JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2025

B.Tech- III Semester (CE)

COURSE CODE (CREDITS): 25B11CE311 (4) MAX. MARKS: 35

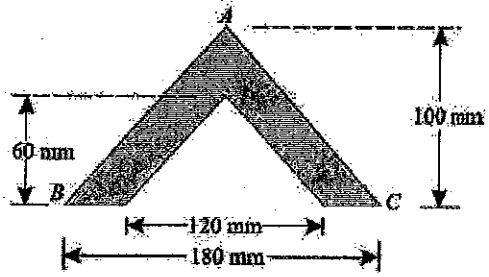
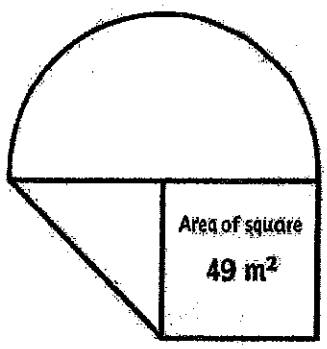
COURSE NAME: ENGINEERING MECHANICS

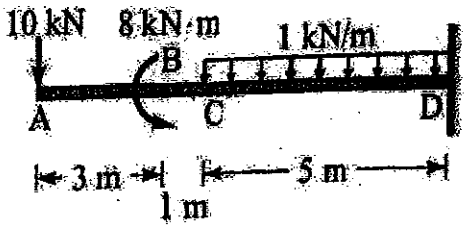
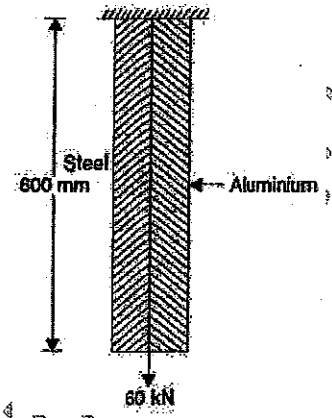
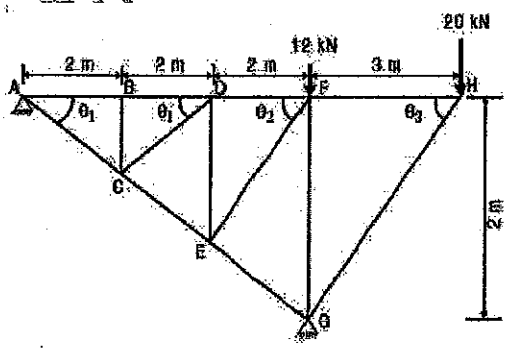
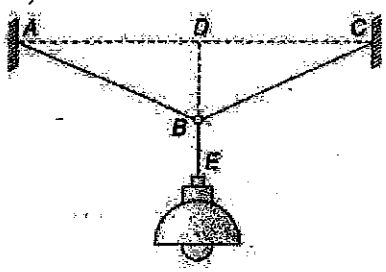
COURSE INSTRUCTORS: DR SAURAV MAX. TIME: 2 Hours

Note: (a) All questions are compulsory.

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

(c) *Use of Non Programmable Scientific Calculator is allowed*

Q.No	Questions	CO	Marks
Q1	i) Derive mathematical expression for the moment of inertia of a triangular section of width B and height H about its base using first-principle concepts. ii) A hollow triangular section shown in Fig. 1 is symmetrical about its vertical axis. Find the moment of inertia of the section about the base BC.  **Fig. 1**	3	4+2
Q2	Find the coordinates of the centroid of the Fig 2. Clearly mention the reference axis and origin of the coordinate system.  **Fig. 2**	3	5
Q3.	A simply supported beam of length L and depth D is subjected to temperature change of T°C at bottom fibres, whereas at top fibres temperature is unchanged. If the temperature variation is linear from top to bottom, then find the central deflection of the beam due to temperature effect.	3	4

Q4.	For the cantilever beam as shown in Fig. 3. calculate the support reactions generated for the given loading.	 Fig. 3	1	4
Q5.	A compound bar (Fig. 4) of length 600 mm consists of a strip of aluminum 40 mm wide and 20 mm thick and a strip of steel 60 mm wide × 15 mm thick rigidly joined at the ends. If elastic modulus of Elasticity of aluminum and steel are 1×10^5 N/mm^2 and 2×10^5 N/mm^2 respectively, determine the stresses developed in each material and the extension of the compound bar when axial tensile force of 60 kN acts.	 Fig. 4	4	5
Q6.	Find the forces in all the members of the truss shown in Fig. 5.	 Fig. 5		7
Q7.	An electric street lamp is suspended from a small ring B supported by two wires AB and CB, the ends A and C of which are on the same level [Fig.6]. Assuming these wires to be perfectly flexible and neglecting their weights, find the force produced in each if the weight of the lamp is 67 N, length of each wire, 3.05 m, and the sag DB, 1.22 m.	 Fig. 6	1	4