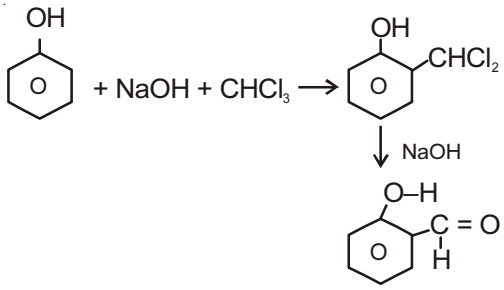
88. Answer (4)




89. Answer (4)

$MgCO_3$ and $Al(OH)_3$ are antacid.

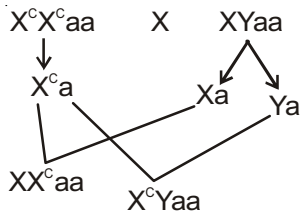
90. Answer (3)




In this reaction electrophile is : $CCl_2$

# [BIOLOGY]

91. Answer (3)




92. Answer (1)

n = 20

Caruncle *(2n)* = 40

tube nucleus (n) = 20

PEC (3n) = 60

Nucellus (2n) = 40

93. Answer (4)

*Zea mays* – $C_4$ plant

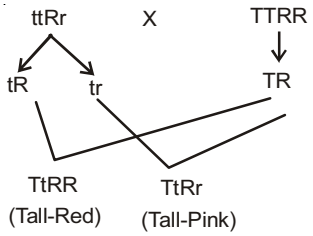
94. Answer (3)

Collenchyma

95. Answer (3)

Insectivorous plants

96. Answer (2)




97. Answer (3)

Oxidative phosphorylation in mitochondria.

98. Answer (2)

Diapause is a stage of suspended development.

99. Answer (1)

Dry to mesic conditions.

100. Answer (3)

23 S rRNA.

101. Answer (3)

Hypogynous and perigynous flowers.

102. Answer (2)

(b) Metaphase I

(d) Anaphase I

(a) Anaphase II

103. Answer (3)

Largest tiger reserve.

104. Answer (3)

Parietal placentation

105. Answer (3)

106. Answer (2)

80 dB

107. Answer (2)

Autosomal dominant trait

108. Answer (3)

Pyruvate act as oxidant in lactic acid fermentation.

109. Answer (3)

ER, golgi body, lysosomes and vacuoles in endomembrane system.

110. Answer (4)

LDP.

111. Answer (2)

Secondary phloem is developed on outer side of vascular cambium.

112. Answer (1)

Ethylene

113. Answer (2)

*Fucus* – Brown algae

*Polysiphonia* – Red algae

114. Answer (1)

CMP-11, 2015, Paris.

115. Answer (4)

Dorsiventral thalloid gametophyte in liverworts.

116. Answer (2)

Nucleosomes in eukaryotes.

117. Answer (3)

Diatoms.

118. Answer (4)

(a) Gases (b) Bacteria, fungi (c) Public transport

119. Answer (4)

Viroid is naked RNA.

120. Answer (2)

121. Answer (4)

*Ulothrix*, *Spirogyra* – cellulosic wall.

122. Answer (2)

Hydrophyte.

123. Answer (4)

Axillary buds.

124. Answer (2)

Consciousness.

125. Answer (4)

Functionally similar.

126. Answer (3)

Night and early morning when absorption is high.

127. Answer (3)

Pericarp, placenta and thalamus are edible in guava.

128. Answer (2)

129. Answer (1)

130. Answer (3)

131. Answer (4)

Fungi, bacteria and cyanobacteria in organic farming

132. Answer (2)

PEG and $NaNO_3$

133. Answer (3)

ETC and oxidative phosphorylation.

134. Answer (3)

*Albugo candida* is parasite on mustard.

135. Answer (2)

Haplo-diplontic.

136. Answer (1)

The first digit in E.C. indicates the class of the enzyme and hence the mode of its activity.

137. Answer (3)

Proton pump inhibition results in reduced HCl release.

138. Answer (3)

Thymosine is a hormone from thymus gland.

139. Answer (1)

Regression of corpus luteum is triggered by reduced level of LH of secretory phase.

140. Answer (3)

The first haploid cells in testes are secondary spermatocytes while in ovaries are secondary oocyte and first polar body.

141. Answer (4)

Annelids generally have closed circulatory system.

142. Answer (2)

Mitochondrial DNA from Africans populations has maximum variations through mutations.

143. Answer (2)

Elytra are mesothoracic wings. Two pairs of thoracic and eight pairs of abdominal spiracles are present in cockroach. Unjointed anal styles are found only in male cockroaches.

144. Answer (4)

Urethra has pseudostratified non-ciliated epithelium while all other parts have transitional epithelium.

145. Answer (2)

Haem is the prosthetic group and it is a part of the active site of enzyme.

146. Answer (1)

Lens and cornea, both are easily transplantable due to avascular nature.

147. Answer (3)

Male amphibians have copulatory pads on first digit of forelimbs.

148. Answer (2)

GIFT – Gametic Intrafallopian Transfer.

149. Answer (4)

Vector mediated gene transfer is indirect method of gene transfer.

150. Answer (3)

Dystrophy is a genetic disorder, characterized by lack of dystrophin protein.

151. Answer (3)

HIV reduces number of helper T cells by destroying them.

152. Answer (1)

Frequency of recessive allele (q) = 0.3

So, frequency of dominant allele (p) = 0.7

Hence frequency of heterozygotes (2 pq) = 0.42

153. Answer (3)

AB positive blood group is a universal recipient due to absence of agglutinins/antibodies.

154. Answer (4)

Interferons are secreted by virally infected cells and other cells of the body to protect the non-infected cells.

155. Answer (1)

Autonomic neurons in submucosa (meissner's plexus) and muscularis externa (auerbach's plexus) control the muscles of gut wall.

156. Answer (2)

Melatonin hormone from pineal gland sets up the biological clock of the body.

157. Answer (4)

$Ca^{2+}$ ions trigger the exocytosis of synaptic vesicles from synaptic knots.

158. Answer (4)

Deglutition is a voluntary process in which uvula prevents the food from rising up in the nasopharynx and epiglottis prevents the food entry in glottis

159. Answer (3)

Annelids and arthropods are metamerically segmented schizocoelomates.

160. Answer (3)

Macroglia are ectodermal in origin.

161. Answer (2)

Malpighian tubules are located at the junction of midgut and hindgut.

Pharyngeal glands of cockroach have four secretory parts and two receptacles.

162. Answer (4)

Hemidesmosomes connect the cells to their basement membranes.

163. Answer (3)

164. Answer (2)

Charge and size both play an important role in separation of DNA fragments.

165. Answer (1)

Synarthrose/fibrous joints are completely immovable joints.

166. Answer (4)

167. Answer (2)

$Ca^{2+}$ ions are involved in blood clotting.

168. Answer (2)

Syphilis is curable in primary stage and its chancres are painless.

169. Answer (2)

Insertionally inactivated lac z' gene results in failure to utilize 'X–gal' by recombinant bacteria, which fail to produce blue color, hence appearing white.

170. Answer (3)

171. Answer (3)

Dissociation of oxygen from (Hb) causes a right shift in the curve.

172. Answer (1)

Secondary/anamnestic response is always vigorous due to memory cells.

173. Answer (2)

Earliest autotrophs were chemoautotrophs and were anoxygenic.

174. Answer (1)

Dehydration triggers on 'RAAS' and enhanced tubular reabsorption of $Na^{+}$ ions.

175. Answer (1)

Outcrossing is mating of animals of same breed but not having any common ancestors for at least 4–6 generations, introducing variations but not causing drastic changes.

176. Answer (3)

Corpora allata produce juvenile hormone.

177. Answer (3)

Ringworms are fungal infections.

178. Answer (2)

179. Answer (1)

180. Answer (1)

Retroviruses are used as ideal cloning vectors for eukaryotic host cells.

❑ ❑ ❑

# All India Aakash Test Series for Medical-2016

click here for code-A solutions

## TEST - 9 (Code-B)

**Test Date : 03-04-2016**

## ANSWERS

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

# Hints to Selected Questions

## [PHYSICS]

1. Answer (3)

   $E = B\ C$

2. Answer (2)

   $f_o + f_e = 60$

   $f_o + f_e + 10 = V_o + f_e$

   $V_o = 65,\ f_o = 55$

   $$\frac{1}{V_o} - \frac{1}{u_o} = \frac{1}{f_o}$$

3. Answer (1)

   $\gamma$ – ray is E.M. radiation

4. Answer (3)

5. Answer (2)

6. Answer (3)

7. Answer (2)

   $S_1 + S_2 = 0$

   $(\mu - 1)\ A_1 + (\mu - 1)\ A_2 = 0$

8. Answer (4)

9. Answer (4)

   $$\text{No. of fission} = \frac{10^3}{200 \times 1.6 \times 10^{-3}}$$

10. Answer (2)

    $$-eV = \frac{1}{2} m\left[v^2 - u^2\right]$$

11. Answer (3)

12. Answer (4)

    $$\frac{I}{0} = \frac{f}{u+f} = \frac{f}{-1.5+1}$$

    $$\frac{I}{2} = \frac{1}{-.5}$$

    $$I = -4\ \text{cm}$$

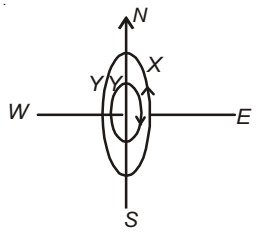
13. Answer (4)

    $$V_{\text{rms}} = \sqrt{\left(\frac{200}{\sqrt{2}}\right)^2 + \left(\frac{100}{\sqrt{2}}\right)^2 + \left(\frac{50}{\sqrt{2}}\right)^2}$$

14. Answer (4)

15. Answer (1)

16. Answer (1)




    $M = NiA$

    $M = m\ x - m_y$

17. Answer (3)

18. Answer (4)

    $$\lambda = \frac{h}{\sqrt{3kTm}}$$

19. Answer (4)

20. Answer (2)

    $$\frac{0+693}{10} = \frac{2.3}{t}\log\left(\frac{64\ N_0}{N_0}\right)$$

21. Answer (3)

    $$\frac{1}{2}\,5\,(12)^2 \times 10^{-6} + 120 \times 12 \times 10^{-6}$$

    $$= \frac{1}{2}\,5\,(12)^2 \times 10^{-6} + \text{Heat}$$

22. Answer (4)

23. Answer (3)

    $5 - 10i = 2 + i\ x = 4$

24. Answer (2)

    $$\vec{P}_i = mv\,\hat{i}$$

    $$\vec{P}_i = m\frac{v}{\sqrt{3}}\,\hat{j} + m\vec{v}$$

    $$\vec{P}_i = \vec{P}_f$$

25. Answer (3)

26. Answer (4)

27. Answer (4)

$$f' = f\left(\frac{V - V_w + V_o}{V - V_w - V_s}\right)$$

28. Answer (1)

$A_1V_1 = A_2V_2$

29. Answer (1)

30. Answer (2)

$mV_0 = 2m\,v$

$$\frac{1}{2}(2m)v^2 = \frac{1}{2}K\,x^2$$

31. Answer (1)

$$C = C_v - \frac{R}{u-1}, \quad PV^n = \text{constant}$$

$$P = \frac{K}{T} \quad \left(\frac{PV}{T} = \text{constant}\right)$$

$P^2V = K$

$$PV^{\frac{1}{2}} = K$$

32. Answer (1)

33. Answer (4)

34. Answer (3)

35. Answer (2)

36. Answer (4)

$V_{12}$ is uniform along – $y$ axis.

$$\vec{V}_{12} = \left(u_1\cos 37^\circ \hat{i} + u_1 \sin 37^\circ \hat{j}\right) - \left(u_2\cos 53^\circ \hat{i} + u_2 \sin 53^\circ \hat{j}\right)$$

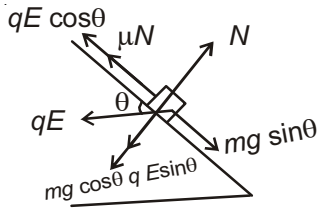
$$= \left(u_1\cos 37^\circ - u_2\cos 53^\circ\right)\hat{i} + \left(u_1 \sin 37^\circ - u_2 \sin 53^\circ\right)\hat{j}$$

$$u_1\cos 37^\circ - u_2\cos 53^\circ = 0$$

$$u_1\left(\frac{4}{5}\right) = u_2\left(\frac{3}{5}\right)$$

$$4u_1 = 3u_2$$

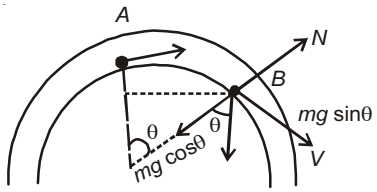
37. Answer (3)




$N = mg\cos\theta + q\,E\sin\theta$

$mg\sin\theta = \mu N + q\,E\cos\theta$

38. Answer (1)

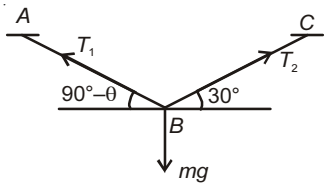



Between $A$ and $B$

$$mg(R - R\cos\theta) + 0 = \frac{1}{2}mv^2$$

$$mg\cos\theta - N = \frac{mv^2}{R}, \quad N = 0$$

39. Answer (3)




$$\frac{T_1}{\sin 120^\circ} = \frac{Mg}{\sin(60^\circ + \theta)}$$

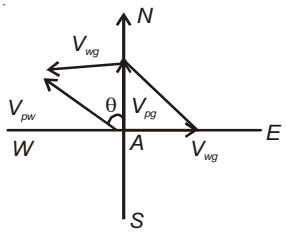
$(T_1)_{min}$ where $\sin(60^\circ + \theta) = 1$

$\theta = 30^\circ$

40. Answer (2)

$P$ will be the maximum height.

41. Answer (1)




$\vec{V}_{pg} \sin\theta = \vec{V}_{wg}$

$40 \sin\theta = 20$

$\theta = 30°$

42. Answer (1)

$v_x = 1$ m/s $v_y = 2$ m/s, $\tan\theta = \frac{v_y}{v_x}$

$y = \tan\theta - \frac{1}{2} g \frac{x^2}{v_x^2}$

43. Answer (1)

44. Answer (1)

$R = \frac{PQ}{\pi r^2}$

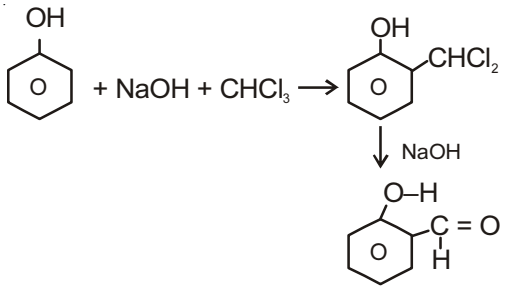
$R\% = l\% + 2r\%$

$= \left(\frac{1}{100} + 2 \times \frac{0.02}{1}\right) 100$

45. Answer (4)

# [CHEMISTRY]

46. Answer (1)




In this reaction electrophile is : $CCl_2$

47. Answer (4)

$MgCO_3$ and $Al(OH)_3$ are antacid.

48. Answer (4)

$CH_2 = \underset{\underset{CH_3}{|}}{C} - CH = CH_2$ and $CH_2 = \underset{\underset{Cl}{|}}{C} - CH = CH_2$

Isoprene Chloroprene

49. Answer (2)

$Br_2$ (aq) forms saccharic acid from glucose but not from fructose.

50. Answer (3)

$CH_3CH_2CH_2CH_2COOH \xrightarrow{HN_3} CH_3CH_2CH_2CH_2NH_2$

$CH_3CH_2CH_2CH_2NH_2 \xrightarrow{HNO_2} CH_3 - CH_2CH_2CH_2OH$ ⌐ Conc. $H_2SO_4$ 443 K

$CH_3 - \underset{\underset{Cl}{|}}{CH} - CH_2 - CH_3 \xleftarrow{HCl} CH_3 - CH_2 = CH - CH_3$ ⌙

51. Answer (1)

A is $CH_3 - \underset{\text{Oxime}}{\overset{\overset{NOH}{\|}}{C} - CH_3} \rightleftharpoons \underset{\text{2- Nitrosopropane}}{CH_3 - \overset{\overset{NO}{|}}{CH} - CH_3}$

52. Answer (4)

Fact

53. Answer (2)

$C_6H_5Cl$ has partial double bond character.

54. Answer (1)

Ionization and linkage both isomerism are possible.

55. Answer (1)

$Fe^{3+}$ has $d^5$ system

56. Answer (4)

All are correct

57. Answer (2)

Fact

58. Answer (2)

Ionic $PCl_5$ is $[PCl_4]^+ [PCl_6]^-$

59. Answer (4)

$Ag_2S + 4NaCN \rightarrow 2Na[Ag(CN)_2] + Na_2S$ .

60. Answer (2)

Argyrol is Ag sol (–ve)

61. Answer (2)

For zero order reaction

$t_1 + t_2 + t_3 = 10 + 5 + 2.5 = 17.5$ s.

62. Answer (1)

$$E_{red} = E^{\circ}_{red} + \frac{0.059}{n} \log \frac{P_{Cl_2}}{[Cl^-]^2} .$$

63. Answer (4)

$$\Delta P = 100 \text{ m}$$

$$\frac{\Delta P}{P^{\circ}_A} = \frac{100}{700} = \frac{1}{7} = X_B$$

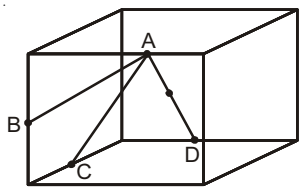
$$\therefore \Delta T_b = K_b \times m$$

$$= K_b \times \left( \frac{X_B}{1 - X_B} \times \frac{1000}{M_A} \right)$$

$$= 10 \left( \frac{\frac{1}{7}}{1 - \frac{1}{7}} \times \frac{1000}{167} \right)$$

$$= 10 \text{ K}$$

64. Answer (4)




$$AB = \frac{a}{\sqrt{2}}, \; AD = \sqrt{2a}, \; AC = a\sqrt{\frac{3}{2}}$$

65. Answer (4)

$SO_2$ is reducing agent

66. Answer (3)

$$CH_3 - \underset{\underset{CH_3}{|}}{C} = CH_2 \xrightarrow[Zn/H_2O]{O_3} CH_3 - \underset{\underset{CH_3}{|}}{C} = O + HCHO$$

67. Answer (1)

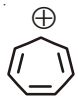
$CH_3 - \underset{\underset{CH_3}{|}}{CH} - \underset{\underset{Cl}{|}}{CH} - CH_3$, the total reactivity.

is $2 \times 3.8 = 7.6$ for 2° - carbon atom

68. Answer (4)

$$FeCl_3 + NaSCN \rightarrow \underset{\text{Blood red}}{Fe(SCN)_3} + NaCl$$

69. Answer (3)


is aromatic

70. Answer (1)

Fact

71. Answer (4)

Acidic character $\propto$ – I

72. Answer (1)

It is dissymmetric

73. Answer (1)


will not show tautomerism

74. Answer (2)

Correct according to IUPAC rules

75. Answer (2)

76. Answer (3)

$$\underset{\underset{COOH}{|}}{COOH} \xrightarrow[\Delta]{\text{Conc. } H_2SO_4} CO + CO_2 + H_2O$$

77. Answer (1)

78. Answer (4)

Fact

79. Answer (2)

$$\overset{+7}{MnO_4^-} + 5I^- \rightarrow \frac{5}{2} I_2 + Mn^{2+}$$

80. Answer (4)

$K_p$ and total pressure remain constant

81. Answer (4)

$$A + B \rightleftharpoons B$$

$$\Delta G^\circ = \Sigma \Delta G_p^\circ - \Sigma \Delta G^\circ R$$

$$= -500 - [-100 + (-200)]$$

$$= -500 + 300$$

$$= -200$$

$$\Delta G^\circ = -2.303\ RT\ \text{Log}\ K_e$$

$$-200000 = -2.303 \times 8.31 \times T \log 10^3$$

$$T = 3483.4\ K$$

82. Answer (4)

1 mole NaOH + 1 mole HF give 68 kJ/mole

83. Answer (1)

$V_c = 3b$

84. Answer (2)

F–Be–F

85. Answer (1)


86. Answer (3)

Cr belongs to 6th group

87. Answer (2)

88. Answer (1)

$$\frac{1}{\lambda} = R\left[\frac{1}{n_1^2} - \frac{1}{n_2^2}\right](Z)^2$$

$$\frac{1}{\lambda} = R\left[\frac{1}{(2)^2} - \frac{1}{(4)^2}\right](2)^2$$

Divide and multiply by $(4)^2$

$$\frac{1}{\lambda} = R\left[\frac{1}{(4)^2} - \frac{1}{(8)^2}\right](4)^2$$

89. Answer (3)

Basicity of $H_3PO_2$ is one

90. Answer (4)

Number of gram equivalents of oxygen = number of gram equivalents of aluminium

$$\Rightarrow \frac{w}{8} = \frac{1.35}{9}$$

$$\Rightarrow w = 1.2\ g$$

# [BIOLOGY]

91. Answer (4)

Haplo-diplontic.

92. Answer (1)

*Albugo candida* is parasite on mustard.

93. Answer (1)

ETC and oxidative phosphorylation.

94. Answer (4)

PEG and $NaNO_3$

95. Answer (2)

Fungi, bacteria and cyanobacteria in organic farming

96. Answer (3)

97. Answer (3)

98. Answer (4)

99. Answer (1)

Pericarp, placenta and thalamus are edible in guava.

100. Answer (1)

Night and early morning when absorption is high.

101. Answer (2)

Functionally similar.

102. Answer (4)

Consciousness.

103. Answer (2)

Axillary buds.

104. Answer (4)

Hydrophyte.

105. Answer (2)

*Ulothrix*, *Spirogyra* – cellulosic wall.

106. Answer (4)

107. Answer (2)

Viroid is naked RNA.

108. Answer (2)

(a) Gases (b) Bacteria, fungi (c) Public transport

109. Answer (1)

Diatoms.

110. Answer (4)

Nucleosomes in eukaryotes.

111. Answer (2)

Dorsiventral thalloid gametophyte in liverworts.

112. Answer (3)

CMP-11, 2015, Paris.

113. Answer (4)

*Fucus* – Brown algae

*Polysiphonia* – Red algae

114. Answer (3)

Ethylene

115. Answer (4)

Secondary phloem is developed on outer side of vascular cambium.

116. Answer (2)

LDP.

117. Answer (1)

ER, golgi body, lysosomes and vacuoles in endomembrane system.

118. Answer (1)

Pyruvate act as oxidant in lactic acid fermentation.

119. Answer (4)

Autosomal dominant trait

120. Answer (4)

80 dB

121. Answer (1)

122. Answer (1)

Parietal placentation

123. Answer (1)

Largest tiger reserve.

124. Answer (4)

(b) Metaphase I

(d) Anaphase I

(a) Anaphase II

125. Answer (1)

Hypogynous and perigynous flowers.

126. Answer (3)

23 S rRNA.

127. Answer (3)

Dry to mesic conditions.

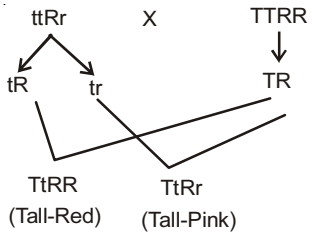
128. Answer (4)

Diapause is a stage of suspended development.

129. Answer (1)

Oxidative phosphorylation in mitochondria.

130. Answer (4)




131. Answer (1)

Insectivorous plants

132. Answer (1)

Collenchyma

133. Answer (2)

*Zea mays* – $C_4$ plant

134. Answer (3)

n = 20

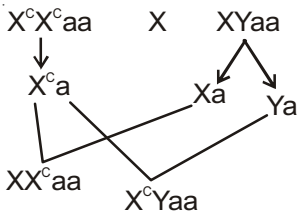
Caruncle *(2n)* = 40

tube nucleus (n) = 20

PEC (3n) = 60

Nucellus (2n) = 40

135. Answer (1)




136. Answer (3)

Retroviruses are used as ideal cloning vectors for eukaryotic host cells.

137. Answer (3)

138. Answer (4)

139. Answer (1)

Ringworms are fungal infections.

140. Answer (1)

Corpora allata produce juvenile hormone.

141. Answer (3)

Outcrossing is mating of animals of same breed but not having any common ancestors for at least 4–6 generations, introducing variations but not causing drastic changes.

142. Answer (1)

Dehydration triggers on 'RAAS' and enhanced tubular reabsorption of $Na^+$ ions.

143. Answer (4)

Earliest autotrophs were chemoautotrophs and were anoxygenic.

144. Answer (3)

Secondary/anamnestic response is always vigorous due to memory cells.

145. Answer (1)

Dissociation of oxygen from (Hb) causes a right shift in the curve.

146. Answer (1)

147. Answer (2)

Insertionally inactivated lac z' gene results in failure to utilize 'X–gal' by recombinant bacteria, which fail to produce blue color, hence appearing white.

148. Answer (4)

Syphilis is curable in primary stage and its chancres are painless.

149. Answer (4)

$Ca^{2+}$ ions are involved in blood clotting.

150. Answer (2)

151. Answer (3)

Synarthrose/fibrous joints are completely immovable joints.

152. Answer (4)

Charge and size both play an important role in separation of DNA fragments.

153. Answer (1)

154. Answer (2)

Hemidesmosomes connect the cells to their basement membranes.

155. Answer (2)

Malpighian tubules are located at the junction of midgut and hindgut.

Pharyngeal glands of cockroach have four secretory parts and two receptacles.

156. Answer (1)

Macroglia are ectodermal in origin.

157. Answer (1)

Annelids and arthropods are metamerically segmented schizocoelomates.

158. Answer (2)

Deglutition is a voluntary process in which uvula prevents the food from rising up in the nasopharynx and epiglottis prevents the food entry in glottis

159. Answer (2)

$Ca^{2+}$ ions trigger the exocytosis of synaptic vesicles from synaptic knots.

160. Answer (4)

Melatonin hormone from pineal gland sets up the biological clock of the body.

161. Answer (3)

Autonomic neurons in submucosa (meissner's plexus) and muscularis externa (auerbach's plexus) control the muscles of gut wall.

162. Answer (2)

Interferons are secreted by virally infected cells and other cells of the body to protect the non-infected cells.

163. Answer (3)

AB positive blood group is a universal recipient due to absence of agglutinins/antibodies.

164. Answer (3)

Frequency of recessive allele (q) = 0.3

So, frequency of dominant allele (p) = 0.7

Hence frequency of heterozygotes (2 pq) = 0.42

165. Answer (1)

HIV reduces number of helper T cells by destroying them.

166. Answer (1)

Dystrophy is a genetic disorder, characterized by lack of dystrophin protein.

167. Answer (2)

Vector mediated gene transfer is indirect method of gene transfer.

168. Answer (4)

GIFT – Gametic Intrafallopian Transfer.

169. Answer (1)

Male amphibians have copulatory pads on first digit of forelimbs.

170. Answer (1)

Lens and cornea, both are easily transplantable due to avascular nature.

171. Answer (4)

Haem is the prosthetic group and it is a part of the active site of enzyme.

172. Answer (2)

Urethra has pseudostratified non-ciliated epithelium while all other parts have transitional epithelium.

173. Answer (4)

Elytra are mesothoracic wings. Two pairs of thoracic and eight pairs of abdominal spiracles are present in cockroach. Unjointed anal styles are found only in male cockroaches.

174. Answer (4)

Mitochondrial DNA from Africans populations has maximum variations through mutations.

175. Answer (2)

Annelids generally have closed circulatory system.

176. Answer (1)

The first haploid cells in testes are secondary spermatocytes while in ovaries are secondary oocyte and first polar body.

177. Answer (3)

Regression of corpus luteum is triggered by reduced level of LH of secretory phase.

178. Answer (1)

Thymosine is a hormone from thymus gland.

179. Answer (1)

Proton pump inhibition results in reduced HCl release.

180. Answer (3)

The first digit in E.C. indicates the class of the enzyme and hence the mode of its activity.

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