16-04-2019

Code - B

Aakash
Medical | IIT-JEE | Foundations
(Divisions of Aakash Educational Services Limited)

Regd. Office **:** Aakash Tower, 8, Pusa Road, New Delhi-110005; Ph.: 011-47623456

MM : 720

Test Series for NEET - 2019
Test – 8

Time : 3 Hrs

ANSWERS

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

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Hints and Solutions

PHYSICS

1. Answer (3)

Curie's law for paramagnetic substance is given as

$$\chi = \frac{c\mu_0}{T}$$

2. Answer (2)

$\tau = MB\sin\theta$

$$M = \frac{\tau}{B\times\sin\theta} = \frac{0.05\times 2}{0.25} = 0.4 \text{ J T}^{-1}$$

3. Answer (4)

$$T_0 = 2\pi\sqrt{\frac{I_0}{M_0 B}}$$

$$T = 2\pi\sqrt{\frac{I}{MB}} = 2\pi\sqrt{\frac{2I_0}{\frac{M_0}{2}B}} = 2\,T_0$$

4. Answer (2)

In superconductors, magnetic field lines are completely expelled ($\chi_m = -1$). The phenomenon of perfect diamagnetism in superconductors is called Meissner effect.

5. Answer (2)

For both, electromagnet and transformer, energy loss must be less, hence Hysteresis loop represented by material *B* has less area which means it dissipates less energy. Hence material *B* is proper to use for both transformer and electromagnet.

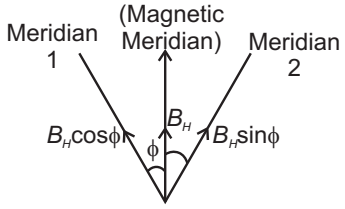
6. Answer (2)

$$\tan\delta_1 = \frac{\tan\delta}{\cos\phi}$$

$$\tan\delta_2 = \frac{\tan\delta}{\sin\phi}$$

$\sin^2\phi + \cos^2\phi = 1$

$$\frac{\tan^2\delta}{\tan^2\delta_1} + \frac{\tan^2\delta}{\tan^2\delta_2} = 1$$

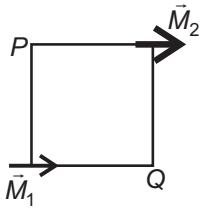


$$\frac{1}{\tan^2\delta_1} + \frac{1}{\tan^2\delta_2} = \frac{1}{\tan^2\delta}$$

7. Answer (3)

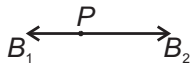
Point *P* is axial point for $\vec{M}_2$

and equatorial point for $\vec{M}_1$



$$\vec{B}_P = \frac{\mu_0}{4\pi}\frac{2M}{d^3} - \frac{\mu_0}{4\pi}\frac{M}{d^3}$$

$$= \frac{\mu_0 M}{4\pi d^3}$$



8. Answer (1)

$W = IAB$ (cos 0° – cos180°)

9. Answer (2)

Diamagnetism character is showcased by all substances.

10. Answer (4)

$$\frac{1}{L} = \frac{1}{L_1} + \frac{1}{L_2} + \frac{1}{L_3}$$

11. Answer (3)

$\tau = MB\sin\theta$

12. Answer (1)

$$T \propto \frac{1}{\sqrt{B_H}} = \frac{1}{\sqrt{B\cos\theta}}$$

$$\frac{T_1}{T_2} = \sqrt{\frac{B_L \cos\theta_2}{B_1 \cos\theta_1}}$$

$$\Rightarrow \quad \frac{B_1}{B_2} = \frac{T_2^2 \cos\theta_2}{T_1^2 \cos\theta_1} = \frac{36}{4}\frac{1}{2} \times \frac{\sqrt{2}}{1}$$

13. Answer (4)

$$z = \sqrt{R^2 + X_L^2}$$

14. Answer (3)

$$U = \frac{1}{2}L\left(\frac{\varepsilon}{R}\right)^2$$

15. Answer (4)

Since $\frac{100}{8} = 2\pi \times 50 \times L \Rightarrow L = \frac{1}{8\pi}$H

Now $X_L' = 2\pi \times 40 \times \frac{1}{8\pi} = 10\ \Omega$

$R = 10\ \Omega$

$Z = \sqrt{10^2 + 10^2} = 10\sqrt{2}\ \Omega$

$I = \frac{120}{10\sqrt{2}} = 6\sqrt{2}$ A

16. Answer (4)

At $t = 1$, $i = 7$ A, $\frac{di}{dt} = 5$ A/s

$V_P - 7 \times 5 - 2 \times 5 - 10 - V_Q = 0$

$V_P - V_Q = 55$ V

17. Answer (2)

$$B = B_H = \frac{\mu_0}{4\pi}\frac{M}{r^3}$$

$$0.4 \times 10^{-4} = \frac{10^{-7} M}{(15 \times 10^{-2})^3}$$

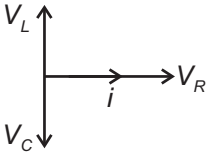
$M = 1.35$ A-m^2

18. Answer (1)

$$dq = M\left(\frac{di}{R}\right)$$

$$dq = \frac{\mu_0 \pi r_1^2}{2r_2}\left[\frac{I - 0}{R}\right]$$

19. Answer (1)



20. Answer (4)

As the magnet enters, the flux increases non-linearly and then decreases as it exits. This would bring about a change in the polarity of the emf. Thus option (4) is the only choice where negative emf also exist.

21. Answer (2)

$\varepsilon = -\frac{d\phi}{dt} = -(14t + 6)$

$\varepsilon(t = 3) = -(14 \times 3 + 6) = -48$ V

$\varepsilon(t = 0) = -(14 \times 0 + 6) = -6$ V

$\frac{\varepsilon(t=3)}{\varepsilon(t=0)} = \frac{-48\,\text{V}}{-6\,\text{V}} = 8$

22. Answer (2)

$L = \frac{\mu_0 N^2 A}{L}$

$L = \frac{4\pi \times 10^{-7} \times (400)^2 \times 0.2 \times 10^{-4}}{10 \times 10^{-2}}$

$\approx 40\ \mu$H

23. Answer (1)

$\varepsilon = NBA\omega \sin\omega t$

$\varepsilon = 2\ BA\omega \sin\omega t$

$$\varepsilon_{avg} = \frac{2BA\omega \int_0^{T/4} \sin\omega t\, dt}{\frac{T}{4}} = \frac{8BA\omega}{T}\frac{[-\cos\omega t]_0^{T/4}}{\omega}$$

$$= \frac{8BA\omega}{\omega T} \cdot [1 - 0] = \frac{8BA\omega}{2\pi}$$

$\varepsilon_{avg} = \frac{4BA\omega}{\pi}$

24. Answer (4)

$V = \sqrt{(V_L - V_C)^2 + V_R^2}$

$220 = \sqrt{(300 - 300)^2 + V_R^2} \Rightarrow V_L = V_C \Rightarrow$ Resonance

$V_R = V_3 = 220$ V

$i = \frac{V_R}{R} = \frac{220}{100} = 2.2$ A

25. Answer (4)

If voltage lags the current then circuit contains capacitive elements hence circuit may have RC or LCR.

26. Answer (3)

$i(t) = 100 \sin 50\pi t \cos 50\pi t$

$= 50(2\sin 50\pi t \cos 50\pi t)$

$= 50 \sin(100\ \pi t)$

$I_0 = 50$ A and $f = \dfrac{100\pi}{2\pi} = 50$ Hz

27. Answer (3)

Area of loop first increases and then decreases.

$e_{max} = B\left(\sqrt{2}\, l\right)v$

28. Answer (2)

$I = I_0 e^{-t/\tau},\ I_0 = \dfrac{E_0}{R},\ \tau = \dfrac{L}{R}$

$I_{av} = \dfrac{1}{\tau}\int_0^{\tau} I dt = \dfrac{1}{\tau}\int_0^{\tau} I_0 e^{-t/\tau} dt$

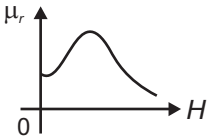
$= \dfrac{I_0}{\tau}\left[\dfrac{e^{-t/\tau}}{-\dfrac{1}{\tau}}\right]_0^{\tau}$

$= I_0\left[1-\dfrac{1}{e}\right] = \dfrac{I_0}{e}[e-1]$

$= \dfrac{E_0}{Re}(e-1)$

29. Answer (2)

$\mu_r - H$ plot for ferromagnetic material is given as



30. Answer (1)

$\dfrac{V_2}{V_1} = \dfrac{N_2}{N_1} \Rightarrow V_2 = \dfrac{N_2}{N_1}\cdot V_1$

31. Answer (2)

Current leads voltage by phase angle $\dfrac{\pi}{2}$

32. Answer (4)

$P_{av} = \dfrac{1}{2}E_0 I_0 \cos\phi = \dfrac{1}{2}\times 100\times 5\times\cos\dfrac{\pi}{3}$

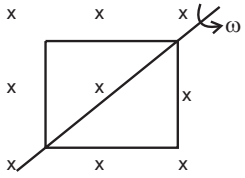
$= \dfrac{1}{2}\times 100\times 5\times\left(\dfrac{1}{2}\right) = 125$ W

$z = \dfrac{e_0}{i_0}\times\dfrac{100}{5} = 20\ \Omega$

33. Answer (1)

$I_{av} = \dfrac{\frac{1}{4}\pi I_0 \times \frac{T}{2}}{\left(\frac{T}{2}-0\right)} = \dfrac{\pi I_0}{4}$

34. Answer (4)



$\phi = BA\cos\theta$

$= Ba^2\cos\omega t$

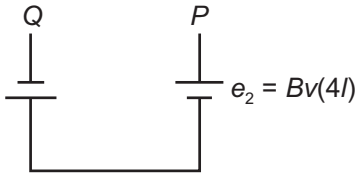
$e = \left|\dfrac{-d\phi}{dt}\right| = \left|\dfrac{d}{dt}Ba^2\cos\omega t\right|$

$e = Ba^2\omega\sin\omega t$

35. Answer (3)

$Q = \dfrac{f_0}{BW}$

36. Answer (2)



37. Answer (1)

$E_0 = B_0 c = 2\times 10^{-6}\times 3\times 10^8$

$= 600$ V/m

38. Answer (2)

$-\int E\cdot dl = -\dfrac{d\phi}{dt}$

$E\cdot 2\pi r = \pi R^2\cdot\dfrac{dB}{dt}$

$E = \dfrac{R^2}{2r}\cdot\dfrac{dB}{dt}$

$\Rightarrow\ E \propto \dfrac{1}{r}$

39. Answer (1)

$E = \dfrac{1}{2}kx^2 + \dfrac{1}{2}mv^2$ (for mechanical system)

$U = \dfrac{1}{2}\dfrac{q^2}{C} + \dfrac{1}{2}Li^2$ (for electrical system)

Hence L is called as inertia of electrical circuit.

40. Answer (2)

$i = \sqrt{i_R^2 + i_C^2}$

$= \sqrt{6^2+8^2} = 10$ A

41. Answer (2)

Since $f_{UV} > f_V > f_{IR}$

Hence $\lambda_{UV} < \lambda_V < \lambda_{IR}$

42. Answer (3)

$i_d = i_c \Rightarrow J \cdot \pi a^2 = i$

$i_d' = J \times A = \frac{i}{\pi a^2} \times \left(\pi a^2 - \frac{\pi a^2}{9}\right)$

$i_d' = \frac{8}{9} i$

43. Answer (1)

Pressure $P = \frac{I}{c} = \frac{E}{Atc}$

44. Answer (2)

$E_y = 5\left(\frac{N}{C}\right)\sin\left[\left(2\pi \times 10^6 \frac{rad}{s}\right)t - \left(\pi \times 10^{-2} \frac{rad}{m}\right)x\right]$

Comparing with standard equation of EM wave

$f = 10^6$ Hz, $\frac{2\pi}{\lambda} = \frac{\pi}{100} \Rightarrow \lambda = 200$ m

Wave is moving along positive x-direction.

45. Answer (2)

$v = \frac{1}{\sqrt{\mu_0 \varepsilon_0 \mu_r \varepsilon_r}} = \frac{c}{\sqrt{\varepsilon_r \mu_r}}$

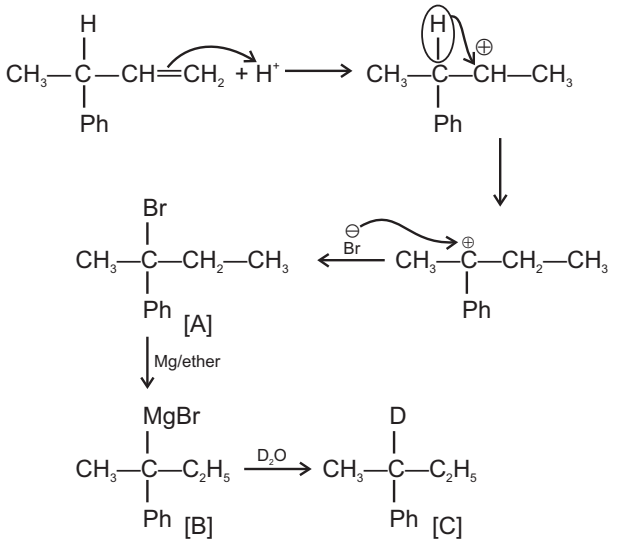
$= \frac{c}{\sqrt{4 \times 6.25}} = \frac{c}{\sqrt{25}} = \frac{c}{5}$

CHEMISTRY

46. Answer (2)

Tertiary alcohol reacts with Lucas reagent (HCl and $ZnCl_2$) most readily by S_N1 mechanism.

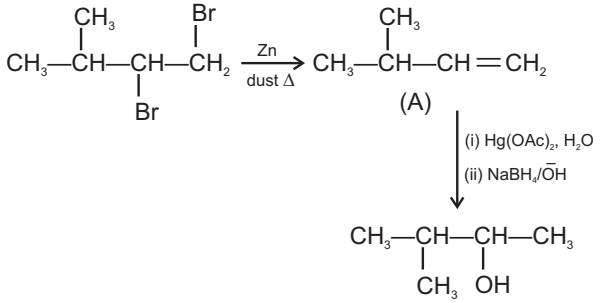
47. Answer (1)



48. Answer (4)

49. Answer (3)

50. Answer (1)



51. Answer (3)

52. Answer (2)

53. Answer (4)

$CH_3 - \underset{Cl}{\overset{|}{CH}} - Cl$ (gem dihalide)

54. Answer (2)

55. Answer (4)

56. Answer (2)

57. Answer (4)

58. Answer (4)

Molecule (4) has plane of symmetry hence it is optically inactive.

59. Answer (1)

$C_6H_5MgBr + CH_3 - \underset{OH}{\overset{CH_3}{\overset{|}{\underset{|}{C}}}} - CH_3 \longrightarrow$

$C_6H_6 + (CH_3)_3COMgBr$

60. Answer (2)

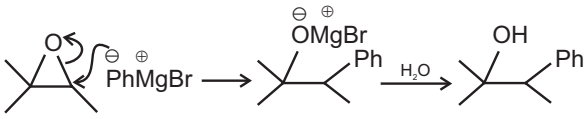
61. Answer (1)

62. Answer (3)

63. Answer (3)

64. Answer (1)

65. Answer (1)



66. Answer (2)

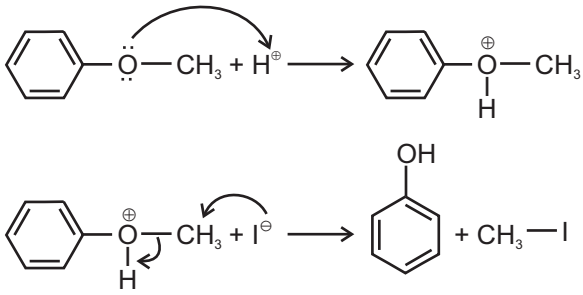
67. Answer (3)

68. Answer (4)

69. Answer (2)

70. Answer (3)

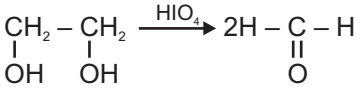
71. Answer (2)



72. Answer (2)

73. Answer (3)

74. Answer (2)



75. Answer (4)

76. Answer (3)

In Reimer-Tiemann's reaction dichloro carbene ($:CCl_2$) acts as electrophile.

77. Answer (2)

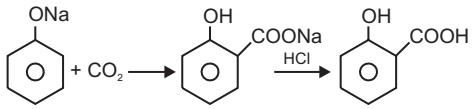
Secondary alcohol gives blue colouration in Victor Meyer's test.

78. Answer (2)

Pinacol-Pinacolone rearrangement.

79. Answer (3)

80. Answer (1)



81. Answer (4)

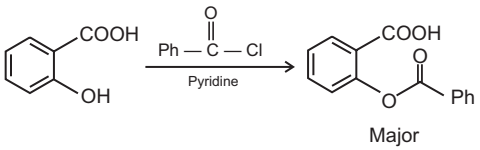
82. Answer (3)

Phenol gives violet colour with neutral $FeCl_3$.

83. Answer (3)

84. Answer (1)

85. Answer (2)



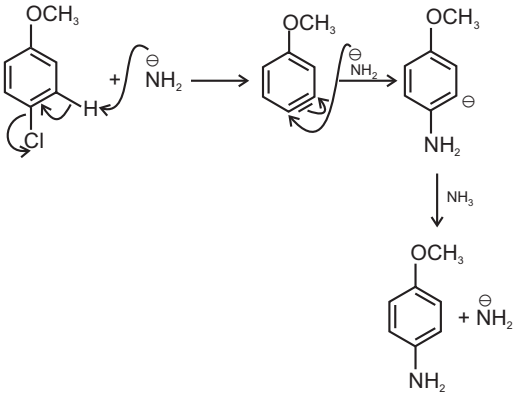
Major

86. Answer (2)

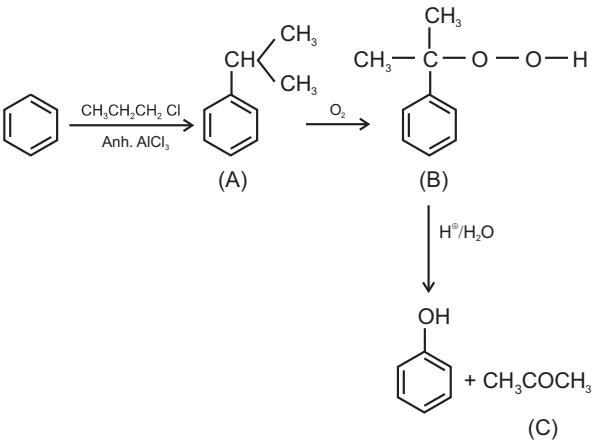
3° alcohol dehydrates on heating with Cu at 573 K.

87. Answer (4)

88. Answer (4)



89. Answer (4)



90. Answer (1)

BOTANY

91. Answer (4)

Tropical canes did not grow well in North India, rather they grow well in South India.

92. Answer (2)

Lactic acid bacteria converts milk into curd. They improve the nutritional quality of milk by increasing vitamin B_{12}. In stomach, LAB inhibit the growth of disease causing microbes.

93. Answer (3)

Monascus purpureus is used in production of statins which is a blood-cholesterol lowering agent.

94. Answer (3)

Aeration tanks allow growth of masses of aerobic bacteria associated with fungal filaments to form flocs.

95. Answer (4)

Cellulase and pectinase are used to produce protoplasts from plant cells.

96. Answer (4)

Arctic and alpine tundra biome has low annual precipitation and least mean annual temperature.

97. Answer (1)

Inland waters have salt concentration less than 5 parts per thousand which is optimum for stenohaline organisms, resistant to narrow range of salinities.

98. Answer (3)

Sonalika and Kalyan Sona.

99. Answer (3)

100. Answer (4)

Atlas-66 is a variety of wheat which has high protein content.

101. Answer (3)

Androgenic haploids are produced by anther culture.

102. Answer (4)

103. Answer (3)

104. Answer (4)

Virus-free plants are produced by meristem culture.

105. Answer (1)

Grit of sewage is removed by sedimentation.

106. Answer (1)

Citric acid is obtained from *Aspergillus niger* (fungus).

107. Answer (1)

Mexican wheat varieties were exposed to gamma radiations before they adopted in India.

108. Answer (2)

109. Answer (3)

110. Answer (4)

Nectar less cotton does not attract bollworms.

111. Answer (2)

112. Answer (3)

In mung bean, resistance to yellow mosaic virus was induced by mutation while in Parbhani Kranti (variety of bhindi), resistance to yellow mosaic virus was induced by using conventional breeding methods.

113. Answer (3)

114. Answer (2)

Bacillus thuringiensis is introduced to control butterfly caterpillars.

115. Answer (4)

In Mycorrhiza, symbiotic partner of plant is fungus which is heterotrophic.

116. Answer (1)

Humus is dark coloured, amorphous, slightly acidic and reservoir of nutrients.

117. Answer (1)

118. Answer (3)

Alcoholic beverages	**Alcoholic concentration**
Rum	40%
Whisky	50%
Wine	9-12%

119. Answer (2)

Temperature.

120. Answer (3)

A-*Nostoc*, B-*Glomus*

121. Answer (3)

At high altitude, breathing rate of an individual increases while binding affinity of haemoglobin to oxygen decreases.

122. Answer (3)

123. Answer (2)

$$\frac{5}{20} = 0.25$$

124. Answer (3)

Plants having needle shaped leaves are present in coniferous forest.

125. Answer (4)

126. Answer (3)

Body organisation of organism is not included in the concept of ecological niche.

127. Answer (4)

128. Answer (2)

129. Answer (2)

Formation of thick walled spores in unfavourable conditions is a kind of suspended growth shown by few fungi, bacteria and algae.

130. Answer (4)

Presence of large air spaces and aerenchyma is a feature of hydrophytes.

131. Answer (4)

132. Answer (2)

Goats and abingdon tortoise of Galapagos islands shows competition.

133. Answer (1)

Extensive parental care is a feature of k-selected species.

134. Answer (3)

135. Answer (4)

J-shaped population curve is represented by species which show exponential growth.

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136. Answer (3)

137. Answer (3)

138. Answer (1)

P. falciparum is the causative agent of malignant tertian malaria.

139. Answer (2)

Fertilization and development takes place in the mosquito's stomach.

140. Answer (4)

Dengue is a viral disease.

141. Answer (1)

Sporozoite is infective stage for human and gametocyte for mosquito.

142. Answer (3)

Symptoms of Ascariasis includes - internal bleeding, muscular pain, fever, anemia and blockage of intestinal passage.

143. Answer (2)

Antigen binding site is formed by variable region of heavy and light chain.

144. Answer (1)

Rheumatoid arthritis is an autoimmune disease.

145. Answer (2)

Interferon is glycoprotein - secreted by virus infected cells.

146. Answer (2)

Computed tomography uses ionising radiation like X-ray.

147. Answer (3)

Common cold is spread by droplet infection.

148. Answer (4)

T-lymphocytes are produced in bone marrow and gain receptor in thymus to interact with antigen.

149. Answer (4)

Benzodiazepines (e.g., valium) are sedatives

150. Answer (1)

Antibodies are glycoproteinaceous in nature containing paratope for antigen

151. Answer (4)

IgA antibody has four paratopes.

152. Answer (2)

Wuchereria bancrofti and *W. malayi* cause filariasis and female *Culex* is secondary host as well as vector.

153. Answer (1)

Helper T lymphocytes decreases in HIV patient.

154. Answer (3)

Macrophages are part of cellular barriers of non-specific defence while interferons are part of cytokine barrier.

155. Answer (4)

RNA genome of HIV virus forms viral DNA by using reverse transcriptase.

156. Answer (1)

Nicotine (an alkaloid) in tobacco stimulate adrenal gland to release adrenaline and noradrenaline which increase blood pressure and heart rate.

157. Answer (3)

Side effect of use of anabolic steroids in females include masculinisation (features like males)

158. Answer (4)

159. Answer (3)

Malignant tumor cells exhibit metastasis.

160. Answer (4)

AIDS is a non-congenital disease.

Spleen is considered as graveyard of RBCs.

Appendix is a secondary lymphoid organ.

161. Answer (3)

Antitoxins provide artificial passive immunity.

162. Answer (3)

Immunological memory is a property of active immunity.

163. Answer (3)

Cyclosporin is an immunosuppresant.

164. Answer (2)

Leprosy (Hansen's disease), Gonorrhoea, whooping cough (Pertussis) and Anthrax, are bacterial diseases.

Yellow fever is a viral disease.

165. Answer (2)

HCl and lysozyme are parts of physiological barriers of non specific immunity.

166. Answer (1)

Infected RBCs become much enlarged and acquires granules called schuffner's dots. Infective stage of *Plasmodium* called sporozoites reproduces asexually in liver cells of human.

167. Answer (3)

Zygote become worm like motile organism called ookinete. Ring-shaped trophozoite is present in erythrocytic schizogony.

168. Answer (1)

169. Answer (1)

170. Answer (1)

T cells provide cell mediated immunity. Neutrophils provides innate immunity.

171. Answer (2)

Memory cells produced in primary immune response trigger a vigorous and fast secondary immune response.

172. Answer (2)

Loss of self tolerance leads to failure of body's immune system to recognize self from non-self cells.

173. Answer (3)

Mutation or inactivation of tumor suppressor genes causes cancer.

174. Answer (4)

Nicotine is not a hallucinogen. It is stimulant.

175. Answer (2)

Rheumatoid arthritis is an autoimmune disorder.

176. Answer (3)

177. Answer (3)

Toxoid is an inactivated toxin and can be used as a vaccine.

178. Answer (3)

IgG and IgM are opsonins which participate in opsonisation

179. Answer (4)

CT and X-rays used ionizing radiations to detect cancer.

180. Answer (3)

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