12-04-2019

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 – 7

Time : 3 Hrs

ANSWERS

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

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Hints and Solutions

PHYSICS

1. Answer (4)

$i = \frac{18\ V}{R_{AC}}$

$R_{AC} = R_{AB} + R_{BC}$

$\frac{1}{R_{BC}} = \frac{1}{18} + \frac{1}{9} + \frac{1}{3} + \frac{1}{6} + \frac{1}{3}$

$= \frac{1+2+8+3+6}{18}$

$R_{BC} = 1\ \Omega$

then,

$R_{AC} = \frac{4}{5} + 1 \Rightarrow \frac{9}{5}\Omega$

then, $i = \frac{18}{9} \times 5 \Rightarrow 10\,A$

2. Answer (3)

$15\ V - 9\ V \Rightarrow 3\ V = iR_1$

Similarly,

$9\ V - 6\ V \Rightarrow 3\ V = iR_2$

$6\ V - 0\ V \Rightarrow 6\ V = iR_3$

$R_1 : R_2 : R_3$

2 : 1 : 2

3. Answer (3)

$i = i_{max}\, e^{-\frac{t}{RC}}$

$= \frac{q_{max}}{CR} e^{-\frac{t}{RC}}$

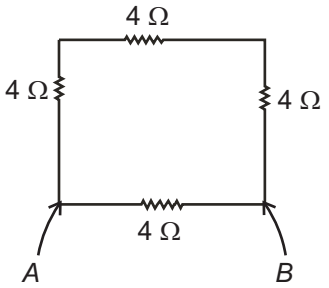
$= \frac{100 \times 10^{-6}}{10^{-5} \times (4 \times 10^6)} e^{-\frac{t}{40}}$

$1.25 \times 10^{-6} = 2.5 \times 10^{-6} e^{-\frac{t}{40}}$

$\ln 2 = \frac{t}{40}$

$t = 28$ s

4. Answer (2)



then, $R_{eq} = \frac{12 \times 4}{12+4} \Rightarrow \frac{48}{16} = 3\ \Omega$

5. Answer (2)

$\because$ V_{AJ} for 30 V > for 20 V

6. Answer (1)

$0.216 \times 10^{-3}\,J = \frac{1}{2} \times 3 \times 10^{-6} \times V^2$

$\frac{216 \times 2}{3} = V^2$

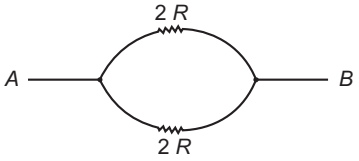
$V = 12$ V

$12 = E\left(\frac{R}{\frac{5}{2}R}\right)$

$E = 30$ V

7. Answer (3)

This is balanced wheatstone bridge.



$$R_{eq} = \frac{(2R)}{2} = R$$

8. Answer (3)

Resistivity is the property of material.

9. Answer (2)

$R \propto L^2$

10. Answer (2)

$$\frac{dq}{dt} = i_0 + 3\alpha t$$

$$Q = \left[i_0 t + \frac{3}{2}\alpha t^2 \right]_0^{10}$$

$$Q = \left[10 \times 0.5 + \frac{3}{2} \times 0.04 \times 100 \right]$$

$Q = 5 + 6 = 11$ C

11. Answer (2)

$$\frac{dq}{dt} = 2 + t$$

$$\int dq = \int_0^4 (2+t)\,dt = \left[2t + \frac{t^2}{2} \right]_0^4 = 8 + 8 = 16 \text{ C}$$

$$i = \frac{16}{4} = 4 \text{ A}$$

12. Answer (1)

$$i = \frac{V}{R_{eq}} = \frac{10}{2+4+1+3} = 1 \text{ A}$$

13. Answer (2)

Voltmeter reads 18 V

$\Rightarrow$ Potential difference across 24 Ω resistor

$= 30 - 18 = 12$ V

$\Rightarrow$ Current through battery = $\frac{12}{24}$ = 0.5 A

$\Rightarrow$ Let voltmeter resistance = x

Now current through 50 ohm is $\frac{18}{50}$

and current through voltmeter = $\frac{18}{x}$

$$\frac{18}{50} + \frac{18}{x} = 0.5$$

$\Rightarrow$ $x = 128.5\ \Omega$

14. Answer (2)

$$P_{max} = \frac{E^2}{4r} = \frac{10 \times 10}{4 \times 2} = 12.5 \text{ W}$$

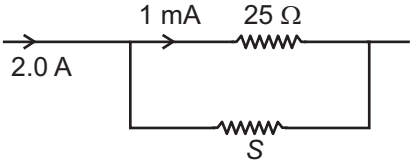
15. Answer (4)

For $R_1 = 6\ \Omega$, circuit will be balanced Wheatstone Bridge, current through R will be zero for any arbitrary value.

16. Answer (1)

Due to rise in current brightness will increase.

17. Answer (3)



$\Rightarrow 1\,\text{mA} \times 25\ \Omega = (2\text{A} - 1\text{mA})\ S$

$\Rightarrow S = 1.25 \times 10^{-2}\ \Omega$

18. Answer (1)

$$i = \frac{8\varepsilon - \varepsilon}{9r} = \frac{7\varepsilon}{9r}$$

$V = \varepsilon + ir$

$$= \varepsilon + \frac{7\varepsilon}{9} = \frac{16\varepsilon}{9}$$

19. Answer (2)

R_{max} when resistances are connected in series

$R_{max} = 20 + 50 + 100 = 170\,\Omega$

R_{min} when resistances are connected put in parallel

$$\frac{1}{R_{min}} = \frac{1}{20} + \frac{1}{50} + \frac{1}{100}$$

$$R_{min} = \frac{100}{8} = \frac{25}{2}\Omega$$

$$\frac{R_{max}}{R_{min}} = \frac{170}{25/2} = \frac{68}{5}$$

20. Answer (3)

The electric field produced by charges accumulated on the surface of wire.

21. Answer (3)

$$R = \frac{(300)(3)}{(100-3)} \Rightarrow \frac{900}{97} \approx 9$$

Resistances must be of same order for accuracy.

22. Answer (1)

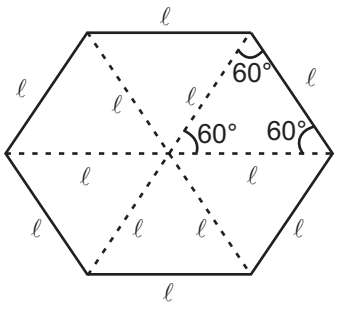
$$V = IR = \frac{ER}{(R+r)}$$

23. Answer (3)

$\vec{J} = ne(\mu)\vec{E}$

$= ne\cdot\left(\frac{e\tau}{m}\right)\vec{E} = \frac{ne^2\tau}{m}\vec{E}$

24. Answer (1)



$= i\times(3)\left(6\times\frac{1}{2}\times\ell\times\ell\cos 30^\circ\right)$

$M = 9i\ell^2\times\frac{\sqrt{3}}{2}$

25. Answer (1)

$F_{net} = |F_2 - F|$

$= |i_2(1)(10) - i_1(1)(10)|$

$= \left|\frac{15}{5} - \frac{15}{3}\right|10$

$F_{net} = 20$ N

26. Answer (2)

$$\text{Gyromagnetic ratio} = \frac{\text{Magnetic momentum}}{\text{Angular momentum}} = \frac{e}{2m}$$

27. Answer (1)

–6 V V' +24 V

←18 cm→

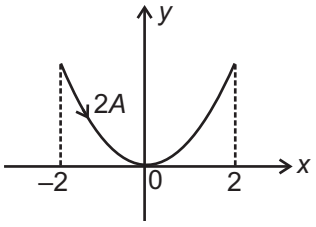
←100 cm→

$\frac{+24-(-6)}{100} = \frac{V'+6}{18}$

$\frac{30}{100} = \frac{V'+6}{18}$

$V' = 5.4 - 6 = -0.6$ V

28. Answer (3)



$\vec{F} = i(\vec{l}\times\vec{B})$

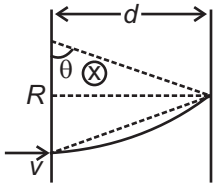
$\vec{F} = 2\left[4\hat{i}\times(-0.02\hat{k})\right] = 0.16\hat{j}$

$\vec{a} = \frac{\vec{F}}{m} = \frac{0.16\hat{j}}{100\times10^{-3}} = 1.6\hat{j}$ m/s^2

29. Answer (2)

$\because\ R = \frac{mv}{qB}$ then $\frac{R_1}{R_2} = \frac{q_2}{q_1}$

30. Answer (2)



$R\sin\theta = d$

$\sin\theta\frac{mv}{qB} = \frac{\sqrt{3}}{2}\frac{mv}{qB}\sin\theta$

$\sin\theta = \frac{\sqrt{3}}{2}, \theta = \frac{\pi}{3}$

Displacement = $R = \frac{mv}{qB}$

31. Answer (3)

$F = qvB\sin\theta$

$\because\ q = 0$

$\therefore\ F = 0$

32. Answer (3)

$\tau = NIAB\sin\theta$

$\tau = 1\times I\times\pi R^2\times B\times\sin 90^\circ$

$\tau = I\pi R^2B$

33. Answer (2)

$F_{repulsive} > F_{attractive}$

34. Answer (1)

$B = \frac{\mu_0 I.\frac{\pi}{3}}{4\pi R} - \frac{\frac{\mu_0 I\pi}{3}}{4\pi(2R)} = \frac{\mu_0 I}{12R} - \frac{\mu_0 I}{24R} = \frac{\mu_0 I}{24R}\otimes$

35. Answer (2)

$F = 0,\ \tau \neq 0$

36. Answer (2)

$\vec{M} = i\vec{A} = ia^2\hat{k}$

37. Answer (4)

$B = \frac{\mu_0 i}{2r}$

$\boxed{i = \frac{2Br}{\mu_0}}$

38. Answer (1)

Outside the toroid $B = 0$.

39. Answer (3)

Perpendicular to the paper outward.

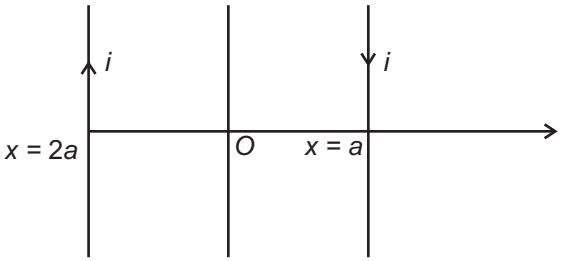
40. Answer (2)

$$P = \frac{2\pi m}{qB} v\cos 37^\circ$$

$$r = \frac{mv\sin 37^\circ}{qB} = \frac{P}{2\pi}\tan 37^\circ$$

$$r = \frac{3P}{8\pi}$$

41. Answer (3)



$$B_0 = \frac{\mu_0 i}{2\pi}\left[\frac{1}{a} + \frac{1}{2a}\right]$$

$$B_P = \frac{\mu_0 i}{2\pi}\left[\frac{1}{a} - \frac{1}{4a}\right]$$

$$\Rightarrow \quad \frac{B_0}{B_P} = \frac{\frac{3}{2}}{\frac{3}{4}} \Rightarrow 2:1$$

42. Answer (4)

$$= \left[\frac{B}{\mu_0}\right][RC]$$

$$= \left[\frac{i}{r}\right][T] = [A^1\ L^{-1}\ T^1]$$

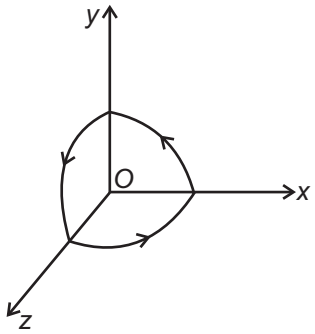
43. Answer (4)

$$M = \frac{I\pi R^2}{2} \text{ for half loop}$$

$$M_{eq} = \sqrt{M_1^2 + M_2^2} = M\sqrt{2}$$

$$M_{eq} = \left(\frac{I\pi R^2}{2}\right)\sqrt{2}$$

44. Answer (2)



$$B_0 = \sqrt{3}\ B_{arc}$$

$$= \sqrt{3}\left(\frac{\mu_0 i}{4(2R)}\right)$$

$$B_0 = \frac{\sqrt{3}\,\mu_0 i}{R}$$

45. Answer (3)

$$mg = i_1 \ell\left(\frac{\mu_0 i_2}{2\pi h}\right)$$

$$5\times 10^{-3}\times 10 = \frac{0.5\times 2\times 10^{-7}\times 20\times 20}{h}$$

$$h = \frac{400\times 10^{-7}}{5\times 10^{-2}}$$

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

$h = 0.8 \times 10^{-3}$ m

CHEMISTRY

46. Answer (4)

Aniline is used as froth stabiliser.

47. Answer (3)

During calcination, ore is converted into its oxide.

48. Answer (2)

Impurity of FeS present in copper matte result in the form of slag of $FeSiO_3$.

49. Answer (1)

From low grade ore, copper is leached out using acid or bacteria. Solution containing Cu^{2+} is treated with scrap iron or H_2

$Cu^{2+}(aq) + H_2(g) \longrightarrow Cu(s) + 2H^+(aq)$

50. Answer (3)

Van Arkel method

$$Zr + 2I_2 \longrightarrow ZrI_4 \xrightarrow{\Delta(1800\,K)} Zr + 2I_2$$

51. Answer (1)

Brass (Cu → 60%, Zn → 40%).

52. Answer (4)

$3HNO_2 \xrightarrow{\Delta} HNO_3 + H_2O + 2NO.$

53. Answer (4)

$PCl_3 + H_2O \rightarrow H_3PO_3$

In hydrolysis oxidation state doesnot change.

54. Answer (3)

Bond angle of hydrides decreases down the group and becomes almost 90° at bottom

55. Answer (1)

HI is the strongest reducing agent among halogen acids because of lowest bond dissociation energy.

56. Answer (2)

$SO_2 + 2H_2O \rightarrow H_2SO_4 + 2\,[H]$

57. Answer (4)

58. Answer (1)

59. Answer (4)

60. Answer (1)

Cu is placed above Ag in electrochemical series, hence it reduces Ag^+ from its salt solution.

$Cu + 2AgNO_3 \longrightarrow Cu(NO_3)_2 + 2Ag$

61. Answer (2)

$2CuSO_4 + 4KI \longrightarrow Cu_2I_2 + K_2SO_4 + I_2$

$I_2 + KI \longrightarrow KI_3$

62. Answer (4)

$AgCl + 2NH_4OH \longrightarrow [Ag(NH_3)_2]Cl + 2H_2O$

$AgCl + 2KCN \longrightarrow K[Ag(CN)_2] + KCl$

$AgCl + 2Na_2S_2O_3 \longrightarrow Na_3[Ag(S_2O_3)_2] + NaCl$

63. Answer (3)

$\mu = 0$ n = number of unpaired electron.

$\sqrt{n(n+2)} = 0$ $Sc \rightarrow [Ar]\ 3d^1 4s^2$

$n = 0$ $Sc^{3+} \rightarrow [Ar]\ 3d^0 4s^0$

64. Answer (1)

65. Answer (2)

Bond enthalpy of 'N ≡ N' bond is 941.4 kJ mol^{-1}.

66. Answer (3)

$(NH_4)_2SO_4 + 2NaOH \longrightarrow 2NH_3 + 2H_2O + Na_2SO_4.$

67. Answer (1)

$\Delta_f H°\ (NH_3) = -46.1$ kJ mol^{-1}, $\Delta_f H°$ of others is +ve.

68. Answer (3)

$H_4P_2O_6 \longrightarrow$ Hypophosphoric acid.

69. Answer (2)

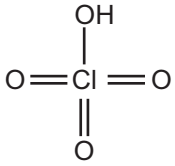
$3O_2 \longrightarrow 2O_3$, $\Delta H°$ (298 K) = + ve

70. Answer (4)

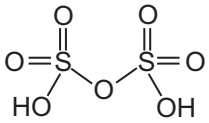
SO_2 :

71. Answer (3)

Perchloric acid ($HOClO_3$)



72. Answer (3)



73. Answer (4)

$2HNO_2 \xrightarrow{\Delta} N_2O_3 + H_2O$

74. Answer (3)

Only SO_2 can behave as a reducing agent.

75. Answer (1)

76. Answer (2)

77. Answer (3)

78. Answer (2)

Order of trans effect is : $C_2H_4 > Br^- > OH^- > H_2O$

79. Answer (4)

Hybridization of Cu in $[Cu(H_2O)_6]^{2+}$ is sp^3d^2, which is outer orbital complex.

80. Answer (3)

81. Answer (4)

82. Answer (2)

83. Answer (4)

84. Answer (3)

Ag: [Kr] $4d^{10}\ 5s^1$

85. Answer (3)

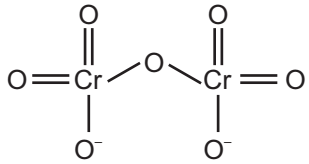
Cr^+: [Ar] $3d^5\ 4s^0$

86. Answer (3)

$[Co(en)_2Br_2]Cl \rightarrow$ has total 6 isomers which includes geometrical and optical isomers

87. Answer (1)

$Cr_2O_7^{2-}$:



88. Answer (3)

Lanthanoids are good conductors of heat and electricity.

89. Answer (1)

$[Fe(CN)_6]^{3-}$: EAN = 26 – 3 + 12 = 35

90. Answer (2)

For co-ordination number 4, possible distribution is square planar or tetrahedral.

BOTANY

91. Answer (2)

Parents genotype : RrYy

Selfing : RrYy × RrYy

Offspring : $\frac{1}{16}$ which have wrinkled and green seeds.

Hence, total wrinkled and green seed

$= \frac{1}{16} \times 800$ = 50 seeds

92. Answer (3)

Turner's syndrome – XO (occurs due to allosomic monosomy)

Down's syndrome -Trisomy of chromosome 21.

93. Answer (1)

Point mutation occur due to change in a single base pair of DNA

94. Answer (2)

Klinefelter's syndrome = 44 + XXY is a male with feminine features.

95. Answer (2)

A gene which masks the action of another gene is termed as epistatic gene.

96. Answer (3)

The skin colour in the individual is determined by three pairs of genes and intermediate ones are more frequent in polygenic inheritance.

97. Answer (3)

Human male – 24 linkage groups

Human Female – 23 linkage groups

98. Answer (4)

Green seed colour is a recessive trait in pea plant.

99. Answer (1)

Aa × aa is a test cross.

100. Answer (1)

101. Answer (3)

Starch synthesis shows incomplete dominance

102. Answer (3)

The third cross ($i^Ai^O \times i^Oi^O$) will produce 'A' and 'O' types of phenotypes.

103. Answer (2)

Short index finger in males is a sex influenced trait.

104. Answer (3)

105. Answer (4)

A × AB cannot produce O blood group child.

106. Answer (3)

Complimentary genes – 9 : 7

107. Answer (4)

Type of gametes = 2^n

n = number of heterozygous loci

$2^2 = 4$

108. Answer (2)

It results in loss of amino group from nitrogenous base.

109. Answer (4)

According to Chargaff's rule $\frac{A+G}{T+C} = 1$

110. Answer (2)

XX – XO type – Grasshopper

ZO – ZZ type – Moth

111. Answer (3)

112. Answer (4)

113. Answer (4)

Heterochromatin – Transcriptionally inactive

114. Answer (2)

Eukaryotes – 5 types of DNA polymerases

Prokaryotes – 3 types of DNA polymerases

115. Answer (2)

rRNA of prokaryotes – 16S, 23S and 5S

rRNA of eukaryotes – 18S, 28S, 5.8S and 5S

116. Answer (1)

Lac operon – Catabolic, inducible system

117. Answer (3)

Myotonic dystrophy is an autosomal dominant trait.

118. Answer (2)

Male *Drosophila* is smaller than female.

119. Answer (2)

120. Answer (4)

Antisense is template strand and sense strand is coding strand.

121. Answer (3)

122. Answer (2)

Phenotypic ratio of Dihybrid test cross' is 1 : 1 : 1 : 1.

123. Answer (2)

Down syndrome is due to trisomy of 21st chromosome.

124. Answer (1)

Replication includes DNA polymerase, primase and topoisomerase.

125. Answer (2)

126. Answer (1)

127. Answer (3)

Tryptophan act as co-repressor.

128. Answer (4)

129. Answer (3)

M. Wilkins and R. Franklin obtained very fine X-ray diffraction picture of DNA.

130. Answer (2)

G + C = 32 + 32 = 64%

A + T = 100 – 64 = 36%

$$A = \frac{36}{2} = 18\%$$

131. Answer (4)

TDF gene is the smallest gene with 14 bases.

132. Answer (3)

133. Answer (1)

Pericentric inversion involves the centromere.

134. Answer (3)

QB bacteriophage has RNA.

135. Answer (2)

Last step of DNA fingerprinting is detection of hybridised DNA fragments by autoradiography.

ZOOLOGY

136. Answer (2)

S.L. Miller created electric discharge in a closed flask containing CH_4, H_2, NH_3 and water vapour at 800°C.

137. Answer (2)

Free hydrogen was abundant in early atmosphere

138. Answer (3)

Life appeared almost 4 bya on Earth

139. Answer (1)

According to Darwin, those who are better fit in an environment, leave more progeny than others.

140. Answer (2)

141. Answer (1)

142. Answer (2)

Hardy-Weinberg equation is $p^2 + 2pq + q^2 = 1$

143. Answer (3)

Hardy-Weinberg's equilibrium aims at keeping allele frequency of a population constant along generations.

144. Answer (2)

145. Answer (3)

146. Answer (3)

Industrial metamism is an example of directional selection. Idea of chemical evolution/Abiogenesis for origin of life is more or less accepted.

147. Answer (2)

148. Answer (2)

149. Answer (4)

150. Answer (3)

Homologous structures in different organisms show similarity in their anatomy.

151. Answer (4)

Creation of universe is explained by Big Bang Theory.

152. Answer (3)

153. Answer (1)

154. Answer (3)

155. Answer (3)

Archaeopteryx hand bears typical reptilian plan and each finger terminates in a claw.

156. Answer (3)

Pelycosaurs and Therapsids are synapsids which have become extinct from earth.

157. Answer (4)

Ear pinna is not a vestigeal structure in man

158. Answer (2)

Bottle neck effect leads to a decrease in the genetic variability of a population.

159. Answer (1)

This experiment is a beautiful example of the genetic basis of a particular adaptation and was demonstrated in bacteria.

160. Answer (2)

If the selection does not favour the mean character value, rather favours both the peripheral character values then this kind of selection is called disruptive selection.

161. Answer (2)

Smoke has SO_2 that eradicated lichens so the dark brown colour of the bark were exposed.

162. Answer (4)

163. Answer (1)

164. Answer (2)

165. Answer (4)

Tracheophytes possibly have given rise to lycopods.

166. Answer (4)

Life originated in the proterozoic era in water

167. Answer (2)

The effect of natural selection traits can be stabilising, directional and disruptive.

168. Answer (4)

Most primitive mammals are prototherians.

169. Answer (1)

170. Answer (2)

171. Answer (2)

$p = 0.8$

$q = 1 - p = 1 - 0.8 = 0.2$

$\therefore \quad pq = 0.8 \times 0.2 = 0.16$

$\therefore \quad 2pq = 0.32$

32% of 1000 = 320

172. Answer (4)

Forelimbs of whale and bat exemplify

173. Answer (3)

174. Answer (2)

In *Pliohippus*, each fore and hind limb had one complete finger and one complete toe and two splints hidden beneath the skin.

175. Answer (1)

In Miocene (Golden age of mammals) epoch of Cenozoic era, continued radiation of mammals occurred.

176. Answer (1)

177. Answer (3)

Placental mammals — Anteater, Lemur

Australian marsupials — Numbat, Spotted cuscus.

178. Answer (2)

According to Malthus, the populations remains nearly stable in size except during some seasonal fluctuations.

179. Answer (1)

In 1938, a fish caught in South Africa happened to be a Coelacanth which was thought to be extinct.

180. Answer (3)

Pre-historic cave art developed about 18,000 years ago.

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