

# SOLUTIONS

**PHASE TEST-1**

**MGZK-1903,1904**

**NEET PATTERN**

**Test Date: 04-11-2017**



## PHYSICS

1. (1)

Magnitude of velocity = Speed

So, if the speed is zero then it must have zero velocity also.

2. (2)

$$a = \frac{dv}{dt} = \frac{dv}{dx} \frac{dx}{dt}$$

$$a = \frac{v dv}{dx}$$

3. (3)

Final velocity  
 ↓  
 Initial velocity  
 ↓

$$\text{Velocity at the mid-point} = \sqrt{\frac{v^2 + u^2}{2}}$$

(When acceleration is constant)

Given,  $v = 3u$ ,  $u = u$ 

$$\text{So, } v_{\text{mid}} = \sqrt{\frac{9u^2 + u^2}{2}} = \sqrt{\frac{10u^2}{2}}$$

$$v_{\text{mid}} = \sqrt{5u^2} = \sqrt{5}u = v_{\text{mid}}$$

4. (2)

$$x^2 = t + 2 \Rightarrow \frac{1}{x^2} = \frac{1}{t + 2} \quad \dots(i)$$

$$\Rightarrow x = \sqrt{t + 2}$$

$$\Rightarrow \frac{dx}{dt} = \frac{1}{2}(t + 2)^{\frac{1}{2}-1}$$

$$\Rightarrow \frac{dx}{dt} = \frac{1}{2}(t + 2)^{-\frac{1}{2}}$$

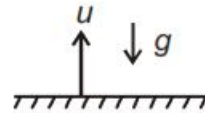
$$\Rightarrow \frac{d^2x}{dt^2} = \frac{1}{2} \left( -\frac{1}{2} \right) (t+2)^{-\frac{1}{2}-1} \Rightarrow a = -\frac{1}{4} (t+2)^{-\frac{3}{2}} = -\frac{1}{4(t+2)} \times \frac{1}{(t+2)^{\frac{1}{2}}} = -\frac{1}{4} \times \frac{1}{x^2} \times \frac{1}{x}$$

$$\Rightarrow a = -\frac{1}{4x^3}$$

5. (2)

Whether body move upwards or downwards

the earth tries to pull it downwards only.



Hence during both the motion  $g$  will be negative.

So, negative, negative

6. (3)

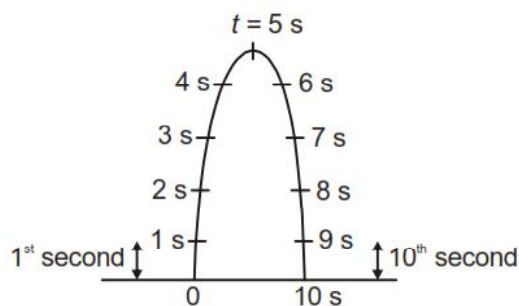
$$x = (-2t^3 + 3t^2 + 5)m \Rightarrow \frac{dx}{dt} = -6t^2 + 6t = v$$

$$\Rightarrow \frac{d^2x}{dt^2} = -12t + 6 \quad (\text{for } v = 0, 6t = 6t^2 \Rightarrow t = 1s)$$

$$a|_{t=1s} = -12 + 6 = -6ms^{-2}$$

7. (1)

The motion under gravity is a symmetric motion and the time taken to go up is same as time taken to come back to the initial position.



So, clearly the distance travelled in 1<sup>st</sup> second is same as that travelled in 10<sup>th</sup> second.

8. (2)

$$u = 0, a = 2 \text{ ms}^{-2}$$

The velocity of object after one second

$$v = u + at \quad s = \frac{1}{2} \times 2 \times 1^2 = 1\text{m}$$

$$\Rightarrow \boxed{v = 2\text{ms}^{-1}}$$

Now after separating from the balloon it will move under the effect of gravity alone

$$-h = vt - \frac{1}{2} \times 9.8 \times t^2$$

$$\Rightarrow -1 = 2t - 4.9t^2$$

$$\Rightarrow 4.9t^2 - 2t - 1 = 0$$

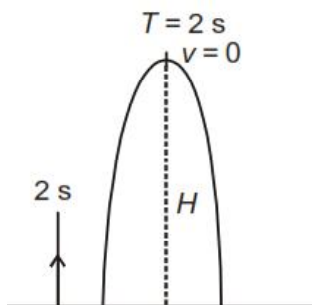
$$\Rightarrow \boxed{t = 0.7\text{s}}$$

9. (3)

$$2T = \frac{2u}{g} \Rightarrow 2 = \frac{u}{9.8} \Rightarrow u = 19.6$$

$$H = \frac{u^2}{2g} = \frac{19.6 \times 19.6}{2 \times 9.8}$$

$$\Rightarrow \boxed{H = 19.6 \text{ m}}$$

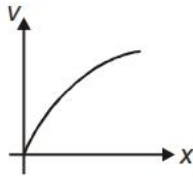


10. (3)

For uniform acceleration,  $a \rightarrow$  constant

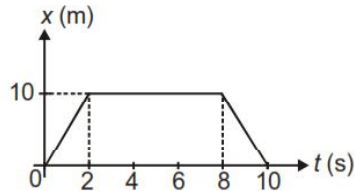
$$v^2 = u^2 + 2as$$

$$\Rightarrow \boxed{v^2 \propto x} \quad (\because u = \text{rest})$$



11. (3)

The total distance travelled from 0 to 2 s is 10 m

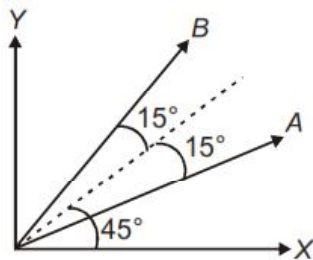
2 s to 8 s  $\rightarrow$  Zero distanceand from 8 s  $\rightarrow$  10 m

So, distance = 10 + 0 + 10 = 20 m

12. (3)

As there are two extremes in the graph one is maxima and other is minima. At both maxima and minima the slope is zero. So, it comes to rest twice.

13. (4)

The slope of line A is  $\tan 30^\circ$  and B =  $\tan 60^\circ$ 

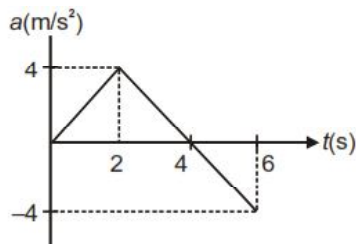
$$\frac{V_A}{V_B} = \frac{\tan 30^\circ}{\tan 60^\circ} = \frac{\frac{1}{\sqrt{3}}}{\sqrt{3}} = \frac{1}{3} \Rightarrow \boxed{V_A : V_B = 1 : 3}$$

14. (2)

Area under a-t graph gives change in velocity.

$$\Delta v = \frac{1}{2} \times 4 \times 4 - \frac{1}{2} \times 2 \times 4 = 8 - 4$$

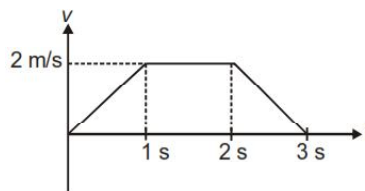
$$\Delta v = 4 \text{ ms}^{-1}$$



15. (1)

Draw the v-t graph from a-t graph.

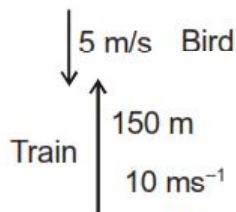
$$\text{Area under v-t graph} = \frac{1}{2} \times 2 \times (3+1) = 4\text{m}$$



16. (1)

$$\text{Time} = \frac{150}{10+5} = \frac{150}{15}$$

$$\Rightarrow T = 10 \text{ s}$$



17. (3)

A measurement having more number of decimal places is the one with the most precision. So, 20.01 g is most precise.

18. (2)

Most accurate reading is the one having minimum error.

$$\text{So, } 6 - 6.281 = 0.28 \text{ cm}$$

$$6.5 - 6.281 = 0.22 \text{ cm}$$

$$5.99 - 6.281 = 0.29 \text{ cm} \quad 6.0 - 6.281 = 0.28 \text{ cm}$$

So, second reading is most accurate.

19. (4)

A pure number has infinite number of significant figures.

20. (4)

$$V = IR \Rightarrow R = \frac{V}{I}$$

$$\Rightarrow \left( \frac{\Delta R}{R} \right) \times 100\% = \left( \frac{\Delta V}{V} + \frac{\Delta I}{I} \right) \times 100\%$$

$$\Rightarrow \frac{\Delta R}{R} \times 100\% = 3\% + 2\% = 5\%$$

21. (2)

The trailing zeros are not significant.

So, only two digits are significant.

22. (2)

The dimensions of change in velocity is same as that of velocity  $[M^0L^1T^{-1}]$

23. (3)

Wavelength and focal length both are have units of length.

24. (1)

$$u = \frac{A\sqrt{x}}{x+B}$$

By the principle of homogeneity,  $x = B$  (dimensionally)

$$\Rightarrow \boxed{B = [L]}$$

$$\text{and } [ML^2T^{-2}] = \frac{AL^{1/2}}{L} \quad [ML^2T^{-2}] = AL^{1/2}$$

$$\boxed{A = [ML^{3/2}T^{-2}]}$$

25. (3)

$$\text{Sped of light } c = \frac{1}{\sqrt{\mu_0 \epsilon_0}} \Rightarrow c = (\mu_0 \epsilon_0)^{-1/2}$$

So dimensional formula of  $(\mu_0 \epsilon_0)^{-1/2}$

26. (3)

$$\left( P + \frac{a}{V^2} \right) = b \frac{\theta}{V}$$

Dimensionally

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

$$ML^{-1}T^{-2} \times L^6 = a \Rightarrow \boxed{a = [ML^5T^{-2}]}$$

27. (3)

$$R = \frac{V}{l} = \frac{W/q}{l} = \frac{W}{l^2 t} \quad R = \frac{ML^2T^{-2}}{l^2 T} \Rightarrow [ML^2T^{-3}l^{-2}]$$

$$\boxed{R = [ML^2T^{-3}l^{-2}]}$$

28. (2)

$$G = [E^a d^b P^c]$$

$$E = [ML^2T^{-2}]$$

$$d = [ML^{-3}]$$

$$P = [ML^2T^{-3}]$$

$$G = [M^{-1}L^3T^{-2}]$$

$$[M^{-1}L^3T^{-2}] = [ML^2T^{-2}]^a [ML^{-3}]^b [ML^2T^{-3}]^c$$

$$a + b + c = -1$$

$$2a - 3b + 2c = 3$$

$$-2a - 3c = -2 \Rightarrow 2a + 3c = 2$$

On solving,

$$a = -2$$

$$b = -1$$

$$c = 2$$

$$\text{So } \boxed{G = [E^{-2}d^{-1}P^2]}$$



29. (1)

$$KE = \frac{1}{2}MV^2$$

$$\Rightarrow \frac{\Delta K}{K} \times 100\% = \frac{\Delta M}{M} \times 100\% + \frac{2\Delta V}{V} \times 100\%$$

$$= 2\% + 2 \times 3\%$$

$$\Rightarrow \boxed{\frac{\Delta K}{K} \times 100\% = 8\%}$$

30. (3)

$$\text{Volume of sphere} = \frac{4}{3}\pi R^3$$

$$\Rightarrow \frac{\Delta V}{V} \times 100\% = 3 \times \frac{\Delta R}{R} \times 100\% = 3 \times 2\%$$

$$\Rightarrow \boxed{\frac{\Delta V}{V} \times 100\% = 6\%}$$

31. (1)

$$\frac{L}{R} = \text{Time}$$

32. (2)

$$v = at + \frac{b}{t+c}$$

By the principle of homogeneity

$$c = t = [T]$$

$$at = v \Rightarrow a = [LT^{-2}]$$

$$\frac{b}{T} = LT^{-1} \Rightarrow b = [L]$$

33. (1)

$$\vec{A} = 2\hat{i} + 4\hat{j} - 5\hat{k} \therefore |\vec{A}| = \sqrt{(2)^2 + (4)^2 + (-5)^2} = \sqrt{45}$$

$$\cos \alpha = \frac{2}{\sqrt{45}}, \quad \cos \beta = \frac{4}{\sqrt{45}}, \quad \cos \gamma = \frac{-5}{\sqrt{45}}$$

34. (2)

$$\vec{A} = \hat{i} + \hat{j} \Rightarrow |\vec{A}| = \sqrt{1^2 + 1^2} = \sqrt{2}$$

$$\cos \alpha = \frac{A_x}{|\vec{A}|} = \frac{1}{\sqrt{2}} = \cos 45^\circ \therefore \alpha = 45^\circ$$

35. (1)

$$\vec{P}_1 = mv \sin \theta \hat{i} - mv \cos \theta \hat{j}$$

$$\text{and } \vec{P}_2 = mv \sin \theta \hat{i} + mv \cos \theta \hat{j}$$

So change in momentum

$$\Delta \vec{P} = \vec{P}_2 - \vec{P}_1 = 2mv \cos \theta \hat{j}, \quad |\Delta \vec{P}| = 2mv \cos \theta$$

36. (1)

37. (1)

$$\text{Resultant } \vec{R} = \vec{P} + \vec{Q} + \vec{P} - \vec{Q} = 2\vec{P}$$

The angle between  $\vec{P}$  and  $2\vec{P}$  is zero.

38. (3)

$$\hat{R} = \frac{\vec{R}}{|\vec{R}|} = \frac{\hat{i} + \hat{j}}{\sqrt{1^2 + 1^2}} = \frac{1}{\sqrt{2}} \hat{i} + \frac{1}{\sqrt{2}} \hat{j}$$

39. (3)

40. (4)

Displacement, electrical and acceleration are vector quantities.

41. (3)

$$\vec{R} = \vec{A} + \vec{B} = 6\hat{i} + 7\hat{j} + 3\hat{i} + 4\hat{j} = 9\hat{i} + 11\hat{j}$$

$$\therefore |\vec{R}| = \sqrt{9^2 + 11^2} = \sqrt{81 + 121} = \sqrt{202}$$

42. (1)

$$\Delta v = 2v \sin\left(\frac{\theta}{2}\right) = 2 \times v \times \sin 90^\circ$$

43. (1)

$$\vec{S} = \vec{r}_2 - \vec{r}_1$$

$$W = \vec{F} \cdot \vec{S} = (4\hat{i} + \hat{j} + 3\hat{k}) \cdot (11\hat{i} + 11\hat{j} + 15\hat{k})$$

$$= (4 \times 11 + 1 \times 11 + 3 \times 15) = 100 \text{ J.}$$

44. (2)

$$\vec{A} \times \vec{B} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 3 & 1 & 2 \\ 2 & -2 & 4 \end{vmatrix}$$

$$= (1 \times 4 - 2 \times -2)\hat{i} + (2 \times 2 - 4 \times 3)\hat{j} + (3 \times -2 - 1 \times 2)\hat{k}$$

$$= 8\hat{i} - 8\hat{j} - 8\hat{k}$$

$$\therefore \text{Magnitude of } \vec{A} \times \vec{B} = |\vec{A} \times \vec{B}| = \sqrt{(8)^2 + (-8)^2 + (-8)^2}$$

$$= 8\sqrt{3}$$

45. (1)

$$\vec{\tau} = \vec{r} \times \vec{F} = (7\hat{i} + 3\hat{j} + \hat{k})(-3\hat{i} + \hat{j} + 5\hat{k})$$

$$\vec{\tau} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 7 & 3 & 1 \\ -3 & 1 & 5 \end{vmatrix} = 14\hat{i} - 38\hat{j} + 16\hat{k}$$

## CHEMISTRY

46. (1)

$$\frac{r_{\text{He}}}{r_{\text{CH}_4}} = \sqrt{\frac{M_{\text{CH}_4}}{M_{\text{He}}}} = \sqrt{\frac{16}{4}} = 2$$

47. (3)

48. (2)

$$\frac{r_{\text{H}_2}}{r_{\text{A}}} = \sqrt{\frac{M_{\text{A}}}{2}} \quad 6 = \sqrt{\frac{M_{\text{A}}}{2}}$$

$$36 = \frac{M_{\text{A}}}{2} \quad M_{\text{A}} = 72.$$

49. (3)

$$\text{KE} = \frac{3}{2} nRT = \frac{3}{2} \times \frac{1}{32} \times 8.314 \times 320$$

$$= 1.24 \times 10^2 \text{ J}$$

50. (2)

51. (3)

52. (3)

Higher the value of vanderwaal constant 'a' greater will be force of attraction, More tendency to liquify

53. (1) 54. (1) 55. (2) 56. (1) 57. (3)

58. (4) 59. (4)

60. (2)

$$\text{No. of atoms} = \frac{10.6}{106} \times 6 \times N_{\text{A}}$$

61. (4) 62. (1)

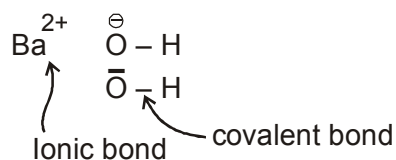
63. (1)

$$\text{No. of moles} = \frac{6 \times 10^{20}}{6.022 \times 10^{23}} = 10^{-3} \text{ mol.}$$

$$\text{Molarity} = \frac{10^{-3}}{0.1} = 0.01 \text{ M.}$$

64. (1) 65. (1) 66. (3)

67. (3)



68. (1)

Molecules or ions which have zero B.O don't exist.

69. (1) 70. (3) 71. (2) 72. (3) 73. (3) 74. (3) 75. (1)

76. (4) 77. (3) 78. (2) 79. (2) 80. (3) 81. (3) 82. (2)

83. (4) 84. (1) 85. (3) 86. (1) 87. (1) 88. (4) 89. (4)

90. (2)

### BOTANY

91. (3) 92. (1) 93. (4) 94. (4) 95. (1) 96. (4) 97. (1)

98. (2) 99. (3) 100. (2) 101. (4) 102. (1) 103. (2) 104. (3)

105. (1) 106. (2) 107. (2) 108. (2) 109. (4) 110. (2) 111. (4)

112. (4) 113. (4) 114. (4) 115. (2) 116. (1) 117. (2) 118. (1)

119. (1) 120. (4) 121. (4) 122. (3) 123. (4) 124. (1) 125. (4)

126. (3) 127. (3) 128. (4) 129. (1) 130. (1) 131. (1) 132. (1)

133. (2) 134. (2) 135. (4)

### ZOOLOGY

136. (4) 137. (2) 138. (2) 139. (1) 140. (4) 141. (4) 142. (2)

143. (1) 144. (3) 145. (4) 146. (1) 147. (1) 148. (1) 149. (1)

150. (2) 151. (4) 152. (1) 153. (2) 154. (1) 155. (1) 156. (3)

157. (2) 158. (1) 159. (1) 160. (4) 161. (4) 162. (1) 163. (2)

164. (3) 165. (4) 166. (3) 167. (2) 168. (3) 169. (1) 170. (1)

171. (1) 172. (4) 173. (1) 174. (1) 175. (2) 176. (3) 177. (4)

178. (4) 179. (3) 180. (2)