

M.E. Second Semester (Civil (Structural Engineering)) (New-CGS)
13095 : Elective Substructures and Foundation Design
2 SFSE 5

P. Pages : 2

Time : Four Hours



AW - 3622

Max. Marks : 80

- Notes :
1. Answer **any four** question.
 2. Due credit will be given to neatness and adequate dimensions.
 3. Assume suitable data wherever necessary.
 4. Illustrate your answer necessary with the help of neat sketches.
 5. I.S.I. Hand book for structural Steel section, I.S. Code 800/1962 or 1964, I.S. 456 (Revised) I.S. 875 may be consulted.
 6. Use of pen Blue/Black ink/refill only for writing the answer book.

1. Derive an expression for slope, S.F, deflection and Bending moment for a beam having infinite length and resting on elastic foundation subjected to a point load 'P'. 20

2. a) Explain the term modulus of subgrade reaction. How is it determined? 6

- b) A floor is supported on six column as shown below. 14

Column	1	2	3	4	5	6
Dead load (kN)	600	190	350	300	500	400
Live load (kN)	250	350	250	200	300	600

Explain and provide the proportioning of area of footing. Assume SBC of soil as 150 kN/m^2 .

3. Design a sloped footing for rectangular column $400\text{mm} \times 500\text{mm}$ carrying an axial load of 800kN the safe bearing capacity of soil is 150 kN/m^2 M20 mix & Fe415 steel. 20

4. Design a pile under a column carrying load of 1000kN the pile is driven into a hard strata available at 10m below the G.L. Use M20 concrete and Fe415 steel. Sketch the reinforcement details. 20

5. Explain the following.

- i) Gravity & U-abutments. 5
- ii) Stub and counter fort abutments. 5
- iii) Handling and erection stresses in piles. 5
- iv) Design criterion for block type machine foundation. 5

6. Check the stability of an abutment as shown in Fig. 1 for
- Over faming
 - Sliding
 - Eccentricity
 - Pressure analyse at river bed level
- # Material of abutment is concrete
 # Density of soil is 180 kN/m^3
 # Coefficient of friction is 0.65
 # Angle of repose is $\phi = 30^\circ$
 # Live load on the bridge IRC class AA tracked
 # Span of bridge = 15m
 # Angle of friction between soil and concrete $\delta = 18^\circ$
 There are three longitudinal girders of 1.4m and 0.3m width supporting deck slab of 200mm thickness
 Analyse the River at Bed level.

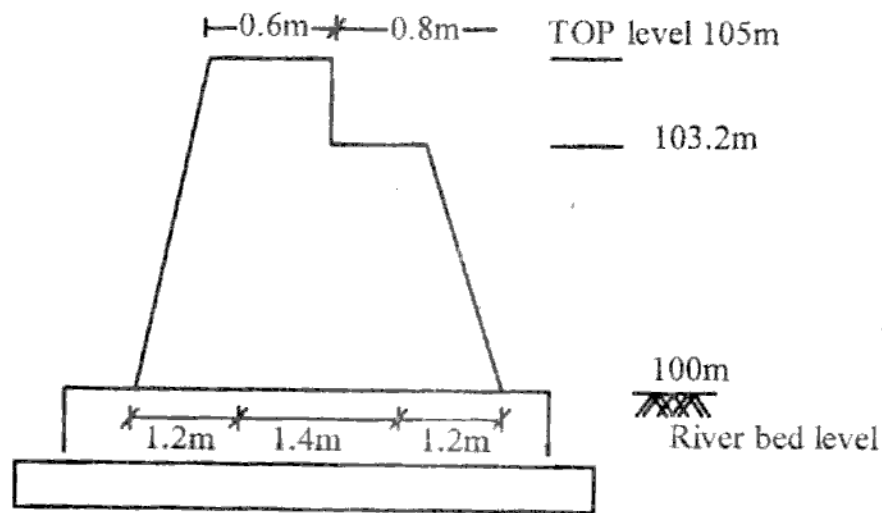


Fig. 1

Not to the scale
