Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Sixth Semester B.Tech Degree Regular and Supplementary Examination July 2021

Course Code: CE304
Course Name: DESIGN OF CONCRETE STRUCTURES - II

Max. Marks: 100 Duration: 3 Hours

Use of IS 456, IS 1343, IS 3370 and column design charts from SP16 are permitted.
Assume any missing data suitably.

PART A

Answer any two full questions, each carries 15 marks.

			Marks
1		Design a short square column to carry an axial load of 1000 kN and two biaxial moments of 100 kNm each in two perpendicular directions. Use M25 concrete and Fe415 steel.Sketch the reinforcement details.	(15)
2	a)	Explain the design procedure of slender columns.	(5)
	b)	Design a short recatangular column subjected to an axial load of 1000 kN and a uniaxial moment of 100 kNm. Use M25 concrete and Fe415 steel.Sketch the reinforcement details.	(10)
3	a)	Explain the procedure for fixing plan dimensions of rectangular combined footing.	(5)
	b)	Design a square footing for a column 300 mm x 300 mm in size carrying an axial load of 1000 kN. The bottom of the footing is at a depth of 1m from the ground level. SBC of soil at this level is 150 kN/m2. Use M25 concrete and Fe415 steel. Density of soil is 18 kN/m3.Show reinforcement details.	(10)

PART B

Answer any two full questions, each carries 15 marks.

4		Design a cantilever retaining wall for retaining soil 3m above the soil level at the toe. Angle of repose of soil is 30 degrees and density of soil is 18 kN/m3. Safe bearing capacity of soil at 1m below the soil level at toe is 180 kN/m2. Coefficient of friction between concrete and soil is 0.50. Concrete grade is M30 and steel grade is Fe415.Sketch sectional view showing reinforcement details.	(15)

5	a)	Explain the design principles of a counterfort retaining wall.	(10)
	b)	Draw a typical reinforcement details in section through counterfort.	(5)
6		Design a circular slab simply supported with a live load of 4 kN/m2 on it. The effective diameter of the slab is 5m. Concrete grade is M30 and steel grade is Fe415. Skech the reinforcement details in plan and in section.	(15)

PART C

Answer any two full questions, each carries 20 marks.

7		Design a square water tank with inner dimensions 5m x 5m x 2m. The tank is resting on ground. The walls are fixed at bottom and free at top. Free board is 30 cm. Concrete grade is M30 and steel grade is Fe415.Draw the reinforcement details in a vertical & horizontal section through tank wall.	(20)
8	a)	List three advantages and disadvantages of prestressing.	(3)
	b)	Write a note on immediate losses in prestressed concrete.	(8)
	c)	Write a note on prestressing steel.	(9)
9		Find the net initial and final concrete stresses in the extreme top and bottom fibres at the midspan of a simply supported beam having span 8m , The beam is having a width of 250mm and a depth of 300mm. The beam is to be prestressed with an final prestressing force of 400 kN at an eccentricity of 100 mm. The losses may be taken as 20 %. The live load on the beam is 6 kN/m..Draw the stress diagrams at midspan during transfer and service.	(20)

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