

THE KAVERY ENGINEERING COLLEGE*(An Autonomous Institution)***B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, NOV/DEC 2025***Fifth Semester**Civil Engineering***CE3501 - Design of Reinforced Concrete Elements****Use of IS 456:2000 and Design aids (SP:16) are permitted***Regulations - 2021**Duration : 3 Hrs**Maximum : 100 Marks****PART - A (ANSWER ALL QUESTIONS) (Marks 10 X 2=20)***

<i>Q.No</i>	<i>Questions</i>	<i>BTL</i>	<i>CO</i>	<i>Marks</i>
1.	Mention any two objectives of the design of reinforced concrete structures.	L2	1	2
2.	List the three methods of design of reinforced concrete structural elements.	L1	1	2
3.	Summarize any two general features of two-way slab.	L1	2	2
4.	Write down the formulae for calculating effective width of flanged beams.	L1	2	2
5.	Sketch the edge and middle strip of one-way slab.	L2	3	2
6.	Identify the circumstances under which dog- legged staircases can be used.	L4	3	2
7.	How does the compression failures occur in columns?	L4	4	2
8.	Define slenderness ratio.	L1	4	2
9.	Why dowel bars are provided in footing?	L4	5	2
10.	Classify the different types of combined footing.	L2	5	2

PART - B (ANSWER ALL QUESTIONS) (Marks 5 X 16 = 80)

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
11.	a Explain the various design philosophies used in reinforced cement concrete structures as per IS456:2000. Or	L3	1	16
	b A singly reinforced beam 250 mm X 500 mm in section is reinforced with four bars of 16mm diameter with an effective cover of 50mm. effective span of the beam is 6m. Assuming M20 grade of concrete and Fe415 grade of steel determine the central concentrated load that can be carried by the beam in addition to its self-weight.	L3	1	16
12.	a Design a T- beam section with a flange width of 1200 mm, a flange depth of 100 mm, a web width of 250 mm and an effective depth of 500 mm, which is subjected to a factored moment of 550 kNm. Or	L4	2	16
	b Calculate the reinforcement required for a rectangular beam section for the following data. Size of the beam 300mmX600mm, factored moment=115 kNm, Factored torsion=45 kNm, Factored shear = 95 kN. Use M25 concrete and Fe415 steel.	L4	2	16

13.	a	Design a two-way slab for an office floor size 3.5m x 4.5m with discontinuous and simply supported edges on all the sides with the corners prevented from lifting and supporting a service live load of 4.4 kN/m ² . Adopt M25 grade concrete and Fe415 steel bars.	L4	3	16
	Or				
	b	Design one of the flight of a dog-legged stairs spanning between landing beams using following data. Number of steps in a flight = 10, Tread = 300 mm, Riser = 150mm, Width of landing beams = 300 mm.	L4	3	16
14.	a	Determine the reinforcement for a short column for the following data. Column size: 400 mm x 600 mm, P _u =2000 kN, M _{ux} = 160 kN, M _{uy} =120 kN. Use M20 grade concrete and Fe500 grade steel.	L4	4	16
	Or				
	b	A circular column, 3 m high is effectively held in position and restrained against rotation at both ends. Design the column to carry an axial load of 750 kN, if its diameter is restricted to 350 mm. Use M25 concrete and Fe500 steel grade.	L4	4	16
15.	a	A rectangular column 600 x 400 mm carries a load of 800 kN. Design a rectangular footing to support the column. The safe bearing capacity of soil is 200 kN/m ² . Use M20 grade concrete.	L5	5	16
	Or				
	b	Design a suitable footing for a 400 mm x 400 mm square column transferring 85kN axial load and a moment of 28 kN-m. The safe bearing capacity of soil is 200 kN/m ² . Use M25 concrete and Fe 500 steel. Adopt limit state design method.	L5	5	16