

:: ANSWER KEY ::**EXERCISE - I**

1.	B	2.	D	3.	A	4.	D	5.	B	6.	D	7.	B
8.	C	9.	B	10.	C	11.	B	12.	C	13.	B	14.	D
15.	A	16.	B	17.	D	18.	A	19.	B	20.	B	21.	C
22.	C	23.	D	24.	A	25.	B	26.	A	27.	B	28.	A
29.	C	30.	A	31.	B	32.	D	33.	B	34.	B	35.	B
36.	B	37.	C	38.	A	39.	B	40.	A	41.	C	42.	D
43.	B	44.	C	45.	B	46.	C	47.	B	48.	D	49.	A
50.	D	51.	D	52.	D	53.	C	54.	A	55.	B	56.	C
57.	D	58.	D	59.	B	60.	B	61.	B	62.	A	63.	B
64.	D	65.	C	66.	C	67.	A	68.	A	69.	C	70.	B
71.	D	72.	D	73.	D	74.	A	75.	A				

EXERCISE - II

1.	D	2.	A,C	3.	A,C	4.	B,C	5.	D	6.	A,C
7.	B,D	8.	B	9.	D						

EXERCISE - III

1. $h = \frac{2m}{\pi}$, $H = \frac{11}{32\pi} m$ 2. 101.8 Kgf-m 3. 54.4 cm 4. 45° , $9600\sqrt{2}$ (gauge) N/m²
5. 100 kg 6. $\omega = \frac{10}{\sqrt{3}} \text{ rad/s}$, $\tan\alpha = \frac{5}{3}$ 7. 19.6 m, 4 sec 8. 2.79 gm/cc
9. at the water surface, $h/2$ 10. 37.5 N 11. 0.75 12. (a) 5, (b) $2/3$
- 13.(i) 2500 kg/m^3 , $\frac{5000}{3} \text{ kg/m}^3$ (ii) $R_D = 7.5 \text{ kg}$, $R_E = 2.5 \text{ kg}$ 14. $3/5$ 15. $\ell(d_2 - d_1)\left(\frac{k}{d_2} + Ag\right)$
16. $h_2 = 3 h_1$ 17. (a) $6\sqrt{2} \text{ m/s}$, (b) $9.6\sqrt{2} \times 10^{-3} \text{ M}^3/\text{sec}$, (c) $4.6 \times 10^4 \text{ N/m}^2$ 18. $\sqrt{3}:\sqrt{2}$
19. $6.43 \times 10^{-4} \text{ m}^3/\text{s}$ 20. 20 cm, 60 cm

EXERCISE - IV

1. 6N 2. 4m/s^2 , 10%, 0, 45 kPa 3. $h_1 = \frac{2(3+\pi)}{15\pi} = 0.26$; $h_2 = \frac{3+\pi}{10\pi} = 0.195$ 4. $x = 1/3$

5. $\frac{Y}{y-x+z}$ 6. $\rho = \frac{W}{\pi h^2 g \tan \alpha \left(R - \frac{1}{3} h \tan \alpha \right)}$ 7. (a) $\left(\frac{M-m}{M+m} \right) g - \frac{(M-m)gx}{(M+m)L}$ (b) $t = \frac{\pi}{2} \sqrt{\frac{L}{g} \left(\frac{M+m}{M-m} \right)}$

8. $\sqrt{\frac{18g}{19a}}$ 9. $\frac{\pi}{80} \text{m}^2$ 10. $h_1 = h_2$ 11. $80\sqrt{5}$ sec, $40\sqrt{5}$ sec 12. 431 sec

13. (i) 4m/s , (ii) $F = 7.2 \text{ N}$, (iii) $F_{\min} = 0$, $F_{\max} = 52.2 \text{ N}$, (iv) both $4 \times 10^{-3} \text{ m/s}$

14. (a) $\frac{d^2 H^2 S}{2\rho g} = 32 \text{ Kg } f - m$, (b) $\frac{1}{2} S H^2 (1-d)^2 = 2 \text{ Kg } f - m$ 15. $\frac{163}{36} \text{ cm}$, $\frac{388}{36} \text{ cm}$

16. $t = \frac{12\sqrt{14}}{\sqrt{15}-\sqrt{14}}$ 17. $\frac{\rho g R}{2}$ 18. 2 sec, 1 sec 19. $b/3$

20. (a) (i) $D = \frac{5}{4}d$, (ii) $p = P_0 + \frac{1}{4}(6H + L) dg$; (b) (i) $v = \sqrt{\frac{g}{2}(3H - 4h)}$, (ii) $x = \sqrt{h(3H - 4h)}$ (iii) $x_{\max} = \frac{3}{4}H$

21. $w = \sqrt{\frac{3g}{2L} \left(\frac{d_2 - d_1}{d_1} \right)}$ 22. (i) 0.2 m/s^2 , (ii) $\sqrt{2g \frac{m_0}{A\rho}}$

23. $+29625 \text{ J/m}^3$, -30000 J/m^3

24. $m_{\min} = \pi r^2 l (\sqrt{\rho\sigma} - \rho)$; if tilted then it's axis should become vertical C.M. should be lower than centre of bouyancy.

EXERCISE - V

1. A 2. D 3. D 4. (a) 0, (b) $h = 0.25 \text{ cm}$, (c) $a = g/6$ (upward)

5. $x = 2\text{m}$ 6. $f = \frac{1}{2\pi} \sqrt{\frac{3g}{2R}}$ 7. C 8. $H = \frac{L^2 \omega^2}{2g}$

9. C 10. B 11. A
12. A 13. B 14. D 15. B 16. B
17. 6 18. $A \rightarrow P, T, B \rightarrow Q, S, T, C \rightarrow P, R, T, D \rightarrow Q$ 19. A, B, D