AHMEDABAD UNIVERSITY
School of Engineering and Applied Science
2025-2026 Winter

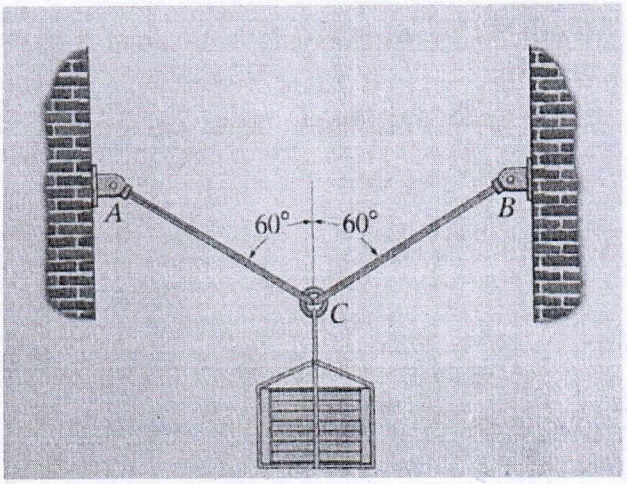
MEC307 Mechanics of Solids and Designing with Materials
Mid-Term Examination
Saturday 21 Feb 2026. 11:00 – 12:15

Name:	Roll no.	A	U	2							Marks /40

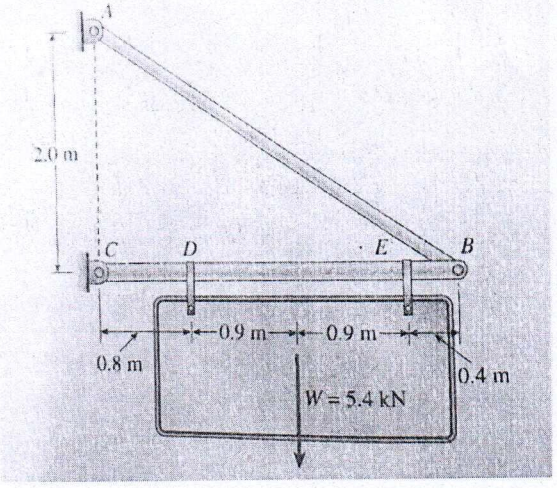
Instructions:

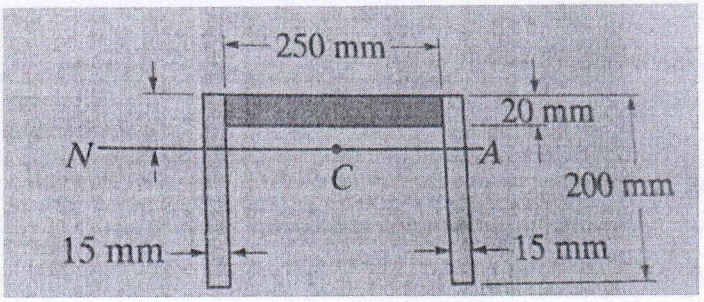
1. Write your answers in the answer book. Answer all questions.
2. Assume suitable data wherever necessary

1. Rods AC and BC are used to suspend the 200 kg mass. If each rod is made of a material for which the average normal stress cannot exceed 150 MPa, determine the minimum required diameter of each rod.



2. The two-bar truss ABC shown in Fig. has pin supports at A and C, that are 2 mm apart. Members AB and BC are steel bars, pin connected at A. The length of the bar BC is 3 m. A sign weighing 5.4 kN is suspended from bar BC at points D and E. The diameter of the pin at A and C is 8 mm. Calculate the shears stress developed in the pin at C, which is in double shear.



3.	A beam has a cross-sectional area in the shape of a channel as shown in the Figure. Determine the maximum bending stress that occurs in the beam when subjected to a bending moment of 150 N.m. 
4.	A solid steel shaft ABC of 50 mm diameter is driven at A by a motor that transmits 50 kW to the shaft at 10 Hz. The gears at B and C drive machinery requiring power equal to 35 kW and 15 kW. Compute the (a) maximum shear stress in the shaft and (b) angle of twist between the gear at A and C. 