



## Advanced Design of Concrete Structures (1030)

P. Pages : 2

Time : Four Hours

Max. Marks : 100

Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Answer sheet 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. Answer **any four** questions.

1. Design the Interior Panel of flat slab 5.50 m x 6.50m in size for carrying a load of 14000 N/m<sup>2</sup> including Dead load. Use Direct design method. Take allowable stresses as per I. S. Provision The Column head is 1.20m round and provided with drop of size 2.75m x 3.25m. Use M<sub>20</sub> and Fe415. **25**
2. Design a grid floor for size 10.5 m x 13.5m with center to center spacing of ribs as 1.5m both way Assuming slab thickness as 1/18<sup>th</sup> of span. Take L. L = 5kN/m<sup>2</sup> and F.f = 1.0 kN/m<sup>2</sup> use M20 and Fe415. Draw the reinforcement details. **25**
3. Design the composite beam for the following detail. **25**
  - a) Span of Beam = 20 m
  - b) Thickness of slab = 200mm
  - c) Total load on beam = 25 kN/m
  - d) Flange width of slab = 2.0m
  - e) Use I - Section from steel table.
4. Design a circular beam supported on three equally spaced 700 mm x 700 mm column. The centers of columns are on a curve of diameter 10 met. The superimposed load on the beam is 20 kN/m use M20 and Fe 415. **25**
5. a) A R.C.C. Column 500mm square carries an axial load of 600 kN and it is supported on three piles of 400 mm square sections, The center to center distance of the piles is 1.5m. Design the suitable pile cap. use M20 & Fe 500. Sketch the details of reinforcement. **15**

- b) Investigate the ultimate strength of rectangular slab continuous on three sides and free on one longer side by using concept of yield line theory. **10**
6. a) A circular Room is 6m diameter from in side. Design the circular roof slab for room to L. L = 4 kN/m<sup>2</sup> The slab may be considered simply supported at edges, Use M20 & Fe415. **15**
- b) Explain with neat sketches patterns of various types of yield lines developed in slabs depending on end conditions. **10**
7. a) Design a conical roof for an 18m diameter Hall. The rise of the roof shall be 3.0m. Assuming Live load = 1.5 kN/m<sup>2</sup> use M20 & Fe415. The dome is supported by 750 mm wide rubble masonry wall on the periphery. **15**
- b) Explain in detail **any two**. **10**
- a) Difference between High performance and High strength concrete.
- b) Under water concreting.
- c) Role of superplasticizers in Design of HPC.
8. Design the form work for the beam and slab floor for the following data. **25**
- i) Thickness of floor = 120 mm.
- ii) Center to center spacing of beams = 3m.
- iii) Width of beam = 300 mm.
- iv) Depth of beam = 400 mm below slab.
- v) Height of ceiling of roof = 4m above the floor.
- vi) Take L. L on sheathing = 4 kN/m<sup>2</sup>.
- vii) Unit weight of concrete = 26500 N/m<sup>3</sup>.

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