Name of the Examinations: BACHELOR OF ARCHITECTURE FIRST YEAR FIRST SEMESTER - 2024
Subject : STRUCTURAL MECHANICS I

Time: 3 Hours | Full Marks: 100

Instructions:	
I	All notations represent their standard relevant meaning.
II	If you feel that any data or condition is/are missing in any question, please assume relevant inputs and mention the same.

Sl No	**Question**	**Marks**
1	(a) Consider the force diagram from Figure: 01.A and determine resultant of the given force system (magnitude of resultant vector and the angle that the resultant vector makes with respect to positive x axis where x axis and y axis are horizontal and vertical axis respectively perpendicular to each other) by graphical approach using polygon law of vector addition. Also, use analytical approach to get the resultant and compare the results by calculating the percentage of error for the resultant force as well as the angle that the resultant vector makes with respect to the positive x axis. (20 marks) (b) Consider the beam given in Figure: 01.B and check if the structure is determinate or not. Also find out the amount and nature of resisting moment at fixed support of the cantilever beam. (5 marks)	25
2	Consider the beam given in Figure: 02 and Find out reaction forces using Analytical Method and Graphical Method. Also Find out percentage of error of your results obtained using graphical approach compared with respect to the analytical results. Also Find out moment inside the beam at 3m from the hinged support using any method.	25

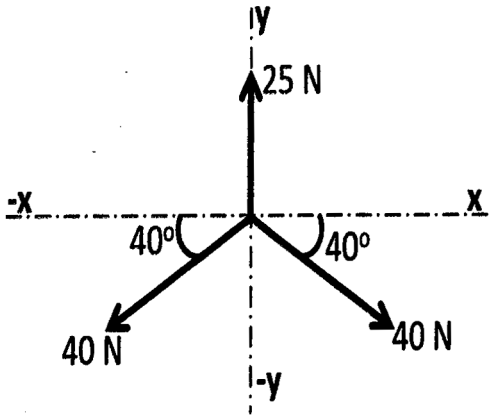


Figure: 01.A (Not to Scale)

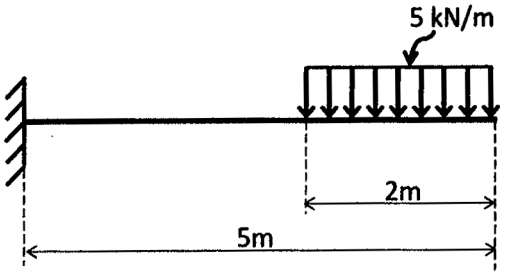


Figure: 01.B (Not to Scale)

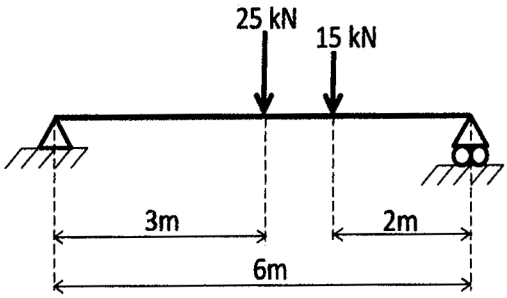
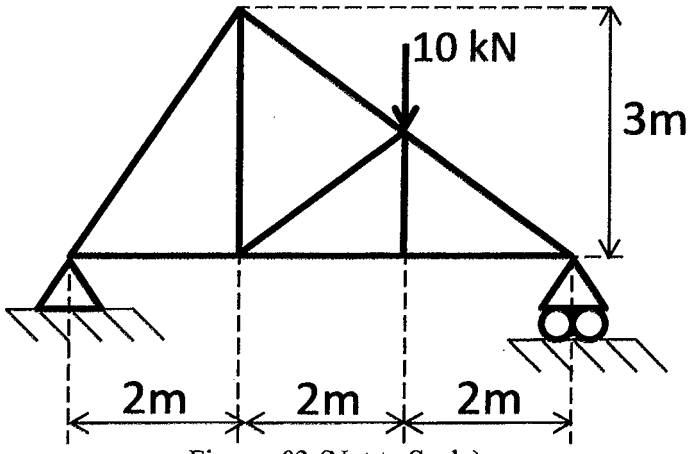
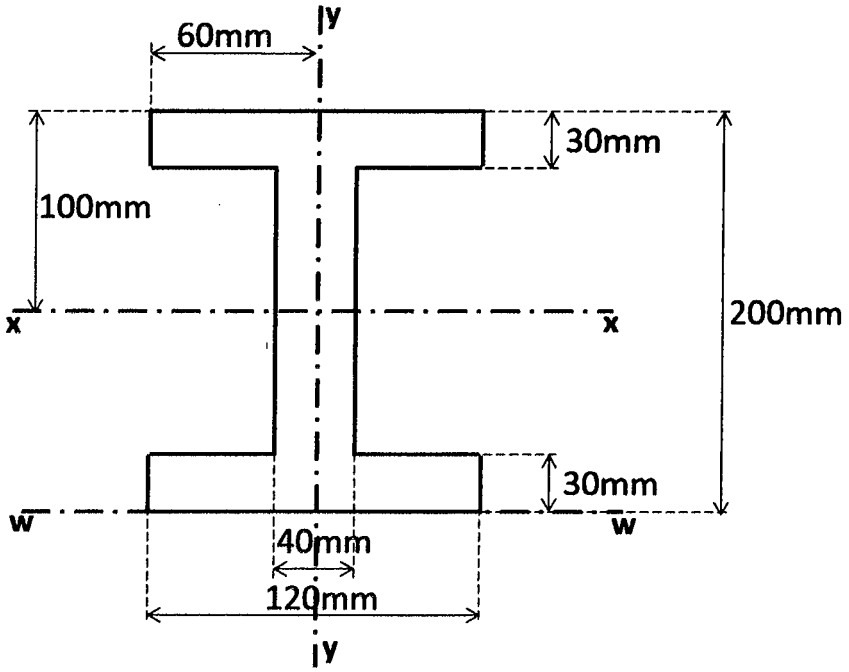


Figure: 02 (Not to Scale)

3	Consider the plane truss from Figure: 03, check if the truss is statically determinate and determine all member forces by using **method of joints** (Show the member forces and joint forces in the diagram with proper notations). Check Member forces of any 3 members using **method of section**.  Figure: 03 (Not to Scale)	25
4	(a) Write a short note on Parallel Axis Theorem and its use in finding out area moment of inertia for structural applications relevant in the field of Architecture. (5 marks) (b) Consider the geometrically symmetrical I-section given in Figure: 04 and determine Area Moment of Inertia for the section with respect to **xx** axis and **ww** axis where **xx** axis and **ww** axis shown in the figure are parallel to each other. (20 marks)  Figure: 04 (Not to Scale)	25