

THE KAVERY ENGINEERING COLLEGE
(An Autonomous Institution)

B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, NOV /DEC 2024

Fifth Semester

Civil Engineering

CE3501 Design of Reinforced Concrete Structural Elements

IS 456-2000 and SP-16 Can be Permitted

Regulations - 2021

Duration : 3 Hrs

Maximum : 100 Marks

PART – A (ANSWER ALL QUESTIONS) (Marks 10*2=20)

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
1.	Outline partial safety factor.	RE	1	2
2.	Write any two assumptions are made in elastic theory methods.	UN	1	2
3.	List the advantages of flanged beams.	RE	2	2
4.	Write short note on under reinforced sections.	RE	2	2
5.	Write the formula used to find the spacing of inclined stirrups.	UN	3	2
6.	Name any two general features of two way slab.	UN	3	2
7.	Discuss- minimum eccentricity of column.	UN	4	2
8.	Define uniaxial and biaxial bending columns.	RE	4	2
9.	On which circumstances combined rectangular footings are suitable?	AP	5	2
10.	Define punching shear.	RE	5	2

PART – B (ANSWER ALL QUESTIONS) (Marks 5*13 = 65)

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
11.	a A reinforced concrete rectangular beam is supported on two wall 300 mm thick, spaced at a clear distance of 6 m. The beam carries a super imposed load of 20 kN/m. Design the beam in working stress method. M20 grade concrete Fe 415 bars. Draw reinforcement details.	AN	1	13
	Or			
	b Examine the concept of elastic method and ultimate load method and write the advantages of limit state method over other methods.	AN	1	13
12.	a A T-beam for slab floor of an office comprises of a slab 150 mm thickness spanning between ribs spaced at 3 m centers. The effective span of the beam is 8 m. Live load on floor is 4 kN/m ² . Using M20 grade and Fe 415HYSD bars. Design one of the intermediate tee beams. Use limit state method.	AN	2	13

Or

	b	A beam of rectangular section is reinforced with 6 nos of 18 mm diameter bars in tension and is supported on an effective span of 5 m, the beam being 300 mm wide and 700 mm deep. The beam carries a uniformly distributed load of 42 kN/m. Design the shear reinforcement considering 2 bars are bent up for shear. Assume $\sigma_{sv}=230 \text{ N/mm}^2$, $\tau_c=0.30 \text{ N/mm}^2$ and $f_y=415 \text{ N/mm}^2$.	AN	2	13
13.	a	Design a slab for an office floor size 3.5 m x 4.5 m discontinuous and simply supported on all the sides with the corners prevented from lifting and a service live load of 4.4 kN/m ² . Adopt M 20 grade and Fe 415 HYSD bars. Assume whatever data is required.	AN	3	13
		Or			
	b	Design one of the flights of stair of a residential building spanning between landing beams to suit the following data. No of steps = 10 Tread =300mm Rise =150mm Width of landing beam =300mm Use M20 & Fe415	AN		13
14.	a	Design the reinforcements in a circular column of diameter 300 mm to support a service load of 800 kN. The column has an unsupported length of 3 m is braced side sway. The column is reinforced with helical ties. Adopt M 20 grade concrete and Fe-415 HYSD bars.	AN	4	13
		Or			
	b	Design the reinforcements in a circular column of diameter 400 mm is to support factored axial load of 800 kN, together with a factored moment of 80 kNm. Use M20 grade concrete and Fe-415 HYSD bars.	AN	4	13
15.	a	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.	AN	5	13
		Or			
	b	Design a reinforced concrete footing for a column of 300 mm diameter supporting an axial factored axial load of 750 kN. The safe bearing capacity of the soil as is 200 kN/m ² . Use M-20 grade concrete and Fe-415 HYSD bars.	AN	5	13

*PART – C (Marks 1*15 = 15)*

<i>Q.No</i>		<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
16.	a	Design a rectangular beam of cross section 230 x 500 mm and of effective span 6 m, imposed load on the beam is 45 kN/m. Use M20 concrete and Fe415 steel. Assume whatever data is required.	AN	1	15
		Or			
	b	Design the short column 400mm x 400 mm at the corner of a multi storied building to support an axial factored load of 1500 kN, together with biaxial moments of 50 kN.m. Acting in perpendicular planes. Adopt M20 grade concrete and Fe-415 HYSD bars.	AN	5	15