

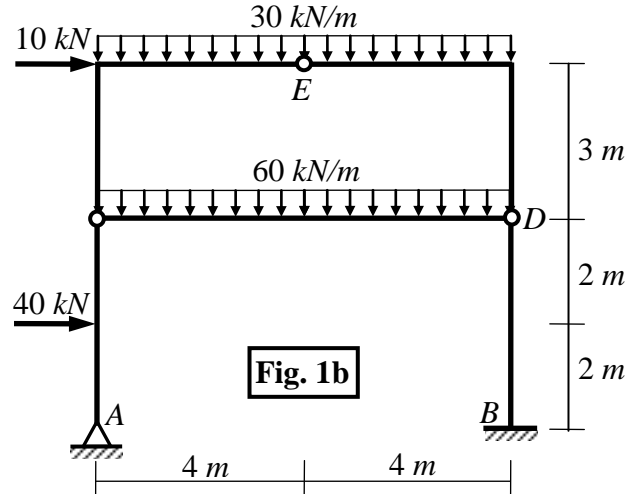
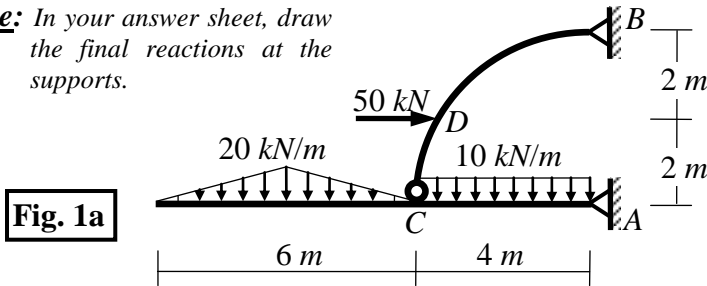
Total Marks: **90**

No. of Questions: **3** (Attempt all questions)

Question (1): (30 Marks)

For the structures shown in **Fig. 1**, determine the reactions at the supports **A** and **B**. Also calculate the bending moment at section **D** of the circular arch.

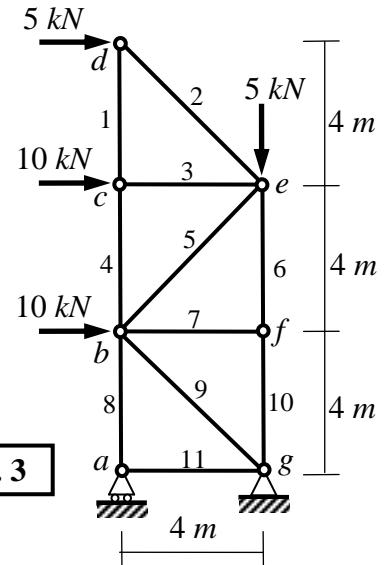
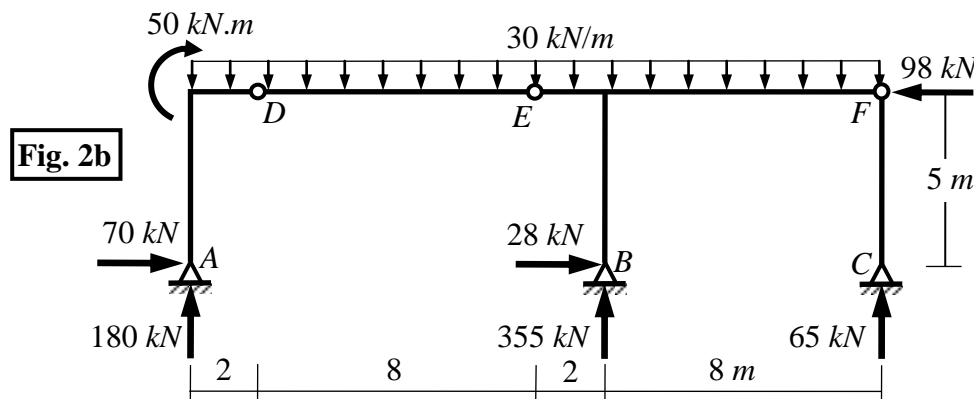
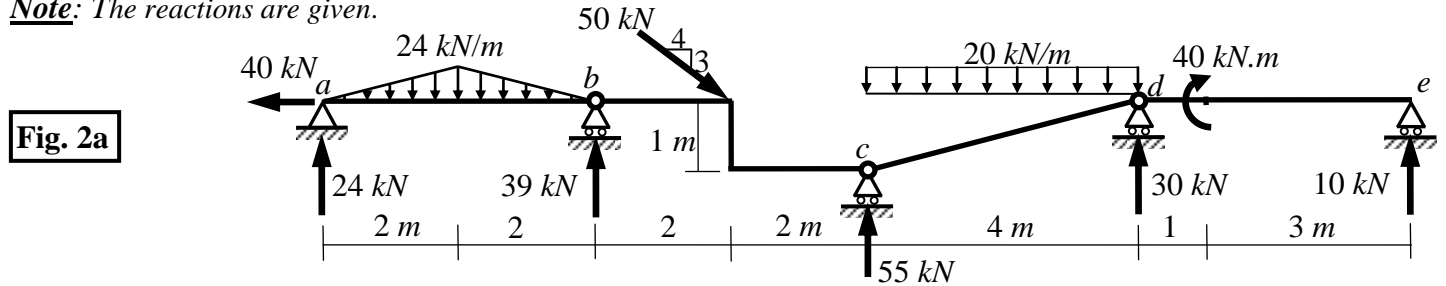
Note: In your answer sheet, draw the final reactions at the supports.



Question (2): (30 Marks)

For the structures shown in **Fig. 2**, draw the normal force, shear force and bending moment diagrams.

Note: The reactions are given.

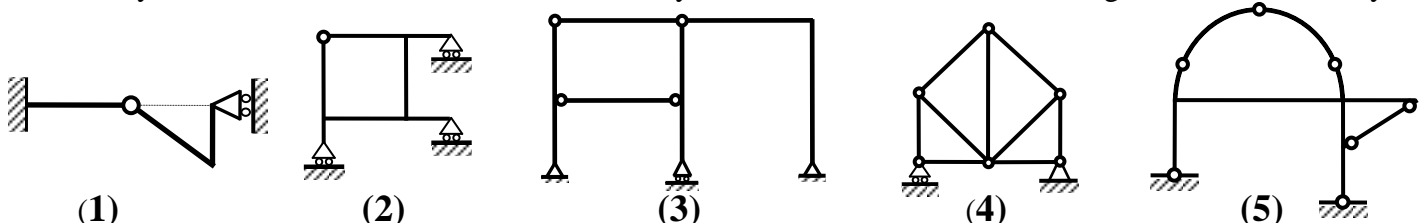


Question (3): (30 Marks)

(a) For the truss shown in **Fig. 3**:

- Find the **zero-force members**.
- Using the **method of joints**, determine the forces in members 1, 2 and 3 (*cd*, *de* and *ce*).
- Using the **method of sections**, determine the forces in members 4, 5 and 6 (*bc*, *be* and *ef*).

(b) Determine whether each of the shown structures is stable or unstable. If stable, determine whether it is statically determinate or indeterminate. If statically indeterminate, determine the degree of indeterminacy.



With my best wishes

Dr. M. Abdel-Kader