Sanjay Ghodawat University, Kolhapur

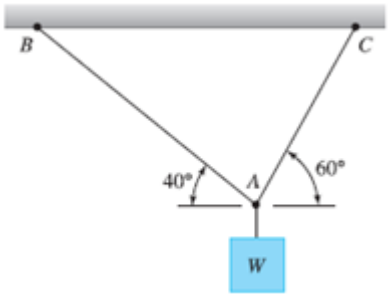
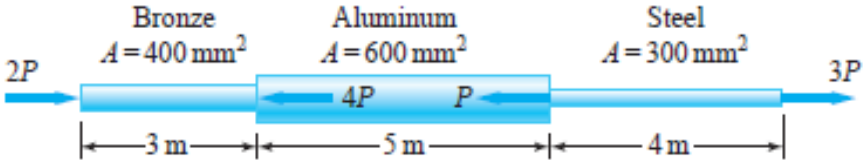
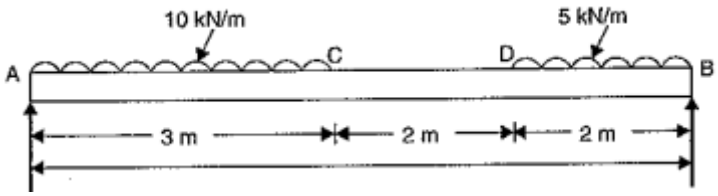
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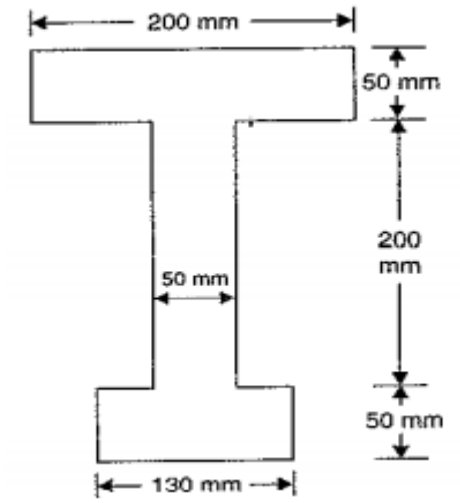
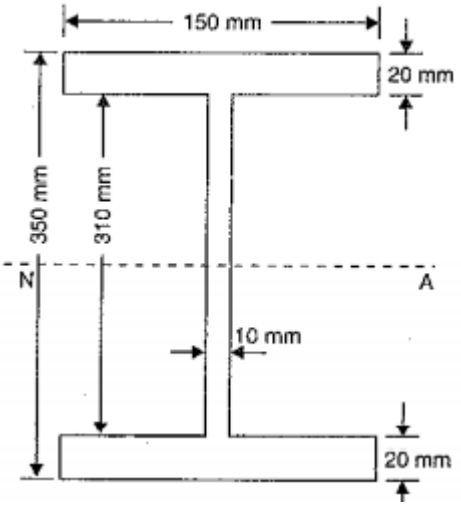
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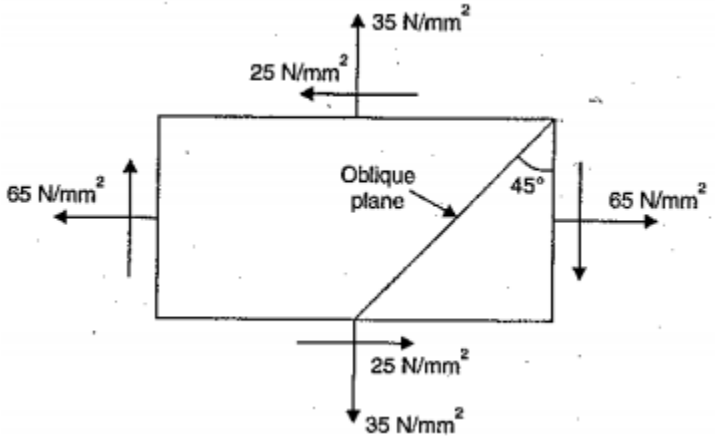
EXM/P/09/00

Year and Program: S.Y. B. Tech.	**School of Technology**	**Department: Aeronautical Engineering**
Course Code: AET208	**Course Title: Mechanics of Materials**	**Semester : IV**
Day and Date:	**End Semester Examination**	**Time : 2 Hrs.** **Max Marks : 50**

Instructions: 1) All Questions are compulsory
2) Missing data may be suitably assumed with justification

Q.1		**Answer/Solve the following (any Two)**	**Marks**	Bloom's Level	CO
	a)	Figure shows a two-member truss supporting a block of weight W. The cross-sectional areas of the members are 800 mm^2 for AB and 400 mm^2 for AC. Determine the maximum safe value of W if the working stresses are 110 MPa for AB and 120 MPa for AC. 	8	L3	1
	b)	Axial loads are applied to the compound rod that is composed of an aluminum segment rigidly connected between steel and bronze segments. What is the stress in each material given that P=10 kN? 	8	L3	2
	c)	Draw shear force and bending moment diagram for a simply supported beam shown in figure. 	8	L3	2

Q.2		**Answer/Solve the following (any two)**			
	a)	Draw bending stress distribution for a beam of I section shown in figure which is subjected to a maximum bending moment of 40 MN-mm. 	8	L3	3
	b)	Draw shear stress distribution diagram for a beam of I-section shown in figure which is subjected to a shear force of 40 kN. 	8	L3	3
	c)	A plane element is subjected to the stresses as shown in figure. Determine i) Principal stresses and their directions ii) Maximum and minimum shear stresses and their directions. Use Mohr's Circle method	8	L3	2

					
Q.3		**Answer/Solve the following (any two)**			
	a)	An overhanging beam is shown in figure with a 10 kN point load at C. Calculate slope at A, B and C points. Also calculate deflection at C and maximum deflection. 	9	L3	4
	b)	A hollow circular shaft 20 mm thick transmits 300 kW power at 200 RPM. Determine the external diameter of the shaft if shear strain due to torsion is not to exceed 0.00086. Take modulus of rigidity as 0.8 x 10^5 N/mm^2.	9	L3	2
	c)	A hollow cylindrical column is 4 m long with both ends fixed. Determine the minimum diameter of the column if has to carry a crippling load of 1250 kN. Take internal diameter as 0.8 times the external diameter, stress in compression as 550 N/mm^2 and a = 1/1600	9	L3	5