

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Fifth Semester B.Tech Degree Regular and Supplementary Examination December 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.*

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|---|--|-------|
| 1 | a) Compare plain and reinforced concrete. | (5) |
| | b) A beam section of size 200 mm x 400 mm is reinforced with 2 Nos. 16 mm diameter bars on tension side. The effective cover to reinforcement is 40 mm. Find the moment of resistance of the section. M20 concrete and Fe 415 steel is used. | (10) |
| 2 | a) Explain development length and anchorage. | (5) |
| | b) Design the stirrups of a beam section of width 230 mm and effective depth 450 mm. The factored shear force is 100 kN and the percentage of tensile reinforcement is 0.5. Use M20 concrete and Fe 415 steel. | (10) |
| 3 | a) Compare working stress method and limit state method. | (5) |
| | b) Write one advantage and one disadvantage of an under reinforced section | (5) |
| | c) What is meant by curtailment of reinforcement? | (5) |

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

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|---|--|------|
| 4 | a) In which situations does torsion come in beams? | (5) |
| | b) A rectangular beam section is of width 230 mm and effective depth 400 mm. Find the steel required to resist a bending moment of 30 kNm. Use M20 concrete and Fe 415 steel. | (10) |
| 5 | a) Explain the bending action of one way and two way slabs | (5) |
| | b) Design a one way slab with 4 m clear span supported on 300 mm thick walls on all four sides. The edges are simply supported. The live load on the slab is 3 kN/m ² . Use M 20 concrete and Fe 415 steel. | (10) |
| 6 | a) How is design for torsion done? | (5) |
| | b) A rectangular beam is simply supported over an effective span of 6 m. | (10) |

Superimposed load on the beam is 80 kN/m. The size of the beam is limited to 300 mm x 700 mm overall. Use M20 concrete and Fe415 steel. Design the critical section for bending moment.

PART C

Answer any two full questions, each carries 20 marks.

- 7 a) Design a slab 3.5 m x 4 m clear in size supported on 250 mm thick walls on all four sides, and corners not held down. The live load on slab 2 kN/m². Use M.20 concrete and Fe 415 steel. Draw all the detailing required for the slab. (20)
- 8 a) Design a circular column to carry a axial load of 1000 kN. Use M 20 concrete and Fe 415 steel. Draw a longitudinal section and a cross section showing the reinforcement. (15)
- b) What changes are to be made in design for columns with helical reinforcement? (5)
- 9 a) Explain short term and long term deflection. (6)
- b) Explain limit state of cracking. (6)
- c) Explain the difference in behaviour of slabs when corners are held down and when not held down. (8)
