

Seat  
No.

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DAI1363

## Structural Design & Drawing - III (New) (1280)

P. Pages : 2

Time : Four Hours

Max. Marks : 100

Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Answersheet should be written with blue ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. Solve **one** question from each unit.
5. Use IS 456, IS 1343 is allowed.
6. Use of non-programmable calculator is allowed.

### UNIT - I

1. Design an interior panel of flat slab 7m x 5m size, It is subjected to live load  $5 \text{ kN/m}^2$  & floor finish  $1 \text{ kN/m}^2$  use M15 & Fe415 show reinforcement details size of column 400mm x 400mm. 25
2. Design a reinforced concrete combined rectangular footing for two columns located 4.5m apart the overall size of column are 400mm x 400mm and 600mm x 600mm and they are transferring 600 kN and 1000 kN respectively. The SBC of soil is  $150 \text{ kN/m}^3$  use M20 & Fe415. The centre of lighter column is 0.4m from property line. 25

### UNIT - II

3. Design a cantilever retaining wall to retain an earth embankment with a horizontal top 3.5m above ground level. Density of earth =  $18 \text{ kN/m}^3$ ,  $\phi = 30^\circ$ , SBC of soil is  $200 \text{ kN/m}^2$ . Use M20 concrete & Fe415 steel. 25
4. Design a circular water tank resting on ground to store 50,000 litres of water. The depth of tank may be kept 4m. Use M25 concrete & Fe415 steel. 25

### UNIT - III

5. a) Explain load balancing concept. 10  
b) Enumerate various losses in prestressed concrete in detail. 15

6. a) A prestressed concrete beam of rectangular section 300mm wide & 600mm deep is prestressed by 5 nos of 8mm high tensile wires at 500mm from top and 15 nos of 8mm high tensile wires at 83mm from soffit. The initial stress in wires is  $1200 \text{ N/mm}^2$ . Estimate the loss of stress in wire due to elastic shortening of concrete  $m=6$ . 15
- b) A concrete beam is post tensioned by a cable carrying an initial stress of  $1200 \text{ N/mm}^2$ . The slip at the Jacking end is 8mm. Modulus of elasticity of steel is  $210 \text{ kN/mm}^2$  calculate the loss of stress in % in steel due to anchorage slip if length of beam is 10m & 50m. 10

#### UNIT - IV

7. a) Explain lower kern point & upper kern point. 8
- b) Difference between partial and full prestressing. 9
- c) Explain Hoyer's long line method. 8
8. Design a simply supported post-tensioned beam for following data. 25
- Span of beam = 18m  
 Live load = 08 kN/m  
 Grade of concrete =  $40 \text{ N/mm}^2$   
 12/7 fressinet system =  $1600 \text{ N/mm}^2$   
 Loss ratio = 0.80  
 Modular ratio  $m = 6$ .

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