

## ANSWERS

### OBJECTIVE UNSOLVED LEVEL - I

- |         |         |
|---------|---------|
| 1. (a)  | 2. (b)  |
| 3. (d)  | 4. (c)  |
| 5. (b)  | 6. (b)  |
| 7. (c)  | 8. (a)  |
| 9. (a)  | 10. (a) |
| 11. (d) | 12. (c) |
| 13. (a) | 14. (c) |
| 15. (b) |         |

### OBJECTIVE UNSOLVED LEVEL - II

- |         |         |
|---------|---------|
| 1. (a)  | 2. (c)  |
| 3. (c)  | 4. (b)  |
| 5. (c)  | 6. (c)  |
| 7. (b)  | 8. (c)  |
| 9. (c)  | 10. (a) |
| 11. (c) | 12. (b) |
| 13. (d) | 14. (a) |
| 15. (b) |         |

### SUBJECTIVE UNSOLVED (C.B.S.E.) LEVEL - I

- 1.8
- $1.5 \times 10^{-4}$  m (steel);  $1.3 \times 10^{-4}$  m (brass)
- $2.5 \times 10^{11}$  Pa
- $1.8 \times 10^2$  N

5.  $6.92 \times 10^5$  Pa
6.  $2.5 \times 10^{-2}$  Nm<sup>-1</sup>
7. Excess pressure = 310 Pa total pressure =  $1.0131 \times 10^5$  Pa
8. 5.8 cm/sec;  $3.9 \times 10^{-10}$  N.
9. 55 N
10. 0.800
11. Mercury will rise in the arm containing spirit; the difference in levels of mercury will be 0.221 cm.
12. (a) absolute pressure = 96 cm of Hg; gauge pressure = 20 cm of Hg for (a), absolute pressure = 58 cm of Hg, gauge pressure = - 18 cm of Hg for (b); (b) mercury would rise in the left limb such that the difference in its levels in the two limbs becomes 19 cm.
13. (a) 11.5 kg (b) 10.5 kg.
14. 5.34 mm
15. For the first bore, pressure difference (between the concave and convex side) =  $2 \times 7.3 \times 10^{-2} / 3 \times 10^{-3} = 48.7$  Pa. Similarly for the second bore, pressure difference = 97.3 Pa. Consequently, the level difference in the two bores is  $[48.7 / (10^3 \times 9.8)]m = 5.0$  mm. The level in the narrower bore is higher.

## SUBJECTIVE UNSOLVED LEVEL - II

- 1 2.8 N
- 2 0.20 m.
- 3  $3.6 \times 10^{-3}$  m
- 4  $T_{Cu} = (5/3)$  kg wt. and  $T_{Fe} = (20/3)$  kg wt.
- 5 (a)  $P_0$  (b)  $P_0 + \frac{mg}{S}$   
(c)  $P_0 + P_g H + \frac{mg}{S}$  yes, in free fall
- 6 
$$\frac{m_2(d_3 - d_1) - m_1(d_3 - d_2)}{d_2 - d_1}$$
- 7 at B is  $3.92 \times 10^{-6}$  m  
at C is  $8.82 \times 10^{-6}$  m  
at D is  $23.52 \times 10^{-6}$  m.

8  $P = 8.08 \times 10^5 \text{ N/m}^2$

9  $= 0.004 \text{ m}$

## SUBJECTIVE UNSOLVED LEVEL - III

1.  $3.71 \text{ mm}$

2.  $6.28 \times 10^6 \text{ N}, 3.33 \times 10^{-4} \text{ m}$

3.  $2.25 \times 10^{-3} \text{ m}$

4.  $l = 0.01 \text{ m}$

5.  $8.8 \text{ m/s}$

6.  $t = \frac{A}{a} \sqrt{\left(\frac{2}{g}\right)} \left[ \sqrt{H} - \sqrt{h_{\min}} \right]$  where  $h_{\min} = \frac{x^2}{4y}$

7. (a)  $1/2$ ;

(b)  $2$ ;

(c)  $h_2 / h_1 = 4$ .

8.  $P = \frac{PQ^2 l}{\pi r^2}$ .

9.  $6 \times 10^5 \text{ N/m}$

10.  $t = -\frac{\rho d^2}{18\eta} \ln n = 0.2 \text{ s}$

## SUBJECTIVE UNSOLVED (IIT-JEE) LEVEL

1. (a) (i)  $D = 5/4 d$

(ii)  $P = P_0 + \frac{dg(6H + L)}{4}$

(d) (i)  $V = \sqrt{(3H - 4h)g/2}$

(ii)  $x = \sqrt{h(3H - 4h)}$

(ii)  $h_m = \frac{3h}{8}, x_m = 3/4H$

2.  $w = \sqrt{\frac{3g(d_2 - d_1)}{2d_1 L}}$

3.  $m = \pi R^2 L \sqrt{\rho \sigma} - \rho$

4. (a) net force zero

(b)  $h = 0.25 \text{ cm}$

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(c)  $a = g/6$ .

5.  $n = \frac{1}{720} \text{ N}\cdot\text{S}/\text{m}^2$

6.  $\Delta Y = 1.09 \times 10^{10} \text{ N}/\text{m}^2$

7.  $T = \frac{\lambda a}{2y}$

8.  $\frac{dQ}{dt} \propto r^5$

9.  $f = \frac{1}{2\pi} \sqrt{\frac{3g}{2R}}$ .