Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 31010

3rd - FN

B.E/B.Tech. DEGREE EXAMINATION, MAY/JUNE 2013.

Sixth Semester

Civil Engineering

080100035 — DESIGN OF RC.ELEMENTS

(Regulation 2008)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. What is the permissible tensile stress of high strength deformed bar?

2. State the conditions for a slab to be designed as a continuous slab?

3. Draw the stress diagram across the cross section of a rectangular beam and indicate the values for ultimate method.

4. Explain the need for corner reinforcements in two way rectangular slab whose corners are prevented from lifting up.

5. Define limit state of collapse in shear.

6. What do you mean by diagonal tension?

7. Enumerate the function of the transverse reinforcements in a reinforced concrete column.

8. When you provide eccentrically loaded columns?

9. When you need a combined footing?

10. Why check for transfer of load at the base of the column over footing is done?

PART B — (5 × 16 = 80 marks)

11. (a) (i) State the assumptions made in the case of limit state method of design of R.C.beams. (8)

(ii) Discuss the salient properties of various grades of concrete as per IS 456-2000. What are the corresponding nominal mixes? (8)

Or

(b) (i) What is the characteristic strength and how it is different from the mean strength? (6)

(ii) What is the value of limit state moment of a balanced rectangular section in terms of 'b' and 'd', when Fe415 steel is used.? (4)

(iii) Explain the term 'characteristic strength' and 'load'. (6)

12. (a) Analyze the T-beam section of 250mm width of web, 1200mm of flange, 100mm thickness of flange and 450mm effective depth to determine the factored moment of resistance for two cases of tension reinforcements

(i) 4nos. 20mm dia. and

(ii) 4nos. 25mm dia. (16)

Or

(b) Design a rectangular beam section 250mm wide and 450mm effective depth subjected to factored moments

(i) 95 KNm and

(ii) 195 KNm. (Consider the concrete of grade M25 and steel of grade Fe 415). (16)

13. (a) A rectangular R.C.C.beam 300mmx600mm is reinforced with 0.3% steel as main reinforcement. The factored shear force at the section is 165kN. Design the shear reinforcement by the limit state method. Use M20 concrete and Fe415 steel. (16)

Or

(b) Design a rectangular beam section of 300mm wide and 500mm effective depth subjected to ultimate moment of 185 kNm. Ultimate shear force of 28 kN and ultimate torsional moment of 11kNm. Use M25 concrete and Fe415 steel. (16)

14. (a) (i) Discuss various assumptions used in the limit state method of design of compression members. (6)

(ii) Determine the ultimate load carrying capacity of rectangular column section 400×600mm reinforced with 10nos. of 25mm dia. Use M25 concrete and Fe415 steel. (10)

Or

(b) Design a biaxially eccentrictiy loaded braced circular column deforming in single curvature for the following data :

Ultimate load = 200KN

Ultimate moment in longer direction at bottom Mux_1 = 178 KNm and at top Mux_2 = 128 KNm.

Ultimate moment in shorter direction at bottom Muy_1 = 108 KNm and at top Muy_2 = 88KNm.

Unsupported length of column = 9m

Effective length in long direction lex = 8m

Effective length in short direction ley = 5.8m

Diameter of column = 550mm

Use M25 concrete and Fe415 steel. (16)

15. (a) A square column of size 400mm carries a service load of 600kN. Design an isolated footing for the column by limit state method, if the safe bearing capacity of the soil is 250kN/m^2. Use M20 concrete and Fe415 steel. (16)

Or

(b) A rectangular column of size 300mm×450mm transmits a limit state load of 600kN at an ecentricity of 150mm about the major axis. Design a sutiable isolated footing for the column by the limit state concept. Safe capacity of soil is 200kN/M^2.

Use M30 concrete and Fe415 steel. (16)
