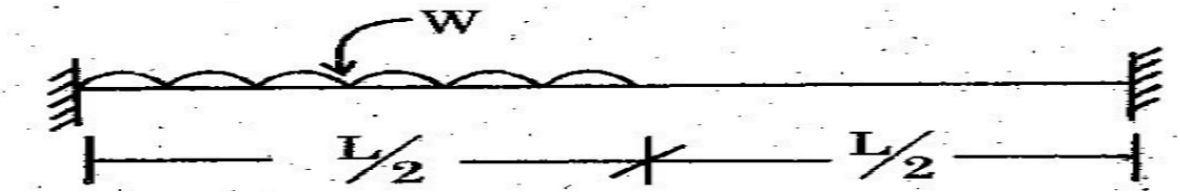
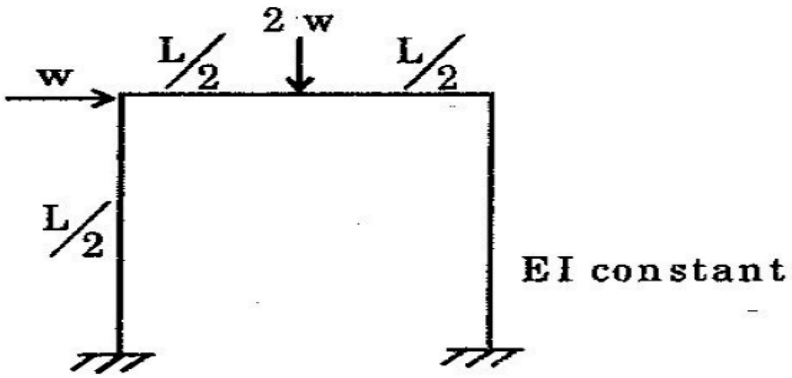
1. What is a plastic hinge?
2. What is a mechanism?
3. What is difference between plastic hinge and mechanical hinge?
4. Define collapse load.
5. List out the assumptions made for plastic analysis.
6. Define shape factor.
7. List out the shape factors for the following sections.
   a) Rectangular section,
   b) Triangular section,
   c) Circular section,
   d) Diamond section
8. Mention the section having maximum shape factor.
9. Define load factor.
10. State upper bound theory.
11. State lower bound theory.
12. What are the different types of mechanisms?
13. Mention the types of frames.
14. What are symmetric frames and how they analyzed?
15. What are unsymmetrical frames and how are they analyzed?
16. Define plastic modulus of a section Zp.
17. How is the shape factor of a hollow circular section related to the shape factor of an ordinary circular section?
18. Give the governing equation for bending.
19. Give the theorems for determining the collapse load.
20. State plastic moment of resistance.
21. Explain pure bending with its assumptions.
22. Determine the beam capacity of beam shown the figure



23. Determine the minimum plastic moment capacity to prevent collapse of frame



24. Calculate the shape factor for a **(a)** rectangle section of breadth b and depth d
(b) Diamond section of breadth b and depth d.

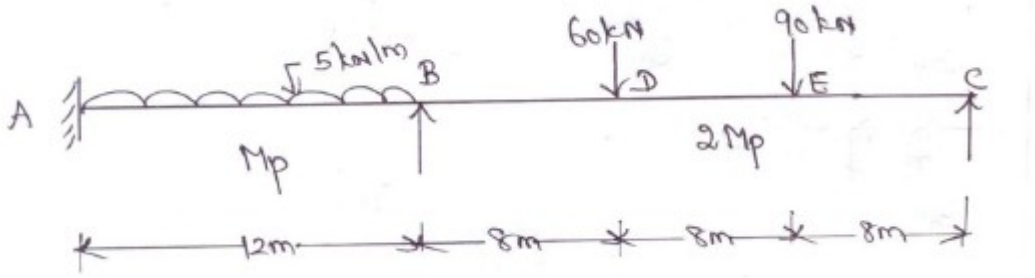
25. Calculate the shape factor for a triangle **a)** centroid lying at d/3 from the base of depth d and breadth b.
b) Circular section of dia D.

26.A mild steel I-section 200mm wide and 250mm deep has a mean flange thickness of 20mm and a web thickness of 10mm.Calculate the S.F. Find the fully plastic moment if σ_y=252N/mm^2.

27..Find the shape factor of the I-section with top flange 100mm wide, bottom flange 150mm wide,20mm and web depth 150mm and web thickness 20mm.

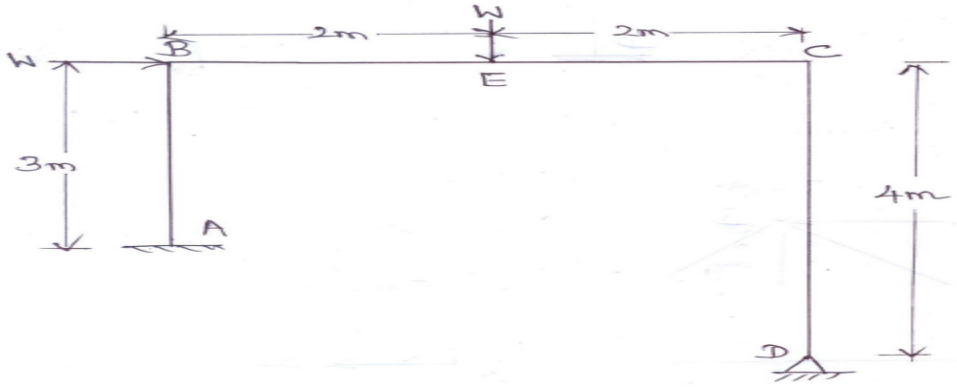
28. Find the shape factor of the T-section of depth 100mm and width of flange 100mm, flange thickness and web thickness 10mm.

29.A continuous beam ABC is loaded as shown .Determine the required Mp if the load factor is 3.2.

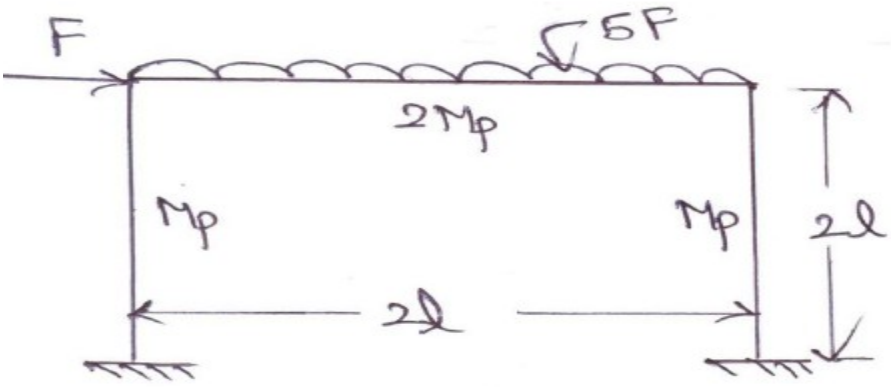


30. A two span continuous beam ABC has span length AB=6m and BC=6m and carries an udl of 30 kN/m completely covering the spans AB and BC.A and C are simple supports. If the load factor is 1.8 and the shape factor is 1.15 for the I-section, find the section modulus, assume yield stress for the material as 250N/mm².

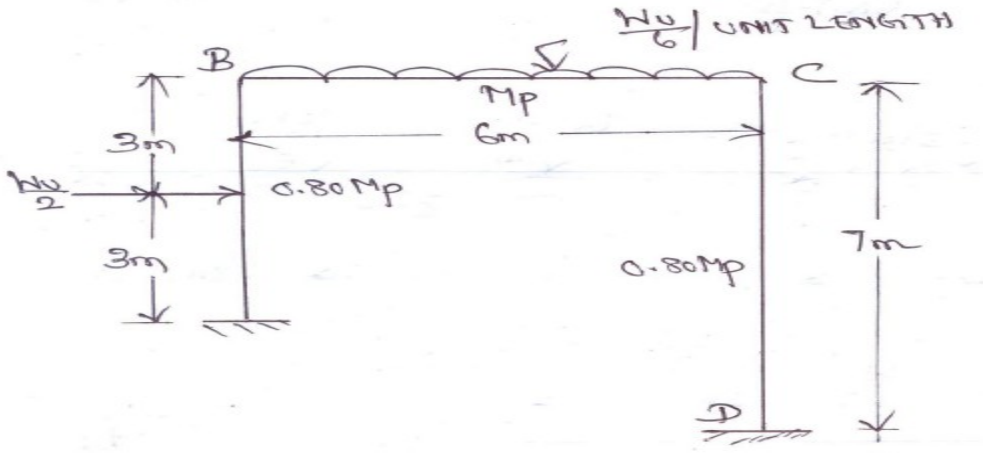
31. Determine the collapse load for the frame shown in the diagram, Mp is the same for all members.



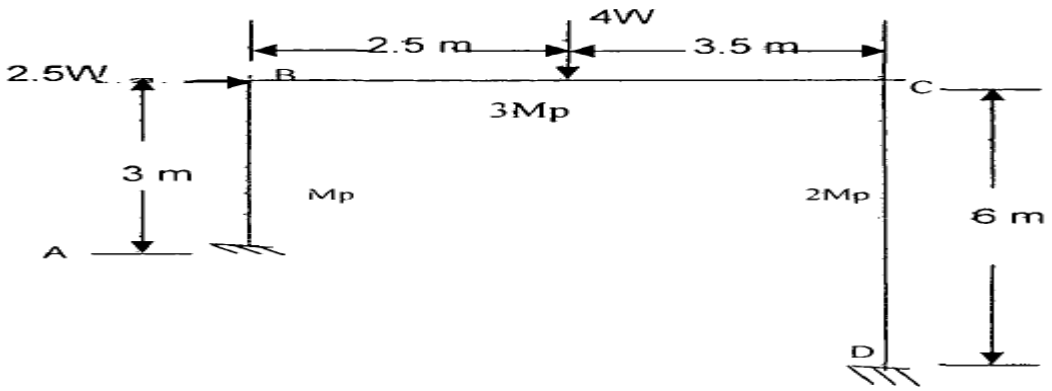
32. Find the collapse load for the portal frame loaded as shown.



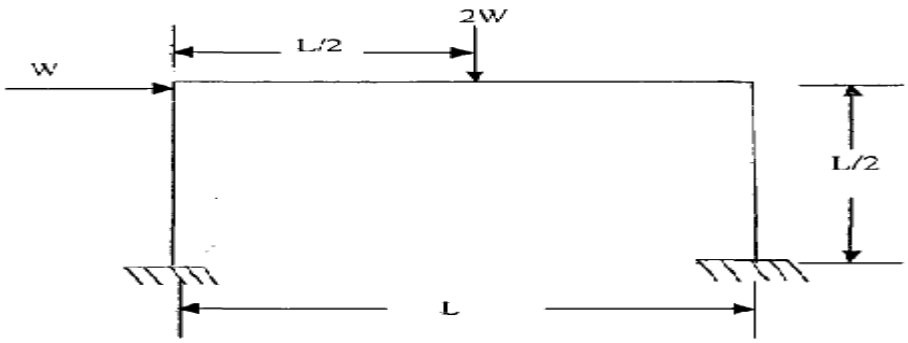
33. Find the collapse load for the loaded frame loaded as shown.



34. Find the value of W at collapse for the portal frame loaded as shown in



35. Find the value of W at collapse for the portal frame loaded as shown in Figure 15(a). All the members have the same plastic moment of resistance

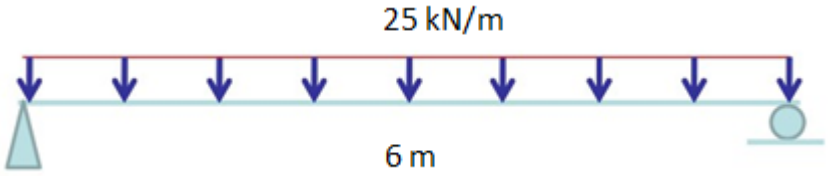


36. A beam of span 6rn is to be designed for an ultimate u.d.l of 25 kN/m. The beam is simply supported at the ends. Design a suitable I section using plastic theory assuming f_y 250 N/mm^2.

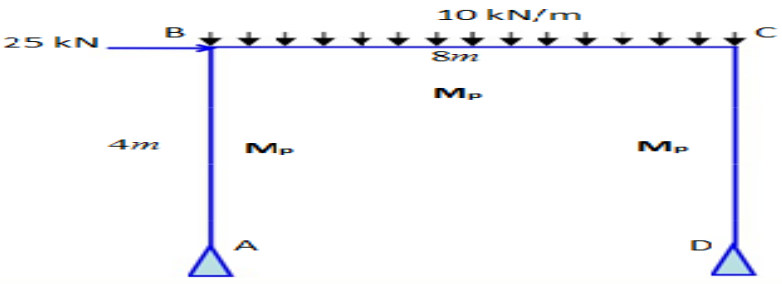
37. Derive the shape factor for Rectangle, Diamond and Circular Sections.

38. For the beam, determine the design plastic moment capacity.

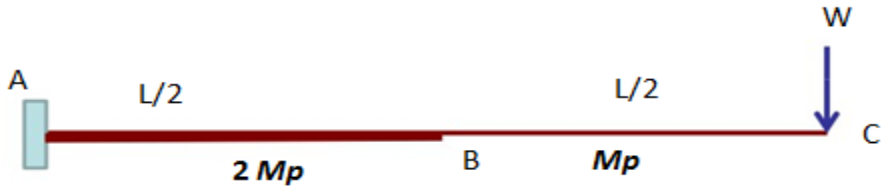
39. A beam of span 6 m is to be designed for an ultimate UDL of 25 kN/m. The beam is simply supported at the ends. Design a suitable I section using plastic theory, assuming σ_y= 250 MPa.



40. A portal frame is loaded up to collapse. Find the plastic moment capacity required if the frame is of uniform section throughout.



41. For the cantilever, determine the collapse load



42.A beam of rectangular section b x d is subjected to a bending moment of 0.9 Mp. Find out the depth of elastic core.