[01 – 3110]

III/IV B.E. DEGREE EXAMINATION.

First Semester

Civil Engineering

REINFORCED CONCRETE STRUCTURES — I

(Common for Civil and Civil Environmental
Engineering)

(Effective from the admitted batch of 2006–2007)

Time : Three hours   Maximum : 70 marks

First question is compulsory.

Answer any FOUR from the remaining.

All questions carry equal marks.

Any data missing may be assumed suitably.

Use of IS456-2000 is allowed.

1. Answer the followings :

    (a) Differentiate between under reinforced and over reinforced sections.

    (b) Write the drawbacks of Working Stress Method.

    (c) Write the advantages of Limit State Method.

    (d) Write short notes on partial safety factor.

(e) Write short notes on development length.

(f) Draw the critical sections for one way and two way shear in slopped footing.

(g) Explain the types of Curing involved in RCC works.

2. A reinforced concrete beam 230 mm wide and 400 mm total depth is reinforced in tension with 4 numbers of 20 mm diameter bars, the clear cover of the steel being 30 mm. If the effective span of the beam be 5 m, find the safe concentrated load that beam can support at its centre. Assume allowable stresses in concrete 7 N/mm² and in steel 230 N/mm².

3. A reinforced concrete beam 300 mm wide and 650 mm deep is reinforced with 4 bars of 25 mm diameter in the tension zone and 4 bars of 20 mm diameter in the compression zone. The cover to the center of both the reinforcements is 50 mm. Determine the moment of resistance of the section, if M 25 and Fe 415 are used. Adopt working stress method.

4. A reinforced concrete T-beam with an effective flange width of 1650 mm, slab thickness of 125 mm and rib width 350 mm has an overall depth of 650 mm. The beam is reinforced with 6 bars of 25mm diameter at bottom with a cover of 50 mm to the centre of reinforcement. If M20 concrete and Fe 415 grades are used, calculate the moment of resistance of the section. Adopt limit state method.

5. Design a slab of 4.5 m × 6.5 m supported on all sides and three edges are continuous and one short side edge discontinuous. Take live load 2 kN/m² and floor finishes are 0.75 kM/m². Adopt concrete M20 and Fe 415 steel. Sketch the reinforcement details.

6. A Column 450 mm × 450 mm turn in size with 8 steel bars of 20 mm dia transfer a dead load of 620 kN and a live load of 860 kN to the footing. The bearing capacity of soil is 120 kN/mm². Design a Square footing to Support the column. Assume M25 concrete and Fe 415 steel.

7. Design a Suitable dog legged stair case in a room of 3.0 m× 4.5 m and a height of 3.0 m adopt landing width 1.5 m. Use grade of concreto M20 and Fe 415 steel.

8. Design a column of 300 mm × 500 mm subjected to an axial load of 1200 kN. Use M20 grade of concrete and Fe 415 steel.