

Code No: 155DD

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B. Tech III Year I Semester Examinations, February - 2022****STRUCTURAL ENGINEERING – I (RCC)****(Civil Engineering)****Time: 3 Hours****Max. Marks: 75**

**Answer any five questions**  
**All questions carry equal marks**

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**Note: IS456 and only the Design charts for columns (SP16) are allowed:**

1. Explain about balanced, under reinforced and over reinforced sections with neat sketches as per limit state method. [15]
2. Design a simply supported T-beam for the given data. Span: 6m, Spacing of beams: 2.5m, slab thickness: 120mm and Live load:  $4\text{kN/m}^2$ . Use M25 concrete and Fe415 steel. Sketch the reinforcement details. [15]
3. Design a beam of 400mm deep and 350mm wide cantilever subjected to a concentrated point load of 2kN at 3 m from fixed support and U.D.L of  $1\text{kN/m}$  over entire span of 6m. Check for shear and deflection. Use M20 mix and Fe415 grade steel. [15]
4. Find the reinforcement required for a rectangular beam section with the following data: Width of section = 350 mm, depth of section = 500 mm, factored B.M = 70 kN-m, factored torsional moment = 50 kN-m, factored S.F. = 80 kN. Adopt M 25 grade of concrete and Fe 500 grade of steel. Sketch the reinforcement details. [15]
5. Design a slab for room of size  $4\text{m} \times 5\text{m}$  supported on 300mm thick masonry walls all around. The corners are free to lift. The Live load is  $2.5\text{kN/m}^2$ . Use M25 concrete and Fe500 steel. Assume mild exposure condition. Sketch the reinforcement details. [15]
6. Design a continuous one way slab having three equal span of 3m each with the following data: Imposed load =  $2.5\text{kN/m}^2$ , Thickness of floor finish = 3cm, concrete grade = M25 and Fe 500 grade steel. Sketch the reinforcement details. [15]
7. Design a circular column of diameter 300mm to carry a factored axial load of 1500kN by using (a) helical reinforcement, (b) hoop reinforcement. Use M25 concrete and Fe500 steel. Sketch the reinforcement details. [15]
- 8.a) List the steps involved in the design of combined footings.  
b) List the steps involved in the design of wall footing. [9+6]

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