

Seat
No.

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मजल - 059

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 of IS456, IS1343, IS13920 and IS3370 is allowed.
6. Assume suitable data if necessary.
7. Use of non-programmable calculator is allowed.
8. Figures to right indicate full marks.

UNIT - I

1. Design an interior panel of a flat slab 6m x 6m in size. The slab is supported on columns 450 mm in diameter. Take super imposed load as 6 kN/m^2 . Use M_{20} and fe415 grade of steel. **25**
2. a) Enlist limitations of direct design method for flat slab. **5**
b) Design a combined rectangular footing for two columns P and Q carrying loads of 400 kN and 650 kN correspondingly. Size of column P is 350mm x 350mm and column Q is 450mm x 450mm. The centre to centre spacing of columns is 3.5m. The safe bearing capacity of soil may be taken as 100 kN/m^2 . Use M_{20} and fe415. **20**

UNIT - II

3. Design a cantilever retaining wall to retain horizontal earth embankment of 4.2m above ground level. The unit weight is 16 kN/m^3 and angle of repose is 29° . The safe bearing capacity is 150 kN/m^2 and $\mu = 0.65$. Use M_{20} and fe500 grade steel. **25**
4. Design an open circular tank of capacity 65,000 litres by using IS 3370 code method. Assume tank is fixed at base and free at top. Maximum depth is 3.5 including free board. Use M_{20} and fe 415 grade of steel. **25**

UNIT - III

5. a) Enumerate various Losses in prestressed concrete members in detail. 10
- b) Analyse a rectangular beam of 200mm x 300mm at mid span. The span is 8m with simply supported ends. The tendon is parabolic with zero eccentricity at ends and central dip is 80 mm. The prestressing force is 1000 kN. Live load is 30 kN/m. Use load balancing method. Also comment on stresses. 15
6. a) Differentiate between R. C. C. and prestressing concrete. 5
- b) Distinguish between pre-tensioned and post-tensioned members. 5
- c) Find out loss of prestressed due to friction at mid span and at another end. Take $\mu = 0.3$ and $k = 0.0015 / m$. The cross section is 400mm x 600mm. The beam is simply supported of span 7m with parabolic tendon with zero eccentricity at both ends and central dip 100mm. Initial stress is 1000 N/mm². 15

UNIT - IV

7. a) Explain Guyon's method for design of end block in detail. 9
- b) Define lower and upper kern point in detail. 8
- c) Write general principle of prestressing with neat sketches. 8
8. Design a simply supported post-tensioned beam for the following data. 25
- a) Span of beam = 18 m
- b) Live load = 12 kN/m
- c) Grade of concrete = 45 N/mm².
- d) Ultimate strength of 12/7 fressinet system = 1600 N/mm².
- e) Loss ratio = 0.85.
- f) Modular ratio = 6.
