ANSWERS

1.1. (*b*)	1.2. (*b*)	1.3. (*a*)	1.4. (*b*)	1.5. (*b*)	1.6. (*d*)	1.7. (*c*)	1.8. (*d*)	1.9. (*d*)	1.10. (*c*)
1.11. (*d*)	1.12. (*d*)	1.13. (*d*)	1.14. (*a*)	1.15. (*d*)	1.16. (*b*)	1.17. (*a*)	1.18. (*c*)	1.19. (*c*)	
2.1. (*a*)	2.2. (*a*)	2.3. (*d*)	2.4. (*a*)	2.5. (*c*)	2.6. (*c*)	2.7. (*c*)	2.8. (*d*)	2.9. (*d*)	2.10. (*c*)
2.11. (*b*)	2.12. (*c*)	2.13. (*d*)	2.14. (*a*)	2.15. (*a*)	2.16. (*b*)	2.17. (*b*)	2.18. (*d*)	2.19. (*a*)	2.20. (*a*)
2.21. (*)	2.22. (*d*)	2.23. (*b*)	2.24. (*c*)						

EXPLANATIONS

1.2 $$\lim_{a\to\infty}\int_1^a x^{-4}\,dn = \lim_{a\to\infty}\left[-\frac{1}{3}\left[x^{-3}\right]_1^a\right]$$

$$= \lim_{a\to\infty} -\frac{1}{3}[a^{-3}-1]$$

$$= -\frac{1}{3}[0-1] = \frac{1}{3}$$

1.3 $f(x) = 1;\ -\frac{\pi}{2} < x < \frac{\pi}{2}$

$= 0$; in other region

$$\therefore \frac{a_0}{2} = \frac{1}{2\pi}\int_{-\pi/2}^{\pi/2} 1\,dx = \frac{1}{2}$$

$$a_n = \frac{1}{\pi}\int_{-\pi/2}^{\pi/2} 1\cos x\,dx = \frac{2}{n\pi}\sin\frac{n\pi}{2}$$

$b_n = 0$ [$\because$ f(x) is even function]

Hence series is, $f(x) = \frac{1}{2} + \sum_{n=1}^{\infty}\frac{2}{n\pi}\sin\frac{nx}{2}\cos nx$

1.5 $E.I = ML^{-1}T^{-2} \times L^4 = ML^3T^{-2}$

1.6

In real beam	In conjugate beam
Fix-end	Freind
Internal hinge	Roller
Roller Support	Internal linge
Hinge	Hinge

1.8 The frame is statically determinate.
Taking moment about C, we have

$$R_A \times L + P\frac{1}{2} - P\frac{L}{2} = 0$$

or $\Rightarrow R_A = 0$

1.12 Here $e = 0.5$

$$\therefore\ n = \frac{e}{1+e} = \frac{0.5}{1.5} = 33\%$$

1.13 $\gamma_{d1} = 17\ KN/m^3$ $V_1 = ?$
$\gamma_{d2} = 16\ KN/m^3$ $V_2 = 100m^3$

$$\therefore\quad \gamma_{s1} = \frac{W_s}{V_s} = \frac{W_s}{V_1}\times\gamma_{d1};$$

and $$\gamma_{s2} = \frac{W_s}{V_2}\times\gamma_{d2}$$

since γ_s is constant for a given soil, therefore

$$\frac{\gamma_{d1}}{\gamma_{d2}} = \frac{V_1}{V_2}$$

or $$V_1 = \frac{17}{16}\times 100 = 106\ m^3$$

1.16 Here $D = 1428$ hect/cum; $B = 120$ days

$$\therefore\quad \Delta = \frac{8.64B}{D} = \frac{8.64\times 120}{1428} = 0.73\ m$$

1.17 For irrotational flow,

vorticity, $$\xi = \frac{\partial u}{\partial y} - \frac{\partial v}{\partial x} = 0$$