Register No : _____

THE KAVERY ENGINEERING COLLEGE

(An Autonomous Institution)

UG/PG DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL/MAY 2026

Fourth Semester

Agricultural Engineering

UAIT24403 - STRENGTH OF MATERIALS

Regulations - 2024

Duration : 3 Hrs *Maximum : 100 Marks*

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

Q.No	*Questions*	*BLT*	*CO*	*Marks*
1.	Define poison ratio. What are the limiting values?	L1	1	2
2.	Write down the relation between young's modulus and shear modulus.	L1	1	2
3.	Justify how method of joints is applied to Trusses carrying Horizontal and inclined loads.	L1	2	2
4.	List out the types of analytical methods in determining the forces in a frame.	L1	2	2
5.	List out the types of load acting on a beam.	L1	3	2
6.	A cantilever beam of length 2 m carries the point loads of 800N at its free end, 600N at 0.8 m and 300N at 1.5 m from its free end. Draw the S.F diagram.	L2	3	2
7.	Maximum shear stress developed on the surface of a solid circular shaft under pure torsion is 240 MPa. If the shaft diameter is doubled, then the maximum shear stress developed corresponding to the same torque will be equal to.	L2	4	2
8.	Write the expression for power transmitted by a shaft.	L2	4	2
9.	State the two theorems in moment area method.	L2	5	2
10.	Illustrate when Macaulay's method is preferred.	L2	5	2

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

Q.No			*Questions*	*BLT*	*CO*	*Marks*
11.	a	i	Estimate the values of change in length, breadth and thickness of a steel bar 4.2m long, 35mm wide and 25mm thick. When subjected to an axial pull of 130kN in the direction of its length. Take E=200Gpa and poisson's ratio = 0.3	L3	1	16
			Or			
	b	i	Obtain a relation for the change in length of a bar hanging freely under its own weight.	L3	1	8
		ii	Derive the relationship between modulus of elasticity and modulus of rigidity.	L3	1	8

12.	a	Determine the forces in all the members of the truss shown in Fig.12.a and indicate the magnitude and nature of forces on the diagram of the truss. All inclined members are at 60° to horizontal and length of each member is 2 m.	L2	2	16

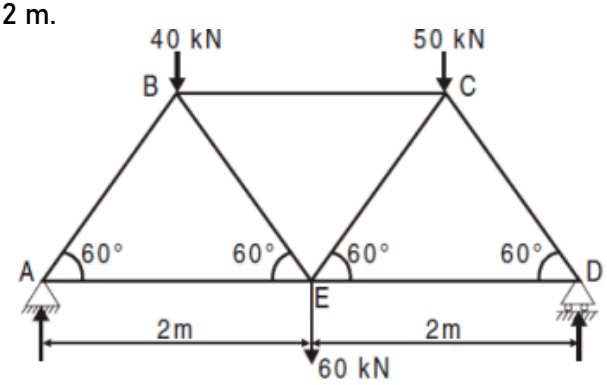

Fig 12.a

Or

	b	A truss of 8m span consisting of seven members each 4m length supported at its ends and loaded as shown in Fig.12.b. Determine the forces on the members by tension coefficient method	L2	2	16

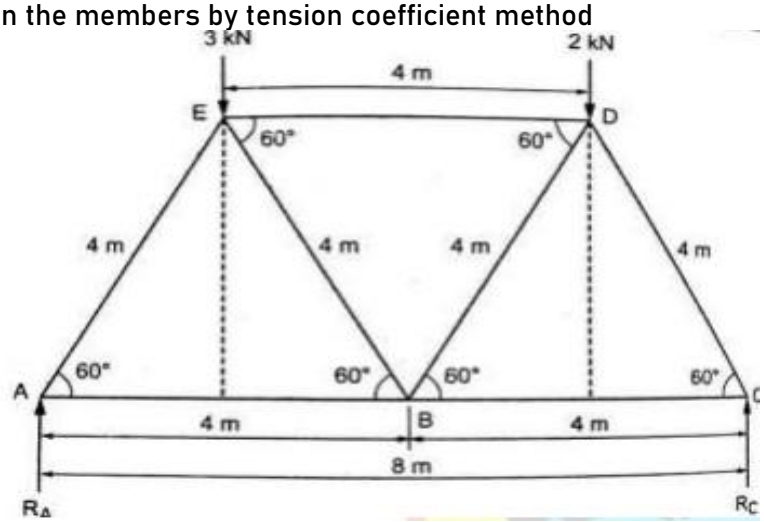

Fig 12.b

13.	a	A simply supported beam of 9 m span is as shown in fig 13.a given below. Draw the B.M and S.F diagram indicating principal values.	L3	3	16

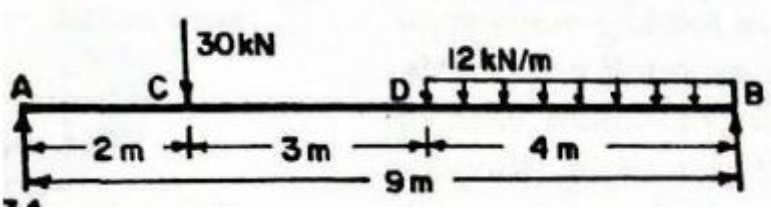

Fig 13.a

Or

	b	A test beam 30mm square in section is broken by a load of 2KN applied at centre of the span of 1.2m. Calculate the safe Udl for a beam 100mm wide and 300 mm deep of same material and freely supported over a span of 4.5m	L3	3	16
14.	a	In a torsion test, the specimen is a hollow shaft with 50 mm external and 30 mm internal diameter. An applied torque of 1.6 kN-m is found to produce an angular twist of 0.4° measured on a length of 0.2 m of the shaft. The Young's modulus of elasticity obtained from a tensile test has been found to be 200 GPa. Find the values of Modulus of rigidity and Poisson's ratio.	L4	4	16

Or

	b	A closely coiled helical spring of round wound steel wire 10 mm in diameter having 10 complete turns with a mean diameter of 12 cm is subjected to an axial load of 200 N. Determine the deflection of the spring, maximum shear stress in the wire and the stiffness of the spring. Take C = 8 x 10^4 N/mm^2	L4	4	16
15.	a	A horizontal beam of uniform section and length L rests on supports at its ends. It carries a U.D.L w per unit length which extends over a length l from the right end. Determine the value of l in order that the maximum deflection may occur at the left end, and if the maximum deflection is wL^4 /kEI, determine the value of k.	L5	5	16
		Or			
	b	Using conjugate beam method, find slopes at the ends and central deflection for the beam as shown in the fig 15.b	L5	5	16

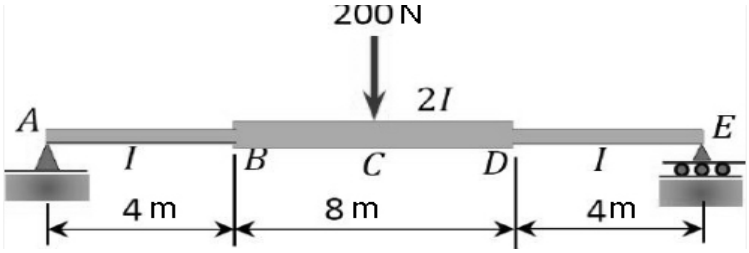

Fig 15.b