

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
FIFTH SEMESTER B.TECH DEGREE EXAMINATION, APRIL 2018

Course Code: CE301

Course Name: DESIGN OF CONCRETE STRUCTURES-I (CE)

Max. Marks: 100

Duration: 3 Hours

(Use of IS 456 – 2000 permitted)

PART A

Answer any two full questions, each carries 15 marks

Marks

- | | | |
|---|---|------|
| 1 | a) Explain under reinforced, balanced and over reinforced sections. | (3) |
| | b) Find the moment of resistance of a beam section with width 250 mm, effective depth 360 mm and reinforced with 3 Nos 16 mm dia. bars. Use M25 concrete and Fe 415 steel. | (12) |
| 2 | a) What are the different types of shear reinforcement in a beam? | (3) |
| | b) Design the stirrups of a beam section of width 200 mm and effective depth 400 mm. The shear force is 100 kN and the percentage of tensile reinforcement is 0.6. Use M20 concrete and Fe 415 steel. | (12) |
| 3 | a) Explain with figure the stress strain relationship of mild steel. | (5) |
| | b) Explain working stress method. | (5) |
| | c) Explain development length. | (5) |

PART B

Answer any two full questions, each carries 15 marks

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|---|---|------|
| 4 | a) Draw the longitudinal and cross sections showing the reinforcement detailing for a cantilever beam. | (5) |
| | b) Design a rectangular beam section to resist a bending moment of 30 kNm. Use M20 concrete and Fe 415 steel. | (10) |
| 5 | a) Design a rectangular beam section to resist a factored bending moment of 575 kNm. The size of the section is limited to 300 mm x 700 mm overall. Use M20 concrete and Fe 415 steel. | (12) |
| | b) State the conditions when a doubly reinforced beam is preferred. | (3) |
| 6 | a) Design a slab for a room 3 m x 7 m clear in size. Use M20 concrete and Fe 415 steel. The live load is 2 kN/m ² . Draw top plan and bottom plan to show the reinforcement detailing. | (12) |
| | b) Differentiate between one-way and two-way slabs. | (3) |

PART C

Answer any two full questions, each carries 20 marks

- 7 Design an RCC slab for a room 3 m x 4 m clear in size. Use M20 concrete and Fe 415 steel. The live load is 2 kN/m^2 . The edges are simply supported and the corners are held down. Draw top plan and bottom plan to show the reinforcement detailing. (20)
- 8 a) Differentiate between short and long columns. (5)
- b) Design a square column to carry an 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)
- 9 a) Explain the function of lateral tie in a column. (5)
- b) Design a circular column with horizontal ties to carry an axial load of 1000 kN. Use M20 concrete and Fe 415 steel. Draw a longitudinal section and a cross section showing the reinforcement. (15)
