

Code No: 115AB

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**B. Tech III Year I Semester Examinations, March - 2017****REINFORCED CONCRETE STRUCTURES DESIGN AND DRAWING****(Common to CE, CEE)****Time: 3 hours****Max. Marks: 75****Note:** This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A**(25 Marks)**

- 1.a) Explain about the different Limit states. [2]
- b) Distinguish between Working stress and limit state method of design of RCC structures. [3]
- c) Write about local bond and anchorage length. [2]
- d) Explain how the shear reinforcement improves the strength of beam? [3]
- e) State the differences between one way slab and two way slab. [2]
- f) Write the code provisions for minimum reinforcement to be provided as primary and secondary reinforcement in R. C. slab. [3]
- g) Differentiate between long and short column. [2]
- h) Describe about the function of lateral ties in a RC column. [3]
- i) Define punching shear. [2]
- j) Write any two situations in which combined footings are preferred to isolated footings. [3]

PART - B**(50 Marks)**

- 2.a) Describe briefly about under-reinforced, balanced and over-reinforced sections.
- b) What do you mean by uncracked and cracked sections and how will you determine the moment of resistance of these section? [5+5]

OR

3. Design the reinforcement for a T-beam for the following data:

Effective span	:	9 m: Ends simply supported.
Spacing of beams	:	3.5 m centre to centre.
Thickness of slab	:	125 mm
Width of web	:	230 mm
Total depth	:	450 mm
Live load on the floor	:	5 kN/m ²
Floor finish load	:	1 kN/m ²

The beam also supports a partition wall which transmits a load of 14 kN/m run.
Use M 20 concrete and Fe 500 steel.
Draw a suitable scale: The cross section and the longitudinal section of the beam. [10]

4. A simply supported beam is 8m in span and carries a characteristic load of 50kN/m. If six numbers of 20 mm diameter bars are provided at the mid span and four numbers of these bars are continuous into the supports, check the development length at the supports. Adopt M 20 grade concrete and Fe 415 grade steel. [10]

OR

5. A beam of rectangular section 300 mm width and 450 mm effective depth is subjected to factored moment of 150 kN-m, factored shear force of 45 kN and factored twisting moment of 30kN-m. Determine the area of reinforcement to resist the above forces. Use M25 grade concrete and Fe 415 grade steel. [10]

- 6.a) Discuss the three basic methods using factor of safety to achieve safe workable structures?

- b) Sketch edge and middle strips of a two way slab. [5+5]

OR

7. Design a R.C. slab for a room measuring 6 m × 8 m size. The slab is simply supported on all the four edges with corners held down, and carries a super-imposed load of 3.5 kN/m², inclusive of floor finishes. Use M 20 mix and Fe 415 steel. Draw the top plan and bottom plan of the designed slab. [10]

8. Design a reinforced concrete column, 400 mm square, to carry an ultimate load of 1500 kN at an eccentricity of 160 mm. Use M 20 grade concrete and Fe 415 grade steel. [10]

OR

9. Design a slender braced circular column under uni-axial bending with the following data:

Size of column: 300 × 300 mm

Concrete grade: M 20 and Steel grade: Fe 415

Effective length: 5 m and Unsupported length: 6 m

Factored load: 1000 kN, Factored moment: 50 kN-m at top, 30 kN-m at bottom.

The column is bent in single curvature. [10]

10. Design the footing for a reinforced concrete column 230 × 450 mm carrying an axial load of 1100 kN. The bearing capacity of the soil is 110 kN/m². Use M 20 concrete and Fe 415 steel. [10]

OR

11. Draw the shear force and bending moment diagrams and design the 20 mm diameter bars as top steel for maximum hogging moment for a RC rectangular combined footing using the following data:

Centre to centre distance between the columns is 5m. Each column is square in shape with 450 mm side. Each column carries an axial load at service state = 1200kN. The projection of footing parallel to the length beyond the axis of each column is 1.2m. The limiting bearing capacity of soil is 300kN/m². Use M25 grade and Fe 415 steel bars. [10]

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