COURSE NAME: 12[TH]

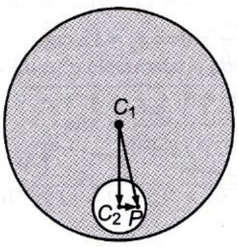
DATE : 24[th] July 2017

Physics :

1. **(3)**

2. **(2)**

$$\vec{E}_P = \frac{\rho}{3\varepsilon_0}\overrightarrow{C_1P} + \frac{-\rho}{3\varepsilon_0}\overrightarrow{C_2P} = \frac{\rho}{3\varepsilon_0}(\overrightarrow{C_1P} - \overrightarrow{C_2P}) = \frac{\rho}{3\varepsilon_0}(\overrightarrow{C_1C_2})$$



Which is constant everywhere in the cavity.

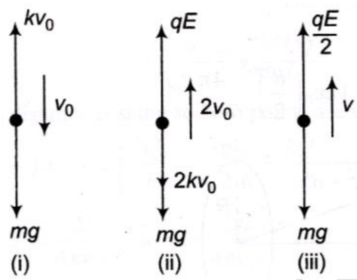
3. **(4)**

4. **(2)**

$$\vec{E} = \frac{\partial V}{\partial x}\hat{i} - \frac{\partial V}{\partial y}\hat{j} - -\frac{\partial V}{\partial z}\hat{k}$$

where, $\frac{\partial V}{\partial x} i = -2xy - z^3, \frac{\partial V}{\partial y} = x^2, \frac{\partial V}{\partial z} = 3xz^2$

5. **(1)**



From (i), $mg = kv_0$

From (ii),

$$qE = 2kv_0 + mg = 3mg = 3mg \Rightarrow \frac{qE}{2} = \frac{3mg}{2}$$

From (iii), $mg + kv = \frac{qE}{2} \Rightarrow v = \frac{v_0}{2}$

6. **(2)**

7. **(3)**

8. **(1)**

9. **(3)**

10. **(3)**

Total charge in r < R region

$$q = \int \rho dV = \int_0^r \rho_0\left(\frac{5}{4} - \frac{r}{R}\right)4\pi r^2 dr$$

$$= 4\pi\rho_0\left[\frac{5}{4}\left(\frac{r^3}{3}\right) - \frac{1}{R}\left(\frac{r^4}{4}\right)\right] = \pi\rho_0 r^3\left(\frac{5}{3} - \frac{r}{R}\right)$$

Electric field $E = \frac{kq}{r^2} = \frac{\rho_0 r}{4\varepsilon_0}\left(\frac{5}{3} - \frac{r}{R}\right)$

11. **(4)**

12. **(3)**

13. **(2)**

14. **(3)**

Net flux = 0, so required flux = (E) (πR^2)

15. **(1)**

$\phi = \vec{E}.\vec{S} = ES\cos 90^o = 0.$

16. **(1)**

Here, $\vec{E} \perp$ Area vector.

17. **(3)**

18. **(4)**

19. **(3)**

$$required\ \ potential = \frac{Q}{4\pi\varepsilon_0\left(\frac{R}{2}\right)} + \frac{q}{4\pi\varepsilon_0 R}$$

20. **(4)**

$$W = \Delta U = Q(V_D - V_C) = Q\left[\frac{q}{4\pi\varepsilon_0(3L)} - \frac{q}{4\pi\varepsilon_0 L} - 0\right]$$

$$= \frac{-Qq}{6\pi\varepsilon_0 L}$$

21. **(1)**

22. **(1)**

Loss in potential energy

$$= \left[\frac{4kq^2}{a} + \frac{2kq^2}{a\sqrt{2}}\right] - \left[\frac{4kq^2}{(2a)} + \frac{2kq^2}{(2a\sqrt{2})}\right]$$

$$= \left(2 + \frac{1}{\sqrt{2}}\right)\frac{kq^2}{a}$$

As gain in kinetic energy = loss in potential energy

So, $4 \times \frac{1}{2}mv^2 = \left(2 + \frac{1}{\sqrt{2}}\right)\frac{kq^2}{a}$

$$\Rightarrow v = \sqrt{\left(1 + \frac{1}{2\sqrt{2}}\right)\frac{q^2}{4\pi\varepsilon_0 ma}}$$

23. **(4)**

$V_A - V_B = \Delta V = -\vec{E}.\Delta\vec{r}$

$= -(5\times10^3\,\hat{j}).(-0.6\hat{i})$

$= -3000$ volt.

24. (2)

$W = q\Delta V = q(V_B - V_A) = 0$

25. (4)

$$\vec{E} = \frac{\partial V}{\partial x}\hat{i} - \frac{\partial V}{\partial y}\hat{j} - \frac{\partial V}{\partial z}\hat{k}$$

$$= -[(6-8y)\hat{i} + (-8x-8+6z)\hat{j} + (6y)\hat{k}]$$

At (1, 1, 1); $\vec{E} = 2\hat{i} + 10\hat{j} - 6\hat{k}$

$$\Rightarrow \vec{E} = \sqrt{2^2+10^2+6^2} = \sqrt{140} = 2\sqrt{35}$$

26. (3)

$$\vec{E} = \frac{\partial V}{\partial x}\hat{i} - \frac{\partial V}{\partial y}\hat{j} - \frac{\partial V}{\partial z}\hat{k}$$

$$\vec{E} = -(6y)\hat{i} - (6x-1+2z)\hat{j} - (2y)\hat{k}$$

At point (1, 1, 0)

$$\vec{E} = 6\hat{i} - 5\hat{j} - 2\hat{k} = -(6\hat{i} + 5\hat{j} + 2\hat{k})$$

27. (1)

28. (3)

29. (2)

30. (4)

$\tau = PE\sin\theta$

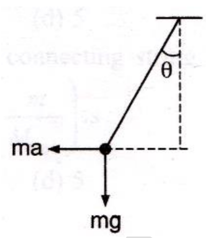
$\tau = q/E\sin\theta$

$4 = q\times 2\times10^{-2}\times 2\times10^5\sin 30^o$

$\Rightarrow q = 2mc$

31. (2)

32. (2)



As the car moves forward with acceleration a, the pseudo-force 'ma' acts on the sphere in the rear direction. If θ is the angle made by the string will be vertical, then

$$\tan\theta = \frac{ma}{mg} = \frac{a}{g}$$

$$\therefore \theta = \tan^{-1}(a/g)$$

33. (1)

$$a = \left(\frac{m_1 - m_2}{m_1 + m_2}\right)g = \left(\frac{2m - m}{2m - m}\right)g = \frac{g}{3}$$

$$T_1 = 2m(g-a) = 2m\left(g - \frac{g}{3}\right) = \frac{4}{3}mg$$

$$T_2 = M(g-a) = m\left(g - \frac{g}{3}\right) = \frac{2}{3}mg$$

$$\therefore \frac{T_1}{T_2} = 2.$$

34. (3)

35. (2)

$$F_x = \frac{\partial U}{\partial x} = \frac{\partial}{\partial x}(\alpha x - \beta y) = -\alpha$$

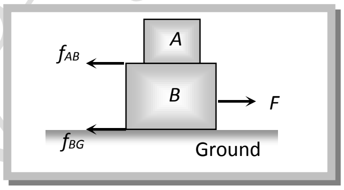
$$F_x = \frac{-\partial U}{\partial y} = \frac{-\partial}{\partial x}(\alpha x - \beta y) = +\beta$$

$$\therefore F = \sqrt{F_x^2 + F_y^2} = \sqrt{\alpha^2 + \beta^2}$$

$$\therefore a = \frac{F}{m} = \left(\frac{\sqrt{\alpha^2+\beta^2}}{m}\right) = \left(\frac{\alpha^2+\beta^2}{m^2}\right)^{1/2}$$

36. (4)

37. (3)



Two frictional force will work on block *B*.

$F = f_{AB} + f_{BG} = \mu_{AB} m_a g + \mu_{BG}(m_A + m_B)g$

= 0.2 × 100 × 10 + 0.3 (300) × 10

= 200 + 900 = 1100*N*. (This is the required minimum force)

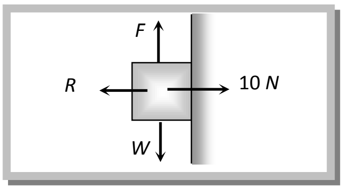
38. (1)

39. (4)

$$S = \frac{u^2}{2\mu g} = \frac{m^2u^2}{2\mu g m^2} = \frac{P^2}{2\mu m^2 g}$$

40. (1)

For equilibrium



Weight (*W*) = Force of friction (*F*)

$W = \mu R = 0.2\times10 = 2N$

41. (4)

42. (3)

43. (1)

44. (4)

45. (4)

Chemistry:

46. **(3)**

47. **(1)**

48. **(1)**

49. **(2)**

50. **(4)**

51. **(1)**

52. **(3)**

53. **(2)**

54. **(4)**

55. **(1)**

56. **(3)**

57. **(3)**

58. **(3)**

59. **(1)**

60. **(3)**

61. **(4)**

62. **(4)**

63. **(1)**

64. **(2)**

65. **(4)**

66. **(2)**

67. **(3)**

68. **(3)**

69. **(3)**

70. **(1)**

71. **(2)**

72. **(3)**

73. **(1)**

74. **(3)**

75. **(4)**

76. **(3)**

77. **(3)**

78. **(1)**

79. **(4)**

80. **(2)**

81. **(1)**

Z = 114 $[Rn]^{86}$ $7s^2$ $5f^{14}$ $6d^{10}$ $7p^2$ 14^{th} gp. (carbon family)

82. **(3)**

83. **(3)** I < Br < Cl < F (given ΔH_{eg} order)

I < Br < F < Cl (Correct)

84. **(4)**

85. **(2)**

$C\ell_2 > Br_2 > F_2 > I_2$

↓

Due to high ℓp-ℓp repulsion

86. **(4)**

87. **(1)**

88. **(1)**

89. **(2)**

90. **(2)**

Biology :

91. **Sol.**

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92. **Sol.**

NCERT – XI Page No – 67.

93. **Sol.**

NCERT – XI Page No – 68.

94. **Sol.**

NCERT – XI Page No – 68.

95. **Sol.**

NCERT – XI Page No – 68 & 71.

96. **Sol.**

NCERT – XI Page No – 69.

97. **Sol.**

NCERT – XI Page No – 69.

98. **Sol.**

NCERT – XI Page No – 69 & 70.

99. **Sol.**

NCERT – XI Page No – 70.

100. **Sol.**

NCERT – XI Page No – 71.

101. **Sol.**

NCERT – XI Page No – 71.

102. **Sol.**

NCERT Xtract – XI Page No – 53.

103. **Sol.**

NCERT Xtract – XI Page No – 53.

104. **Sol.**

NCERT – XI Page No – 71.

105. **Sol.**

NCERT – XI Page No – 71.

106. **Sol.**

NCERT – XI Page No – 72.

107. **Sol.**

NCERT – XI Page No – 72.

108. **Sol.**

NCERT – XI Page No – 72.

109. **Sol.**

NCERT – XI Page No – 72 & 73.

110. **Sol.**

NCERT – XI Page No – 74.

111. **Sol.**

NCERT – XI Page No – 74.

112. **Sol.**

NCERT – XI Page No – 75.

113. **Sol.**

NCERT – XI Page No – 75.

114. **Sol.**

NCERT – XI Page No – 75.

115. **Sol.**

Gynoecium + Androcecium = Gynandrous

116. **Sol. (2)**

117. **Sol. (2)**

118. **Sol. (1)**

119. **Sol. (4)**

120. **Sol. (3)**

121. **Sol. (2)**

122. **Sol.**

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123. **Sol.**

NCERT – XI Page No – 75.

124. **Sol.**

NCERT – XI Page No – 75.

125. **Sol.**

NCERT – XI Page No – 78.

126. **Sol.**

NCERT – XI Page No – 79 to 81.

127. **Sol.**

NCERT – XI Page No – 80.

128. **Sol.**

NCERT – XI Page No – 79.

129. **Sol. (4)**

130. **Sol.**

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131. **Sol.**

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132. Sol.

Genes controlling seven traits in pea studied by Mendel are located on 4 chromosomes - cotyledon and seed coat colour on chromosome – 1; pod shap, flower position and stem length on chromosome 4; pod colour on chromosome 5 and seed shap on chromosome 7.

133. Sol. (1)

134. Sol. (1)

135. Sol.

Non allelic genes are located on the same chromosome at different distance. When expression of one gene covered by another non allelic gene, respectively known as hypostatic (covered) and epistatic (covering). and the phenomenon may be consider as hypostasis or epistasis.

136. Sol.

Skin colour in human is polygeneic trait, controlled by three genes. Number of phenotypic categories can be calculated by using the following formula (2n + 1). Where n is the number of genes.

137. Sol. (4)

138. Sol. (4)

139. Sol. (1)

140. Sol.

When one gene controls more than one traits known as pleiotropic gene and the phenomenon is pleiotropism.

141. Sol. (3)

142. (3)

143. Sol.

144. Sol.

In multiple allellism contribution of each dominant allele $= \frac{\text{Max. Height} - \text{Min. Height}}{\text{Total number of dominant alleles}}$

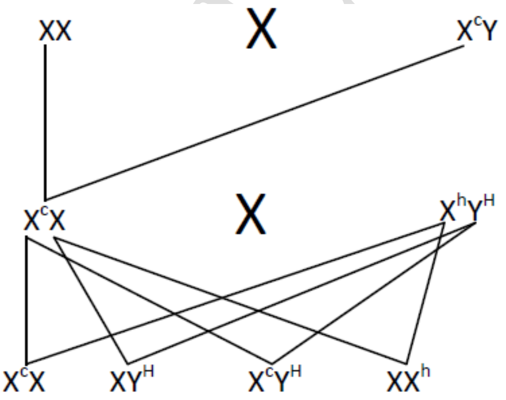
145. Sol.

Colour blindness and haemophilia are sex linked recessive traits but hypertrichosis is a Y linked (Holandric) trait. When we perform a cross between the male and female with above given conditions. Following progeny occur-

c – colour blindness

h – haemophilia

H - hypertrichosis



146. Sol.

Barr bodies were discovered by Barr and Bertram (1949) in nuclei of human females stained with orcein as small distinct chromatin body called **sex chromatin, Barr body** or **X-chromatin.**

Number of Barr bodies is one less than the number of X-chromosomes present in an individual.

Genotype of Klinefelter syndrome is XXY.

147. Sol.

2n + 1 = 25 and therefore 2n = 24 and n = 12.

148. Sol.

Attached ear – lobe is an autosomal recessive trait.

149. Sol. (4)

150. Sol. (1)

151. Sol.

In trihybrid cross phenotypic ration of F_2 generations – 27 : 9 : 9 : 9 : 3 : 3 : 3 : 1

Only one condition is possible with all recessive characters. $\frac{1}{64} \times 2560$

152. Sol.

Phenylketoneuria is an autosomal recessive trait.

153. Sol. (1)

154. Sol. (1)

155. Sol. (1)

156. Sol.

In multiple allellism contribution of each dominant allele $= \frac{\text{Max. weight} - \text{Min. weight}}{\text{Total number of dominant alleles}}$

157. Sol. (4)

158. Sol.

2n = 6x = 42 in a wheat cell

159. Sol. $COV = \frac{\text{Number of new recombinants}}{\text{Total progeny}}$

160. Sol. (4)

161. Sol.

2n = 4x = 100

n = 50; x = 25

162. Sol. (1)

163. Sol. (2)

164. Sol. (1)

165. Sol. (4)

166. Sol. (1)

167. Sol.

$= \frac{\text{Max. Height} - \text{Min. Height}}{\text{Total number of dominant alleles}}$

168. Sol. (2)

169. Sol.

Gynecomastia is a condition with XXY genotype.

170. Sol. (2)

171. Sol. (3)

172. Sol. (3)

173. Sol. (2)

174. Sol. (3)

175. Sol. (1)

176. Sol. (3)

177. Sol. (3)

178. Sol. (3)

Gene responsible for haemophilia is also a lethal gene. In lethal gene homozygous condition is not possible because death occurs before birth.

179. Sol. (1)

180. Sol. (4)