ALLEN CAREER INSTITUTE KOTA (RAJASTHAN)

path to success

# CLASSROOM CONTACT PROGRAMME

(Academic Session : 2024 - 2025)

## PRE-MEDICAL : ENTHUSIAST COURSE PHASE -

## LEADER & ACHIEVER COURSE

PHASE : MLA, MAZA, MAZB, MAZC, MAZD, MAZL, MAZN, MAZO, MAAX, MAAY, MAPA, MAPB, LAKSHYA

## TARGET : PRE MEDICAL 2025

Test Type : **MAJOR** Test Pattern : **NEET (UG)**

## TEST DATE : 01-03-2025

## ANSWER KEY

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

## HINT – SHEET

**1. Ans ( 4 )**

the order of energy of orbitals can be calculated from (n + $\ell$ ) rule. The lower the value of (n + $\ell$ ) for an orbital, lower is its energy. If two orbitals have same (n + $\ell$ ) value, the orbital with lower value of n has the lower energy.

**9. Ans ( 3 )**

NCERT Pg.# 45, 2019

$$\frac{nh}{2\pi} = \frac{2h}{\pi} \Rightarrow n = 4,\ \ KE = +\,0.85\ eV$$

**12. Ans ( 4 )**

$$\frac{r_1}{r_3} = \frac{0.529 \times \frac{n_1^2}{Z}}{0.529 \times \frac{n_3^2}{Z}}$$

$$\frac{y}{r_3} = \frac{1^2}{3^2} = \frac{1}{9} \Rightarrow r_3 = 9y$$

**15. Ans ( 2 )**

$$\overset{-1}{N} = \overset{+1}{N} = \overset{-1}{N}$$

**18. Ans ( 2 )**

$$Na^{+}_{(aq)} < Mg^{+2}_{(aq)} < Al^{+3}_{(aq)}$$

(Hydrated size)

**23. Ans ( 4 )**

Priority to the charge then

$8e^{-} < 18 + 2e^{-} < 18e^{-}$

**26. Ans ( 3 )**

Mg, $Mg^{2+}$, Al, $Al^{3+}$

Mg > $Mg^{2+}$, Al > $Al^{3+}$ Neutral > cation of same element (size)

Largest Mg > Al

$Mg^{+2} > Al^{+3}$ smallest

30. **Ans ( 4 )**
NCERT ($11^{th}$) page # 86 (part -I)

46. **Ans ( 2 )**
NCERT XI Pg. No. # 98

47. **Ans ( 3 )**
NCERT-XI, Pg. 94

48. **Ans ( 2 )**
NCERT (XI) Pg # 96

49. **Ans ( 2 )**
XI NCERT Pg # 96

50. **Ans ( 2 )**
NCERT-XI, Pg. # 98

51. **Ans ( 4 )**
NCERT (XI) Pg # 97

52. **Ans ( 3 )**
NCERT-XI, Pg. # 99

53. **Ans ( 4 )**
NCERT (XI) Pg # 98

54. **Ans ( 4 )**
XI NCERT Pg. No : 100

55. **Ans ( 3 )**
NCERT-XI, Pg. # 100, 101

56. **Ans ( 3 )**
NCERT XI Pg. # 96

57. **Ans ( 2 )**
NCERT-XI, Pg. # 96

58. **Ans ( 3 )**
NCERT-XI, Pg. # 91, 98

59. **Ans ( 4 )**
NCERT-XI, Pg. # 94

60. **Ans ( 3 )**
NCERT (XI) Pg # 89

61. **Ans ( 1 )**
NCERT-XI, Pg. # 95, 97, 98

62. **Ans ( 4 )**
NCERT-XI, Pg. # 95

63. **Ans ( 2 )**
NCERT-XI, Pg. # 88, 90, 100

64. **Ans ( 3 )**
NCERT-XI, Pg. # 127

65. **Ans ( 3 )**
NCERT-XI, Pg. # 127, 128

66. **Ans ( 3 )**
NCERT-XI, Pg. # 127, 128

67. **Ans ( 2 )**
NCERT-XI, Pg. # 125

68. **Ans ( 1 )**
NCERT (XI) Pg # 126, 127

69. **Ans ( 1 )**
NCERT-XI, Pg. # 122

70. **Ans ( 2 )**
NCERT-XI, Pg. # 127

71. **Ans ( 1 )**
NCERT-XI, Pg. # 127

72. **Ans ( 3 )**
NCERT-XI, Pg. # 123

73. **Ans ( 4 )**
NCERT-XI, Pg. # 124

74. **Ans ( 3 )**
NCERT (XI) Pg # 126

75. **Ans ( 1 )**
NCERT-XI, Pg. # 120, 121, 122

76. **Ans ( 4 )**
XI-NCERT Page No. # 126

77. **Ans ( 4 )**
XI-NCERT Page No. # 127, 128

78. **Ans ( 3 )**
NCERT-XI, Pg. # 127

79. **Ans ( 3 )**
XI NCERT Page No. # 106

80. **Ans ( 4 )**
XI NCERT, Pg. # 106,108,109

81. **Ans ( 4 )**
NCERT XI Pg : 111-112

82. **Ans ( 2 )**
NCERT-XI, Pg. # 106

83. **Ans ( 4 )**
NCERT-XI, Pg. # 106

84. **Ans ( 3 )**
NCERT-XI, Pg. # 106

85. **Ans ( 2 )**
NCERT-XI, Pg. # 111, 112

86. **Ans ( 1 )**
NCERT-XI, Pg. # 117

87. **Ans ( 2 )**
NCERT-XI, Pg. # 117

88. **Ans ( 3 )**
NCERT-XI, Pg. # 113-118

89. **Ans ( 4 )**
NCERT-XI, Pg # 115

90. **Ans ( 3 )**
NCERT-XI, Pg. # 112

91. **Ans ( 2 )**
NCERT, Pg # 206

92. **Ans ( 2 )**
NCERT Pg. # 200

93. **Ans ( 4 )**
NCERT Pg. # 187

94. **Ans ( 3 )**
NCERT Pg. # 195

95. **Ans ( 3 )**
NCERT Pg. # 198

96. **Ans ( 2 )**
NCERT Pg. # 183

97. **Ans ( 3 )**
NCERT Pg.# 206

98. **Ans ( 2 )**
NCERT, Pg. # 211

99. **Ans ( 1 )**
NCERT, Pg. # 211

101. **Ans ( 4 )**
NCERT Pg. # 202

102. **Ans ( 2 )**
NCERT, Pg. # 197

103. **Ans ( 1 )**
NCERT, Pg. # 208

104. **Ans ( 3 )**
NCERT Pg. 205, 206

105. **Ans ( 1 )**
NCERT Pg. # 199

106. **Ans ( 3 )**
NCERT Pg. # 282

107. **Ans ( 4 )**
NCERT Pg # 189

108. **Ans ( 1 )**
NCERT Pg. # 187

109. **Ans ( 2 )**
NCERT Pg. # 199

110. **Ans ( 2 )**
NCERT Pg. # 194, 195

111. **Ans ( 4 )**
NCERT Pg. # 187-188

112. **Ans ( 2 )**
NCERT Pg. # 183

113. **Ans ( 1 )**
NCERT Pg.# 184

114. **Ans ( 2 )**
NCERT Pg # 190

115. **Ans ( 2 )**
NCERT Pg. # 199

116. **Ans ( 4 )**
NCERT Pg.# 212

117. **Ans ( 3 )**
NCERT, Pg. # 186

**118. Ans ( 4 )**
NCERT Pg. # 190, 191

**119. Ans ( 4 )**
NCERT, Pg. # 294, 295

**120. Ans ( 3 )**
Module Page No. - 91

**121. Ans ( 1 )**
NCERT, Pg. # 294, 295

**122. Ans ( 4 )**
NCERT Pg. # 187

**123. Ans ( 2 )**
NCERT Pg.# 206, 207

**124. Ans ( 2 )**
NCERT Pg. # 201

**125. Ans ( 1 )**
NCERT Pg. # 201, 202

**126. Ans ( 1 )**
NCERT Pg.# 185

**127. Ans ( 3 )**
NCERT, Pg. # 185

**128. Ans ( 1 )**
NCERT Pg # 190

**129. Ans ( 1 )**
NCERT, Pg # 207

**130. Ans ( 2 )**
NCERT Pg. # 202

**131. Ans ( 2 )**
NCERT, Pg. # 185

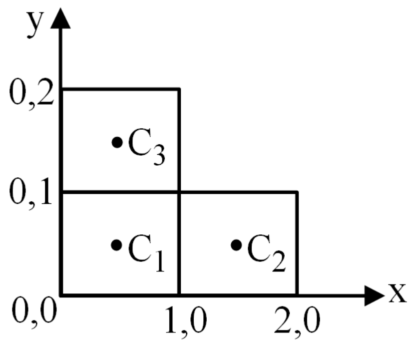
**132. Ans ( 1 )**
NCERT, Pg. # 293

**133. Ans ( 4 )**
NCERT Pg # 185

**134. Ans ( 2 )**
NCERT Pg. # 197

**135. Ans ( 1 )**
NCERT Pg. # 208

**136. Ans ( 1 )**




$C_1\left(\frac{1}{2}, \frac{1}{2}\right)$

$C_2\left(\frac{3}{2}, \frac{1}{2}\right)$

$C_3\left(\frac{1}{2}, \frac{3}{2}\right)$

$$x_C = \frac{1\left(\frac{1}{2}\right) + 1\left(\frac{3}{2}\right) + 1\left(\frac{1}{2}\right)}{3} = \frac{5}{6}\text{m}$$

$$y_C = \frac{1\left(\frac{1}{2}\right) + 1\left(\frac{1}{2}\right) + 1\left(\frac{3}{2}\right)}{3} = \frac{5}{6}\text{m}$$

**137. Ans ( 1 )**

$F_{ext} = 0$

$\therefore\ \vec{P}_{system} = \text{constant}$

$0 + 0 = \vec{P}_{bullet} + \vec{P}_{gun}$

$\therefore\ \vec{P}_{bullet} = -\vec{P}_{gun}$

$\Rightarrow\ \therefore\ P_{bullet} = P_{gun}$

$m_b\, v_b = m_g v_g$

$\therefore\ v_b \propto 1/m_b$

**138. Ans ( 1 )**

$$y_{cm} = \frac{m\left(\frac{2R}{\pi}\right) + m\left(-\frac{4R}{3\pi}\right)}{2m}$$

$$= \frac{R}{3\pi}$$

**139. Ans ( 2 )**

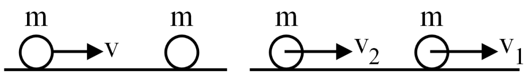
by $\vec{p}_i = \vec{p}_f$

$0 = 70\,(2-v) + 30\,(-v)$

$0 = 14 - 7v - 3v$

$v = 1.4$ m/s

**140. Ans ( 2 )**




$v_1 = \left(\frac{1+e}{2}\right) v \qquad v_2 = \left(\frac{1-e}{2}\right) v$

$KE_f = 75\ \%$ of $KE_i$

$KE_f = \frac{3}{4}(KE_i)$

$\frac{1}{2}mv_1^2 + \frac{1}{2}mv_2^2 = \frac{3}{4}\left(\frac{1}{2}mv^2\right)$

$(1+e)^2 + (1-e)^2 = 3$

$e = \frac{1}{\sqrt{2}}$

**141. Ans ( 2 )**

The speed of COM of the (trolley + child) system remains unchanged (equal to $v_0$) because no external force act on the system. The forces involved in running on the trolley are internal to this system.

**142. Ans ( 1 )**

Velocity of block of mass m just before collision :

$mgh = \frac{1}{2}mv^2$

$v = \sqrt{2gh} = \sqrt{2 \times 10 \times 20} = 20\,m/s$

By COLM :-

$m(20) + 3m(0) = mv_1 + 3mv_2$

$v_1 + 3v_2 = 20$ ______ (1)

$\frac{v_2 - v_1}{20 - 0} = 1$

$v_2 - v_1 = 20$ ______ (2)

By (1) and (2)

$v_1 = -10$ m/s, $v_2 = 10$ m/s

During elastic collision, some part of kinetic energy of blocks will temporarily converted into elastic potential energy at the moment of contact when objects deform slightly.

**143. Ans ( 3 )**

By COLM :-

$(2)(v_0) + (1)(0) = 2v_1 + 1\,v_2$

$2v_1 + v_2 = 2v_0$ __ (1)

$\frac{v_2 - v_1}{v_0 - 0} = \frac{1}{2}$

$v_2 - v_1 = \frac{v_0}{2}$

$2v_2 - 2v_1 = v_0$ __ (2)

eq. (1) + (2)

$\therefore v_2 = v_0$ __ (3)

Tension just after collision :

$T = \frac{mv_2^2}{\ell} + mg$

$40 = \frac{(1)v_2^2}{0.3} + (1)(10)$

$v_2 = 3$ m/s $\quad \therefore\ v_0 = 3$ m/s

**144. Ans ( 2 )**

By COLM :-

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

$0 = \vec{P}_1 + \vec{P}_2 + \vec{P}_3$

$\vec{P}_3 = -\left(\vec{P}_1 + \vec{P}_2\right)$

$\therefore\ P_3 = \sqrt{P_1^2 + P_2^2 + 2P_1P_2\cos\theta}$

$(3m)v_3 = \sqrt{(mv)^2 + (mv)^2 + 2(mv)(mv)\cos 60^\circ}$

$(3m)v_3 = \sqrt{3}\ mv$

$v_3 = \frac{v}{\sqrt{3}}$

**145. Ans ( 4 )**

$T = \frac{2\pi}{\omega} = $ same

**146. Ans ( 1 )**

$\theta = \theta_0 + \theta_1 t + \theta_2 t^2$

$\omega = \theta_1 + 2\theta_2 t$

$\alpha = \frac{d\omega}{dt} = 2\theta_2$

$\frac{(\omega_i)}{\alpha} = \frac{\theta_1}{2\theta_2} \Rightarrow \frac{\alpha}{\omega_i} = \frac{2\theta_2}{\theta_1}$

**147. Ans ( 2 )**

Tension at any point 'P' in V.C.M. is

$T_P = mg\cos\theta + \dfrac{mV_P^2}{R}$

$\begin{bmatrix}\theta_C = 90^o \\ \theta_B = 90^o\end{bmatrix}$

we can calculate velocity at any point by using mechanical, energy conservation.

**148. Ans ( 4 )**

$B = mv$

$v = \dfrac{B}{m}$

$F = \dfrac{mv^2}{r} = \dfrac{mB^2}{m^2a} = \dfrac{B^2}{ma}$

**149. Ans ( 1 )**

NCERT Pg. # 64

$\dfrac{mV^2}{R} = \mu_S mg$

$V = \sqrt{\mu_S Rg} = \sqrt{\dfrac{1}{10} \times 9 \times 10} = 3\text{m/s}$

**150. Ans ( 2 )**

$\boxed{N = \dfrac{mv^2}{R}} \Rightarrow$ Parabolic relation

**151. Ans ( 3 )**

$\omega = \dfrac{(V_{rel})_\perp}{r} = \dfrac{V_A\sin\theta_1 + V_B\sin\theta_2}{r}$

**152. Ans ( 3 )**

For a Rigid Body $\longrightarrow \omega$ = constant

**153. Ans ( 4 )**

$I\omega$ = const

$I\downarrow \omega\uparrow T\downarrow \Rightarrow$ T will decrease

**154. Ans ( 2 )**

$\tau_0 = mgU\cos\theta t$

**155. Ans ( 2 )**

$I_{AB} = I_{CM} + Md^2 \qquad \dfrac{ML^2}{12} = I_0$

$= \dfrac{ML^2}{12} + M\left(\dfrac{L}{4}\right)^2 \qquad ML^2 = 12I_0$

$= \dfrac{ML^2}{12} + \dfrac{ML^2}{16} = \dfrac{7ML^2}{48} = \dfrac{7\times 12I_0}{48} = \dfrac{7I_0}{4}$

**156. Ans ( 3 )**

$I_{AB} = I_{CM} + Md^2$

$I_{AB} = 0 + Ma^2$

**157. Ans ( 3 )**

For system

$I\omega$ = const.

**158. Ans ( 4 )**

As inclined plane is smooth so in absence of friction bodies will not rotate & they will only slide.

Also net force on each body $F_{net} = mg\sin\theta$

& $a = \dfrac{F_{net}}{m} = \dfrac{mg\sin\theta}{m} = g\sin\theta$ = same for all

**159. Ans ( 2 )**

$P = \tau\,\omega = 10 \times 20 = 200$ W

**160. Ans ( 2 )**

$\dfrac{K_{Rot.}}{K_{total}} = \dfrac{\frac{1}{2}Mv^2\frac{2}{5}}{\frac{1}{2}Mv^2\left(1+\frac{2}{5}\right)} = \dfrac{\frac{2}{5}}{\frac{7}{5}}$

$= \dfrac{2}{7}$

**161. Ans ( 4 )**

$I = \dfrac{m\ell^2}{3} + \dfrac{m\ell^2}{3} + \left[\dfrac{m\ell^2}{12} + m\left(\dfrac{\sqrt{3}\ell}{2}\right)^2\right]$

$I = \dfrac{2m\ell^2}{3} + \dfrac{m\ell^2}{12} + \dfrac{3m\ell^2}{4}$

$I = \dfrac{(8+1+9)m\ell^2}{12} = \dfrac{18}{12}m\ell^2 = \dfrac{3}{2}m\ell^2 = 3mK^2$

$K = \dfrac{\ell}{\sqrt{2}}$

**162. Ans ( 3 )**

W.D by static friction is zero.

**163. Ans ( 1 )**

Gravitational force does not depend on medium.

**164. Ans ( 4 )**

$g = \dfrac{Gm}{R^2}$

$g' = \dfrac{G(m/2)}{(R/2)^2} = 2g$

% increase in g

$= \dfrac{g' - g}{g} \times 100$

$= 100\%$

**165. Ans ( 2 )**

$g' = g\left(1 - \dfrac{d}{R}\right)$

$g' = \dfrac{g}{n}$

$d = \left(\dfrac{n-1}{n}\right)R$

**166. Ans ( 4 )**

Potential increases from centre to $\infty$.

**167. Ans ( 2 )**

Potential is a scalar quantity.

$$V = -\frac{Gm}{a} - \frac{Gm}{\sqrt{2}a} - \frac{Gm}{a}$$

$$V = -\frac{Gm}{a}\left(2 + \frac{1}{\sqrt{2}}\right)$$

**168. Ans ( 1 )**

$$E = -\left[\frac{\partial v}{\partial x}\hat{i} + \frac{\partial v}{\partial y}\hat{j}\right]$$

**169. Ans ( 1 )**

Formula based

**170. Ans ( 3 )**

$$\frac{T_2}{T_1} = \left(\frac{r_2}{r_1}\right)^{3/2} = \left(\frac{4R}{R}\right)^{3/2} = 8$$

$\Rightarrow T_2 = 8T_1 = 8\sqrt{2}$ hr.

**171. Ans ( 2 )**

$$\frac{W}{m_0} = \vec{I}.\vec{dr}$$

$$\vec{dr} = 5\hat{i} + 4\hat{j}$$

$$\frac{W}{2} = 10(\hat{i} + \hat{j}).(5\hat{i} + 4\hat{j})$$

$W = 2(50 + 40)$ J

**172. Ans ( 3 )**

As volume immersed is independent of g.

So, it remains same

$$g_{eff} = (g + g/4) = \frac{5}{4}g$$

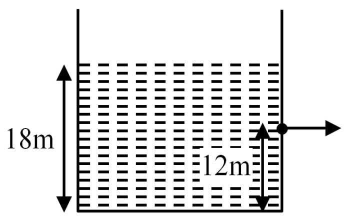
$$F_B = \rho V_{in} g_{eff.} = \frac{5}{4}\rho V_{in} g$$

$F_B$ will increase by 25%

**173. Ans ( 4 )**

Stress - Strain Curve.

**174. Ans ( 4 )**




Remaining total height

$$= \frac{3H}{4} = \frac{3 \times 24}{4} = 18\text{m}$$

$$v = \sqrt{2gh} = \sqrt{2 \times 10 \times 6} = \sqrt{120} = 2\sqrt{30} \text{ m/s}$$

**175. Ans ( 3 )**

Slope of 'Shear Stress' - 'Shear Strain'.

Curve is $\frac{1}{\text{modulus of Rigidity}}$

because $(\text{slope})_A > (\text{slope})_B$

$\eta_A < \eta_B$

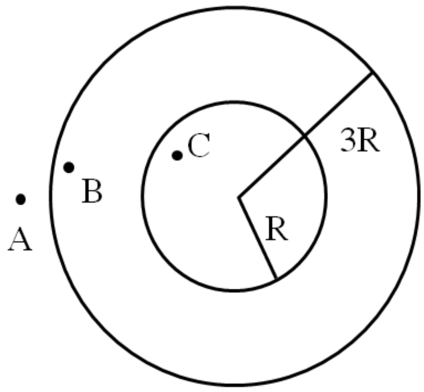
**176. Ans ( 1 )**

$$\frac{\Delta V}{V} = \frac{P}{B}$$

$$\frac{3\Delta r}{r} = \frac{P}{B}$$

$$\frac{\Delta r}{r} = \frac{P}{3B}$$

**177. Ans ( 4 )**




$$P_B - P_A = \frac{4T}{3R}$$

$$P_C - P_B = \frac{4T}{R}$$

$$P_C - P_A = \frac{4T}{3R} + \frac{4T}{R} = \frac{16T}{3R}$$

**178. Ans ( 1 )**

$$W = 4\pi R^2 T(n^{\frac{1}{3}} - 1)$$

$= E(10 - 1) = 9E$

**179. Ans ( 3 )**

AV = const.

Here, $A_2 < A_1 < A_3$

So, $V_2 > V_1 > V_3$

**180. Ans ( 4 )**

$$\rho_1 g h_1 = \rho_2 g h_2$$

$$\rho_1 h_1 = \rho_2 h_2$$

$$10^3 \times 20 \times 10^{-2} = \rho_2 \times 10 \times 10^{-2}$$

$$\rho_2 = 2 \times 10^3 \text{ kg/m}^3$$