Sub Code: MET001 **ROLL NO……..……..**

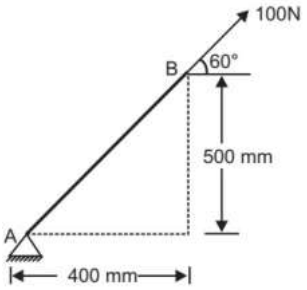
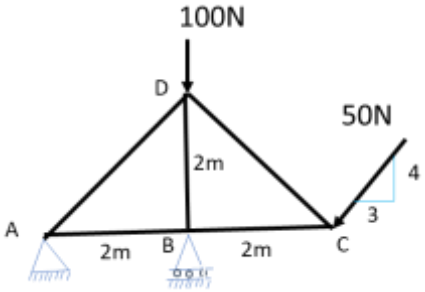
EVEN SEMESTER EXAMINATION, 2023 – 24

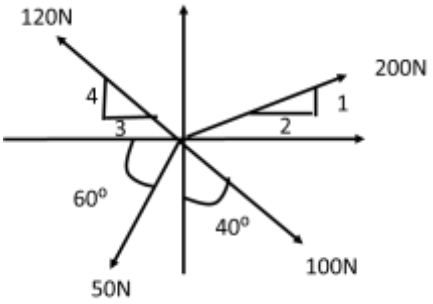
First yr B.Tech.

Basic Mechanical Engineering

Duration: 3:00 hrs **Max Marks: 100**

Note: - Attempt all questions. All Questions carry equal marks. In case of any ambiguity or missing data, the same may be assumed and state the assumption made in the answer.

Q 1.	Answer any four parts of the following. a) Explain the principle of transmissibility of Forces. b) Find the moment of 100 N force acting at B about point A as shown in Figure.  c) Explain the concept of continuum. d) What do you understand by Thermodynamic equilibrium. e) A non- flow reversible process occurs for which pressure and volume are correlated by the expression $p = (V^2 + 6)$ where p is in bar and V is in m^3 .What amount of work will be done when volume changes from 2 to 4 m^3? f) Explain the limitation of First law of thermodynamics.	5x4=20
Q 2.	Answer any four parts of the following. a) Explain why the entropy of the universe in increasing? b) Explain the difference between Impulse and reaction turbines with examples. c) What do you understand by strength, hardness, toughness, and ductility of the material. d) Explain the Newton's law of viscosity e) Explain the different types of fluids f) A fluid expands reversibly behind a piston from initial conditions of pressure 600KPa and volume 0.03 m^3 to a final volume of 0.09m^3. Presuming isothermal conditions estimate the work done during the process	5x4=20
Q 3.	Answer any two parts of the following. a) what do you understand by prefect truss. Find out the forces in all the members of Truss given in figure. 	10x2= 20

	b) Draw the stress-strain curve for mild steel and describe its salient points. c) Explain Pascal's law with help of a neat sketch. The small piston of a hydraulic lift has an area of 0.20 m^2. A car weighing 1.2 x 10^4 N sits on a rack mounted on the large piston. The large piston has an area of 0.90 m^2. How large force must be applied to the small piston to support the car.	
Q 4.	Answer any two parts of the following. a) Derive the Bernoulli's Equation with all assumptions. b) A system of four forces acting on a body is as shown in figure. Determine the resultant and angle of resultant.  c) What is the difference between the hydraulic turbines and hydraulic pumps. Explain the working of Impulse turbines.	10x2= 20
Q 5.	Answer any two parts of the following. a) Derive efficiency for Compression ignitions engine with all assumptions. b) The minimum pressure and temperature in an Otto cycle are 100Kpa and 27ºC. the amount of heat added to the air per cycle is 1500 KJ/Kg. Determine pressure and temperatures at all points of cycle, specific work and thermal efficiency for compression ratio of 8:1. c) Develop the relationship between Young's modulus (E), Bulk modulus (K) and Poisson's ratio (μ)	10x2= 20

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