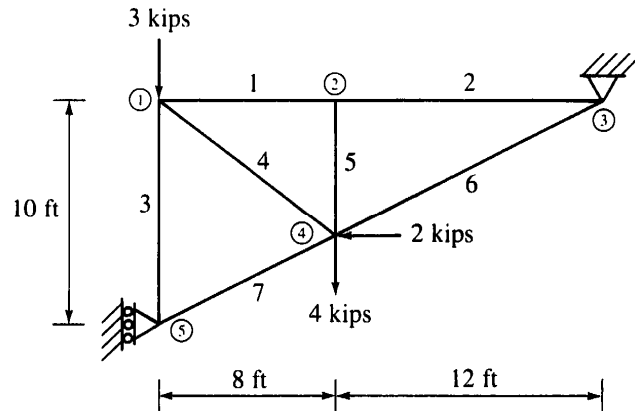
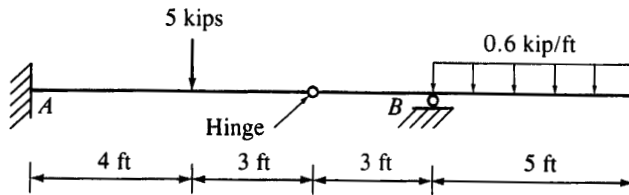


QUESTIONS FROM PREVIOUS EXAMS– SET #1

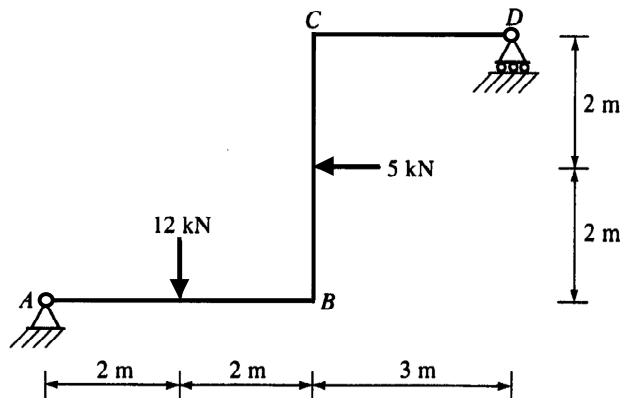
- 1) Determine the support reactions and internal forces in members 1 and 3 of the truss structure loaded as shown below.



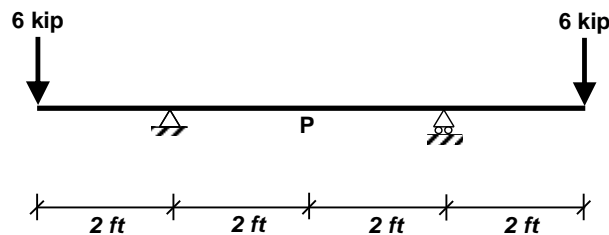
- 2) Draw the axial force, shear force, and bending moment diagram for the structure shown below using the axes provided. Note the presence of a hinge in the structure.



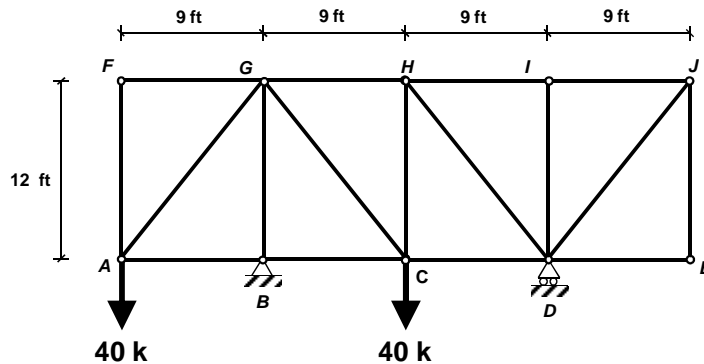
- 3) Draw the axial force, shear force, and bending moment diagram for the structure shown below using the axes provided.



- 4) Find the vertical deflection of the beam at point P. Assume that EI of the beam is constant.

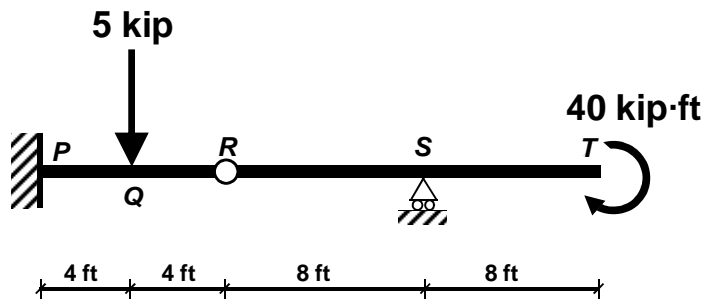


- 5) Find the reactions and member forces in the truss structure shown below. The truss has a pinned-support at B and a roller-support at D . A pair of downward concentrated loads of 40 kip are applied on the truss at joints A and C .

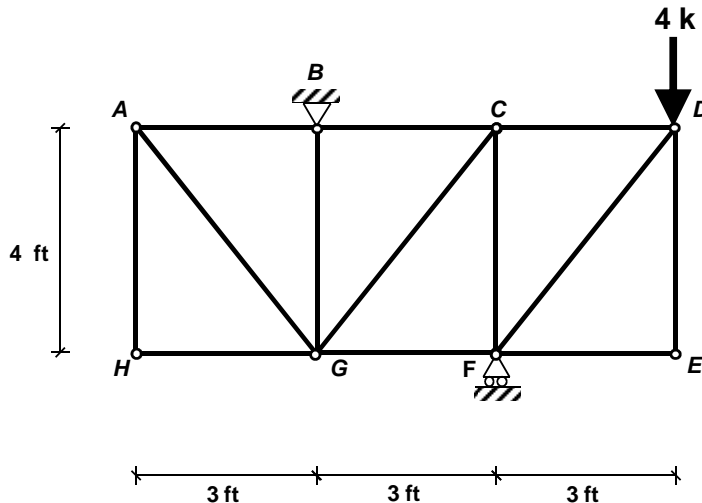


- 6) The beam shown below has a fixed-support at P , a roller-support at S , and an internal hinge at R . It is loaded with a 40 kip-ft clockwise external moment at its free end T and with a 5 kip downward concentrated load at Q which is half-way between the fixed-support and the internal hinge.

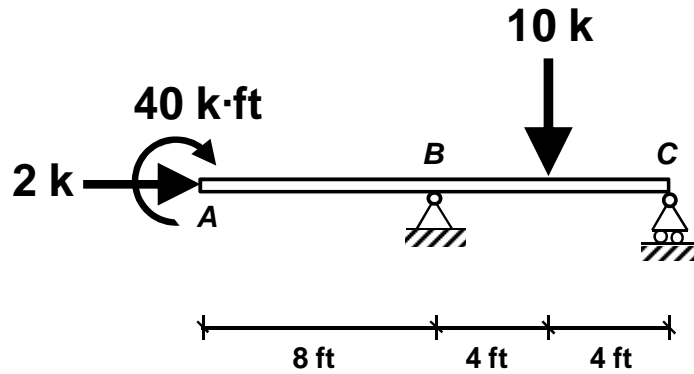
- Find the reactions at supports P and S .
- Draw the shear force diagram.
- Draw the bending moment diagram.



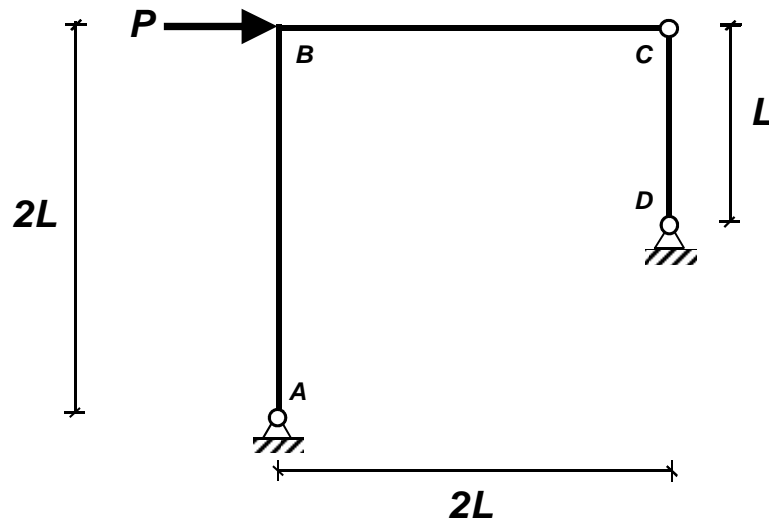
- 7) The truss shown below has a pinned-support at B and a roller-support at F . A 4k downwards point load is acting on the truss at node D . Find the forces in members AB , BC , and CD .



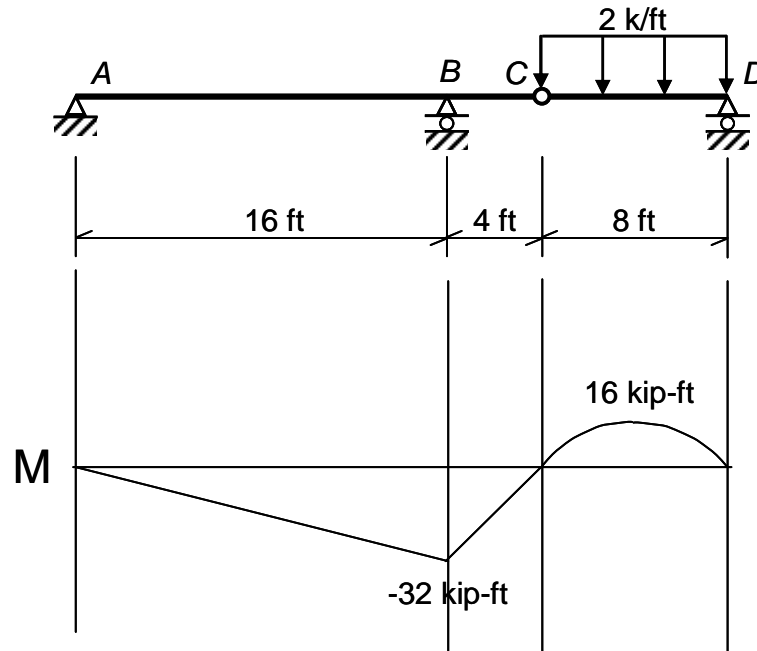
- 8) The beam shown below has a pinned-support at B and a roller-support at C . The beam is loaded at its free-end A with a horizontal point load ($2k$) and a moment ($40 k\cdot ft$), and at mid-point between B and C with a vertical point load ($10 k$), as illustrated.
- Find the support reactions.
 - Draw the axial force diagram.
 - Draw the shear force diagram.
 - Draw the bending moment diagram.
 - Sketch the deflected shape. Consider flexural response only; assume constant EI .



- 9) The portal frame shown below has pinned-supports at A and D . The joint at B is rigid. The frame has an internal frictionless hinge at C . A horizontal point load P is acting on the frame at B .
- Find the support reactions.
 - Draw the axial force diagram.
 - Draw the shear force diagram.
 - Draw the bending moment diagram.



- 10) Determine the rotation at B and the deflection at C. Note that the moment diagram for the original structure is given. EI is constant.



- 11) The beam $ABCD$ is made of two segments connected by an internal frictionless hinge at B . Segment AB has twice the EI of segment BCD , $2EI_0$ vs. EI_0 , as indicated on the figure below. The beam has fixed support at A and has an internal roller support at C . Consider flexural response only.

- a. Draw the bending moment diagram.

Find the following:

- the vertical displacement at B ;
 - the slope of the beam segment AB at just to the left of the frictionless hinge at B ;
 - the slope of the beam segment BCD at just to the right of the frictionless hinge at B ;
 - vertical displacement at D .
- f. Sketch the deflected shape.

