Register No : _____

THE KAVERY ENGINEERING COLLEGE

(An Autonomous Institution)

B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, NOV/DEC 2025

Fourth Semester

Civil Engineering

CE3402 –Strength of Materials

Regulations - 2021

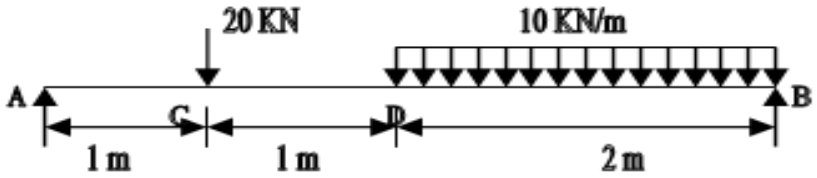
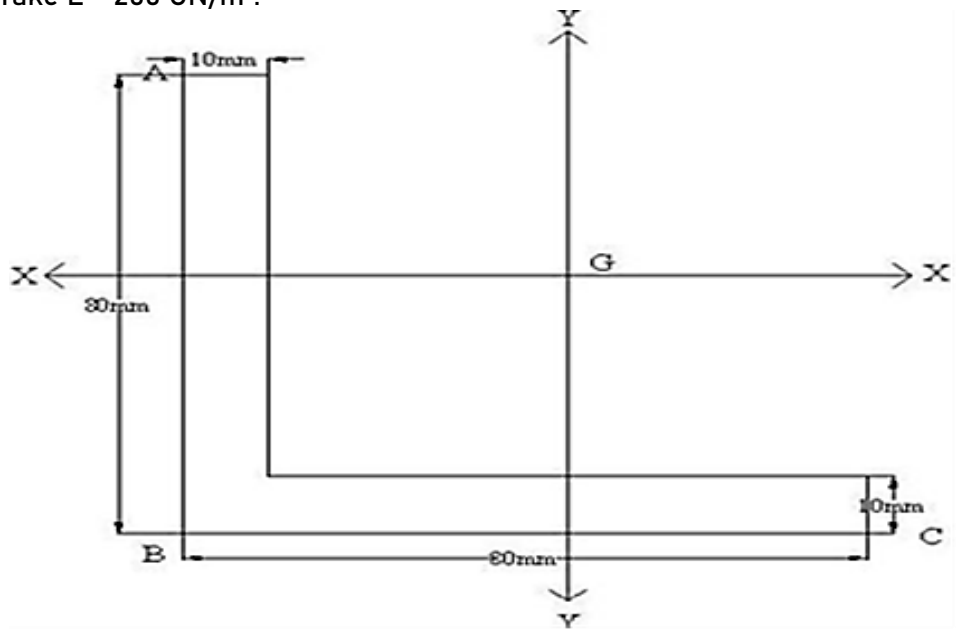
Duration : 3 Hrs *Maximum : 100 Marks*

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

Q.No	*Questions*	*BLT*	*CO*	*Marks*
1.	Express the relationship among the three elastic constants.	L2	1	2
2.	Define principle stresses and principle plane.	L1	1	2
3.	Write the assumptions in the theory of simple bending.	L1	2	2
4.	Name the various types of loading.	L1	2	2
5.	Explain the Theorem for conjugate beam method.	L2	3	2
6.	Write the maximum value of deflection for a cantilever beam of length L, constant EI and carrying concentrated load W at the end.	L1	3	2
7.	Differentiate the statically determinate structures and statically indeterminate structures.	L2	4	2
8.	Enumerate the advantages of fixed beams.	L2	4	2
9.	State two reasons for unsymmetrical bending.	L1	5	2
10.	Define thick cylinder.	L1	5	2

*PART – B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)*

Q.No		*Questions*	*BLT*	*CO*	*Marks*
11.	a	Determine the value of Young's modulus and Poisson's ratio of a metallic bar of length 300mm, width 40mm and depth 40mm, when a bar is subjected to an axial compressive force of 400 kN. The decrease in the length is given as 0.75mm and increase in width as 0.03mm.	L2	1	16
		Or			
	b	A cylindrical shell 900 mm long, 150 mm internal diameter, 8 mm thick is filled with a fluid at atmospheric pressure. If an additional 20000 mm^3 of fluid is pumped into the cylinder. Find the pressure exerted by the fluid on the cylinder and the hoop stress induced. E = 2 x 10^5 N/mm^2 and poisons ratio = 0.3.	L2	1	16
12.	a	A beam of span 10 m is simply supported at its ends and carries point loads of 6kN each at a distance 3m and 7m from the left support and also a uniformly distributed load of 2 kN/m between the point loads. Draw the shear force and bending moment diagram.	L2	2	16
		Or			
	b	The cross section of a simply supported beam of span 4 m is symmetrical I-section having flange width 100 mm and thickness 12 mm and web depth 120 mm and thick 10 mm. Determine the maximum central concentrated load that the beam can carry, if the maximum allowable compressive stress and tensile stress in the beam are limited to 250 MPa and 100 MPa respectively.	L2	2	16

13.	a	A beam AB of 4 meters span is simply supported at the ends is loaded as shown in fig. Determine (i) Deflection at D (ii) Slope at the end A. Take E = 2 x 10^5 N/mm^2 and I = 20 x 10^{-6} m^4.  	L3	3	16
		Or			
	b	A simply supported beam has a span of 6 m. It carries two concentrated loads of 40 kN and 10 kN at distances of 2 m and 4 m from the left support. Find the deflections under the 40 KN load. Take EI= 8000 kNm^2. Use Macaulay"s method.	L3	3	16
14.	a	A fixed beam of 8m span carries a UDL of 40 kN/m run over 4m length starting from left end and a concentrated load of 80kN at a distance of 6m from the left end. Find i) Moments at the supports. ii.) Deflection at centre of the beam Take I = 15000 kNm^2.	L3	4	16
		Or			
	b	A continuous beam ABC 8m long consists of two spans AB=3m and BC=5m.The span AB carries a load of 50 kN/m while the span BC carries a load of 10 kN/m. Find the support moments and the reactions at the supports.	L3	4	16
15.	a	An 80 mm x 80 mm x 10mm angle section shown in fig is used as a simply supported beam over a span 2.4 m. It carries a load of 400 N along the line YG, where G is the centroid of the section. Calculate the i. Stresses at the points A, B and C of the mid-section of the beam ii. Deflection of the beam at the mid-section and its direction with the load line. Take E = 200 GN/m^2.  	L3	5	16
		Or			

b Determine the shear centre for a channel section shown in fig. L3 5 16