

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Fifth semester B.Tech degree examinations (S) September 2020

Course Code: CE301**Course Name: DESIGN OF CONCRETE STRUCTURES I**

Max. Marks: 100

Duration: 3 Hours

*Use of IS 456-2000 is permitted***PART A***Answer any two full questions, each carries 15 marks.*

- | | | Marks |
|---|---|-------|
| 1 | a) Why are over reinforced sections not used in practice? | (5) |
| | b) A concrete beam has 300 mm breadth and 500 mm effective depth; effective cover 50 mm, reinforced with 3 nos. 20 mm diameter steel bars at tension side. M20 concrete and Fe 415 grade steel are used. Determine the moment of resistance. | (10) |
| 2 | a) What is the purpose of providing development length? | (5) |
| | b) Design the shear reinforcement for a beam section of width 200 mm and effective depth 500 mm. The factored shear force is 100 kN and it is reinforced with 3 Nos 16 mm diameter bars on the tension side at the critical section. Use M20 concrete and Fe 415 steel. | (10) |
| 3 | a) Explain characteristic strength of concrete and steel. | (5) |
| | b) Explain with figure the stress strain relationship of mild steel. | (5) |
| | c) Explain anchorage of reinforcing bars. | (5) |

PART B*Answer any two full questions, each carries 15 marks.*

- | | | |
|---|--|------|
| 4 | a) What are T and L beams? | (5) |
| | b) Design a rectangular beam section of width 200 mm to resist a bending moment of 30 kNm. Use M20 concrete and Fe 415 steel. | (10) |
| 5 | a) Differentiate between one way and two way slabs. | (5) |
| | b) Design a one way slab with 3.5 m clear span supported on 230 mm thick walls on all four sides. The edges are simply supported. The live load on the slab is 2 kN/m ² . Use M 20 concrete and Fe 415 steel. | (10) |
| 6 | a) When do you require a doubly reinforced beam? | (5) |

- b) Why do we provide reinforcement in two directions in a one way slab? (5)
- c) Draw a typical detailing of a continuous slab. (5)

PART C

Answer any two full questions, each carries 20 marks.

- 7 Design a slab 3 m x 4 m clear in size supported on 300 mm thick walls on all four sides, and corners held down. The live load on slab 3 kN/m². Use M20 concrete and Fe415 steel. Draw all the detailing required for the slab. (20)
- 8 a) Design a square column to carry a factored axial load of 1500 kN. Use M20 concrete and Fe415 steel. Draw a longitudinal section and a cross section showing the reinforcement. (15)
- b) What are the purposes of lateral ties in a column? (5)
- 9 a) Differentiate between long and short columns. (5)
- b) Explain limit state of serviceability. (5)
- c) Draw a typical detailing for tread riser type stair to show all the reinforcement and mark all reinforcement with assumed values. (10)
