

Reg No.: _____

Name: _____

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

Course Code: CE304

Course Name: DESIGN OF CONCRETE STRUCTURES – II (CE)

Max. Marks: 100

Duration: 3 Hours

*Use of IS 456, IS 1343, IS 3370 and design charts of SP 16 is permitted.
Assume any missing data suitably.*

PART A

Answer any two full questions, each carries 15 marks.

Marks

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| 1 | a) Design a short column subjected to a factored load of 1400 kN and a factored bending moment of 135 kNm about one axis. The column has an unsupported length of 3.6 m. Use M25 concrete and Fe415 grade steel. | (12) |
| | b) Write short note on interaction curves for columns. | (3) |
| 2 | a) Define slender columns. Explain the difference in behaviour of a slender column from a short column. | (7) |
| | b) What is a combined footing? What are the different types of combined footings? Explain the situations in which each type of combined footing is used. | (8) |
| 3 | Design an isolated footing for a circular column of diameter 400 mm carrying a service load of 1240 kN. SBC of soil = 200 kN/m ² . Use M20 Concrete and Fe 415 grade steel. | (15) |

PART B

Answer any two full questions, each carries 15 marks.

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| 4 | a) Briefly explain different types of retaining walls with neat sketches. Identify the situations in which each type of retaining wall is used. | (8) |
| | b) Explain the design procedure of a spherical dome. | (7) |
| 5 | A cantilever retaining wall is designed to retain earth for a height of 4.5 m. The safe bearing capacity of soil is 180 kN/m ² and unit weight of soil is 17.8 kN/m ³ . Coefficient of friction between soil and concrete is 0.6. Proportion the retaining wall and check for stability. Also design and detail the stem slab of the retaining wall. | (15) |

- 6 Design a circular roof slab, fully restrained at edges, of inside diameter 5.50 m (15) supported on brick walls of thickness 230 mm. The slab supports a live load of 4 kN/m^2 . Use M30 concrete and Fe 415 grade steel. Sketch the reinforcement details.

PART C

Answer any two full questions, each carries 20 marks.

- 7 a) Design a circular water tank with fixed base, resting on ground, to store 450 m^3 of water. Use M30 concrete and Fe415 steel. (15)
b) Draw the cross section of water tank showing reinforcement details. (5)
- 8 a) Explain pre-tensioning and post-tensioning concrete with the aid of neat sketches. (12)
b) Why high strength concrete and high tension steel are used in prestressing? (8)
- 9 a) What is loss of stress in prestress? List the losses in prestress. (6)
b) A pre-tensioned prestressed concrete beam of width 180 mm and depth 360 mm is prestressed with 300 mm^2 of steel located at a constant eccentricity 100 mm. The wires are initially tensioned to 1200 N/mm^2 . The span of the beam is 10 m. Calculate the percentage loss of stress in wires, Relaxation of steel is 5% of initial stress, shrinkage of concrete is 300×10^{-6} , creep coefficient = 1.6, $E_s = 210 \text{ kN/mm}^2$ and $E_c = 30 \text{ kN/mm}^2$. (14)
