Register Number:……..

KUMARAGURU
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B.E/B.TECH DEGREE EXAMINATIONS: APRIL /MAY 2024

(Regulation 2018)

Sixth Semester

CIVIL ENGINEERING

U18CEI6201: Design of Masonry and Reinforced Concrete Elements

(Use of IS 456:2000 and SP 16 shall be permitted)

COURSE OUTCOMES

CO1: Design masonry walls subjected to axial and eccentric loads.

CO2: Design rectangular and flanged reinforced concrete beams under flexure.

CO3: Design reinforced concrete staircase.

CO4: Design rectangular and flanged reinforced concrete beams shear and torsion.

CO5: Design reinforced concrete short and slender columns.

CO6: Design isolated and combined footing for columns.

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions

PART A (10 x 2 = 20 Marks)

1.	How will you determine the permissible stress in masonry?	CO1	[K_1]
2.	Differentiate load bearing wall and non-load bearing wall in a structure.	CO1	[K_2]
3.	Draw sketches for different types of shear reinforcement.	CO2	[K_1]
4.	Why it is necessary to provide distribution steel in one way slab?	CO2	[K_2]
5.	Outline the criteria recommended by IS 456-2000 for anchorage value of bend.	CO3	[K_1]
6.	Reinforced concrete slabs are generally safe and do not require shear reinforcement. Why?	CO4	[K_2]
7.	List the assumptions made in the design of short columns.	CO5	[K_1]
8.	Indicate the importance of slenderness ratio in columns.	CO5	[K_1]
9.	Define punching shear in foundation.	CO6	[K_1]
10.	When trapezoidal combined footings are provided in a structure?	CO6	[K_2]

Answer any FIVE Questions

PART B (5 x 16 = 80 Marks)

11.	Design a brick masonry wall using traditional bricks to support an axial load of 100 kN/m. Height of brick wall is 3 m and its length between cross walls is 4 m. Assume 1:6 cement-mortar (CM) ratio and traditional bricks with crushing strength of 7.5 N/mm^2.	16	CO1	[K_4]

12.		A reinforced concrete beam is to be designed over an effective span of 5 m to support a design service load of 8 kN/m. Adopt M20 grade concrete and Fe-415 HYSD bars and design the beam to satisfy the collapse and serviceability limit states.	16	CO2	[K_4]
13.		Design one of the flights of a dog-legged stairs spanning between landing beams using the following data. a. Type of staircase: Dog-legged with waist slab, treads and risers b. Number of steps in the flight: 10 c. Tread T: 300 mm d. Rise R: 150 mm e. Width of landing beams: 300 mm Use M20 grade concrete and Fe-415 HYSD bars.	16	CO3	[K_4]
14.	a)	A beam of rectangular section of 350 mm width and 550 mm effective depth is reinforced with 6 numbers of 20 mm diameter bars out of which three bars have been bent up to 45^o. Determine the shear resistance of the bent up bars and the additional shear reinforcement required if it is subjected to an ultimate shear force of 300 kN. Use M20 grade concrete and Fe-415 steel.	8	CO4	[K_3]
	b)	A RCC section 200 mm x 400 mm is subjected to the following: a. Factored Torsional moment – 25 kNm b. Transverse shear – 60 kN Assume M25 grade concrete and Fe-415 bars. Determine the reinforcement required according to IS 456 code provisions, using the following data. a. Overall depth: 400 mm b. Effective depth: 350 mm c. b_1 = 150 mm d. d_1 = 300 mm e.	8	CO4	[K_3]
15.		Design the reinforcements in a circular column of diameter 300 mm to support a service axial load of 800 kN. The column has an unsupported length of 3 m and is braced against side away. The column is reinforced with helical ties. Adopt M20 grade concrete and Fe-415 HYSD bars.	16	CO5	[K_4]
16.		Design a reinforced concrete footing for a rectangular column of section 300 mm by 500 mm supporting an axial factored load of 1500 kN. The safe bearing capacity of the soil at site is 185 kN/m^2. Adopt M20 grade concrete and Fe-415 HYSD bars.	16	CO6	[K_4]

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