CLASS: BTECH   SEMESTER : II
BRANCH: MECH/PROD/CHEMICAL/BIOTECH/CIVIL   SESSION : SP/2023

SUBJECT: ME101 BASICS OF MECHANICAL ENGINEERING
TIME: 02 Hours   FULL MARKS: 25

INSTRUCTIONS:
1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates

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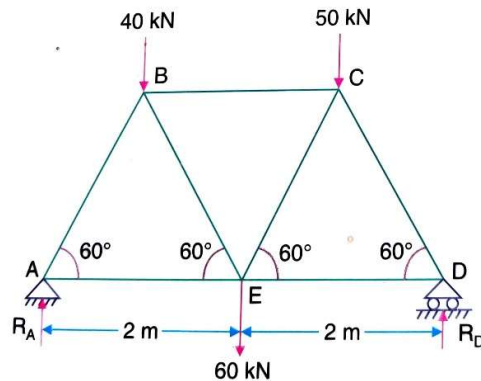|			CO	BL
Q.1	Determine the forces in the members of BC, BE and BA of the truss shown in figure 1 and indicate the magnitude and nature of the forces. All members are inclined at 60^0 to the horizontal and length of each member is 2 m.	[5]	CO1	L2

Figure 1

Q.2	A bar of 30 mm diameter is subjected to a pull of 60 kN. The measured extension on gauge length of 200 mm is 0.1 mm and change in diameter is 0.004 mm. Calculate: (i) Young's modulus, (ii) Poisson's ratio and (iii) Bulk modulus.	[5]	CO1	L1
Q.3	In a crank and connecting rod mechanism, the crank is 300 mm long and the connecting rod 1500 mm long. If the crank rotates uniformly at 300 rpm, find the velocity of the cross-head when the crank is inclined at 30^0 with the inner dead Centre.	[5]	CO2	L2
Q.4	The ends of a slender beam AB of length 2.5 m are constrained to remain in contact with a horizontal floor and a vertical wall respectively. If the end A of beam, which is touching to the horizontal floor and has a horizontal velocity of 1.5 m/s towards left direction to the wall, determine the angular velocity of the beam and the velocity of its end B when beam is inclined with 60^0 to the horizontal floor.	[5]	CO2	L3
Q.5	Explain angle of repose and angle of friction with neat sketches.	[5]	CO3	L1

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