Engineering Mechanics

Unit IV – Analysis of Structures

MCQ'S

1. Which of the following statement is correct in regards to a two force member:
   a) **A two force member is a member that has forces acting on it at only two locations with no moments.**
   b) A two force member is a member that has forces acting on it at only two locations with moments.
   c) A two force member is a member which is acted upon by a point load anywhere on the member.
   d) A two force member is also called as multi-force member.
2. Which of the following figure is not showing a two-force member:

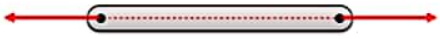


Fig.1

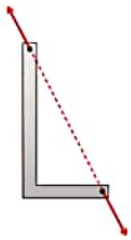


Fig.2

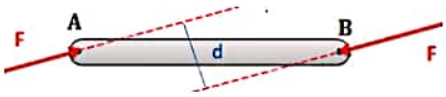


Fig. 3

   a) Both Fig. 1 and Fig. 2
   b) Only Fig. 2
   c) **Only Fig. 3**
   d) Both Fig. 2 and Fig. 3
3. Which of the following figure/s is/are showing two force member/s:

Fig. 1

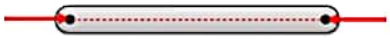


Fig. 2

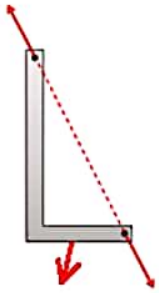
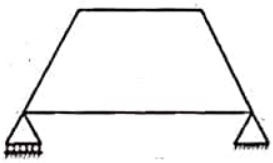


Fig. 3

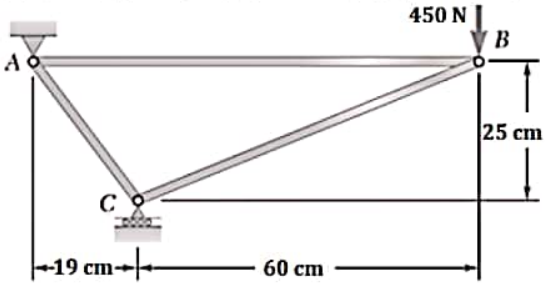
a) Fig. 1 only
b) Fig. 2 only
c) Both Fig. 1 and Fig. 3
d) Both Fig. 1 and Fig. 2

4. A two force member is subjected to:
   a) Only in axial tension
   b) Only in axial compression
   c) Either axial tension or axial compression
   d) Axial tension, axial compression and moment
5. A perfect truss satisfies which of the following equation (m = number of members, j = number of joints):
   a) $m < 2j - 3$
   b) $m = 2j - 3$
   c) $m > 2j - 3$
   d) $0 = 2j - 3$
6. An imperfect truss satisfies which of the following equation (m = number of members, j = number of joints):
   a) $m < 2j - 3$
   b) $m = 2j - 3$
   c) $m > 2j - 3$
   d) $0 = 2j - 3$
7. A truss shown in following figure is:

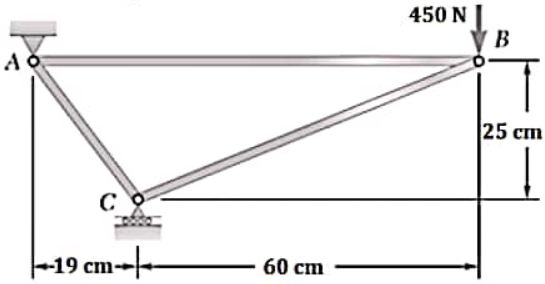


   a) Perfect truss
   b) Deficient truss
   c) Redundant truss
   d) None of the above
8. A truss with m = 11 and j = 6 is classified as:
   a) Perfect truss
   b) Deficient truss
   c) Redundant truss
   d) None of the above
9. Which of the following is not an assumption made in the analysis of truss:
   a) Members are connected at the joints through pin connections.
   b) All members are two force members i.e. members are subjected to either axial tension or compression.
   c) At least one member is a multi-force member.
   d) Truss is subjected to only concentrated loads applied at joints (panel points).

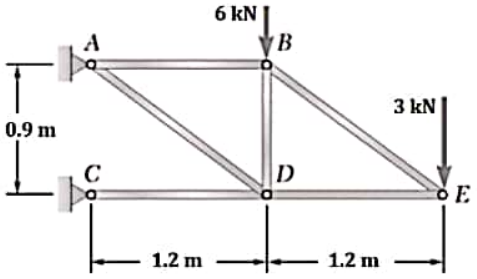
10. Method of section of analysis of truss is most efficient when:
    a) **The force in only one member or few members are desired.**
    b) The force in all members are desired.
    c) The reactions at support are desired.
    d) None of the above
11. Method of joint of analysis of truss is preferred when:
    a) The force in only one member or few members are desired.
    b) The force in all members are desired.
    c) The reactions at support are desired.
    d) None of the above
12. For the truss shown in figure below, the force in member AB = ……



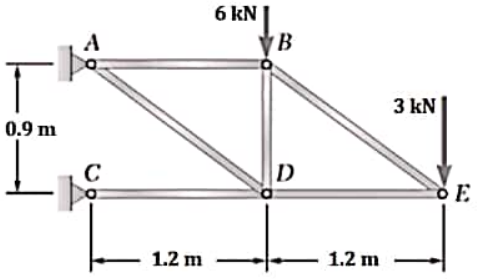
    a) 1080 N (C)
    b) 1080 N (T)
    c) 1170 N (C)
    d) 1170 N (T)
13. For the truss shown in figure below, the force in member BC = ……



    a) 1080 N (C)
    b) 1080 N (T)
    c) 1170 N (C)
    d) 1170 N (T)
14. For the truss shown below, if the force in member BE = 5 kN (T), determine the force in member BD.

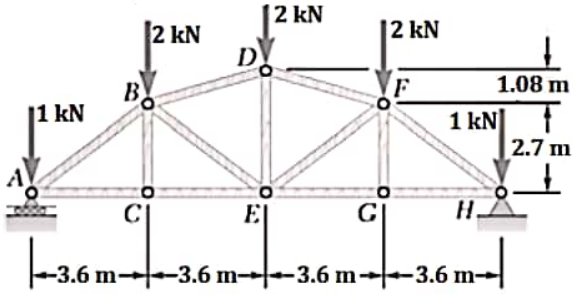


    a) 9 kN (C)
    b) 9 kN (T)
    c) 6 kN (C)
    d) 6 kN (T)
15. For the truss shown below, if the force in member BE = 5 kN (T), determine the force in member AB.



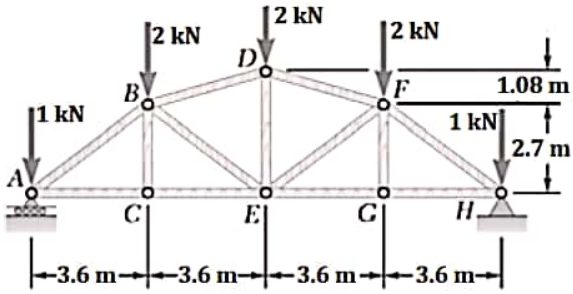
a) 9 kN (C)
b) 9 kN (T)
c) 4 kN (C)
d) 4 kN (T)

16. For the truss shown below, identify zero force members:



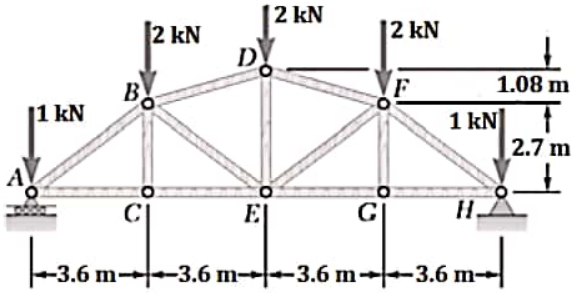
a) AC and GH
b) BC and FG
c) DE
d) BE and EF

17. For the truss shown below, if the force in member AB = 5 kN (C), determine the force in member AC.



a) 4 kN (T)
b) 3 kN (T)
c) 2 kN (T)
d) 6 kN (T)

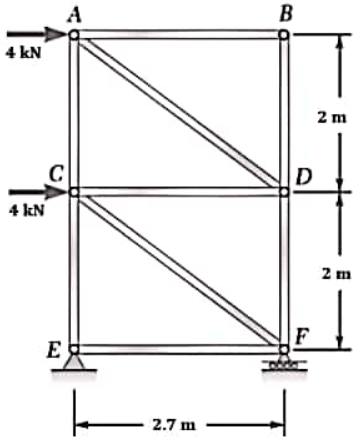
18. For the truss shown below, knowing that the force in member EG = 4 kN (T), determine the force in member GH.



a) 6 kN (T)
b) 0
c) 4 kN (T)

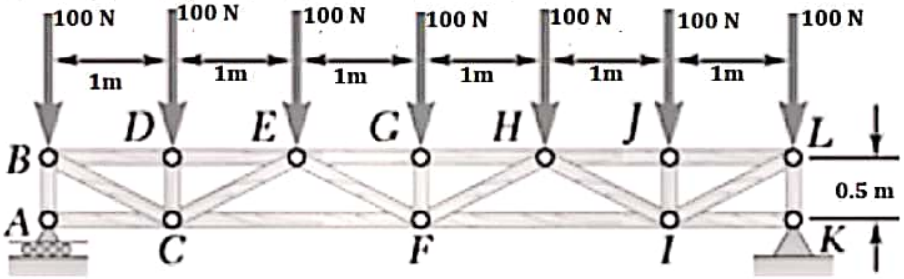
d) 3 kN (T)

19. For the truss shown in figure below, identify zero force members:



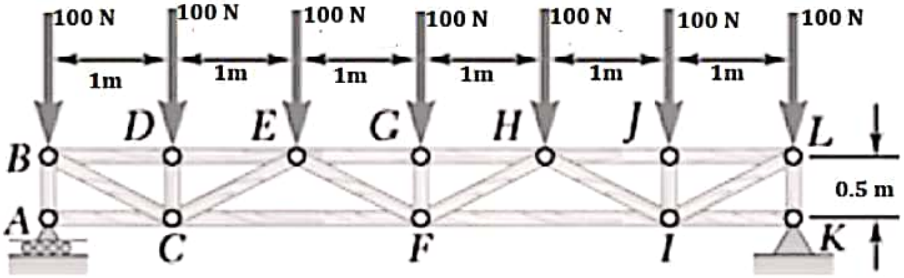
a) AB, BD, EF
b) AB, BD
c) AB, BD, EF, CE
d) AB, BD, AC

20. For the truss shown below, determine force in member BD:



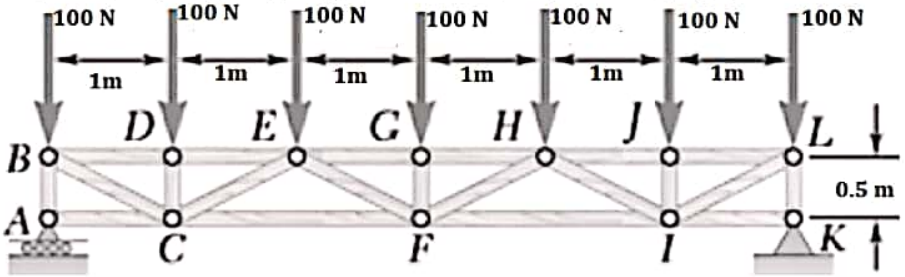
a) 100 N (C)
b) 500 N (C)
c) 350 N (C)
d) 0

21. For the truss shown below, determine force in member AC:



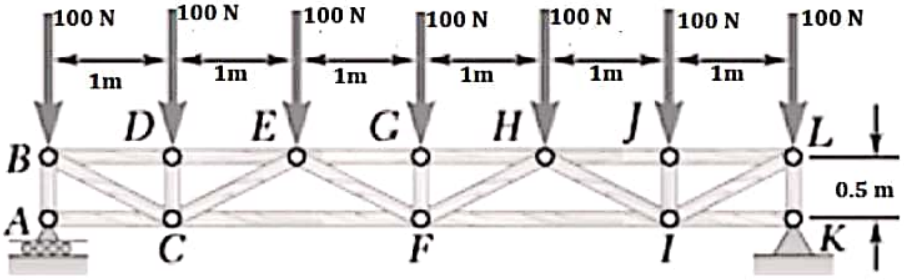
a) 100 N (C)
b) 500 N (C)
c) 350 N (C)
d) 0

22. For the truss shown below, determine force in member AB:



a) 100 N (C)
b) 500 N (C)
c) 350 N (C)
d) 0

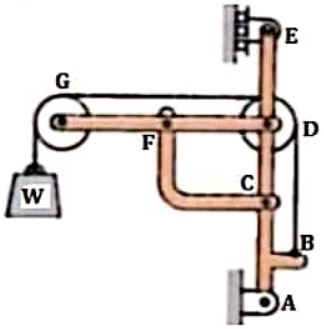
23. For the truss shown below, determine force in member CF:



a) 800 N (T)
b) 800 N (C)
c) 600 N (T)
d) 600 N (C)

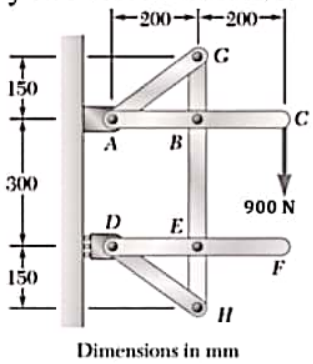
24. In frames, there is/are ……
a) at least one Multi-force member
b) all two force members
c) all are multi-force members
d) may be (a) or (c)

25. For the frame shown below, identify two force member/s:



a) ACE, CF
b) ACE, DFG
c) DFG, CF
d) CF

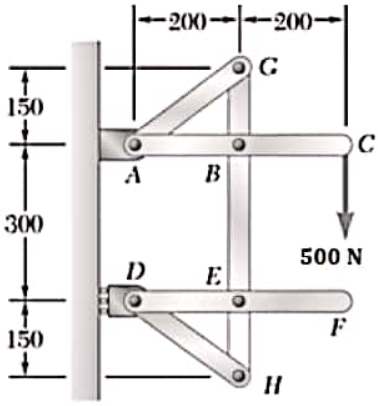
26. For the frame shown below, identify two force member/s:



Dimensions in mm

a) AG, DH, ABC
b) AG, DH
c) AG, DH, DEF
d) No two-force member/s

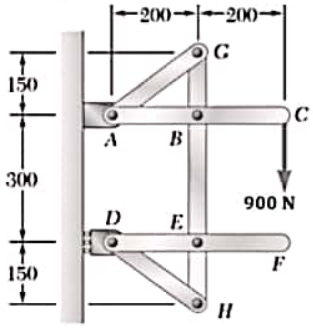
27. For the frame shown below, determine the magnitude of reaction at roller support D:



Dimensions in mm

a) 200.67 N
b) 899.27 N
c) 666.67 N
d) 1400.89 N

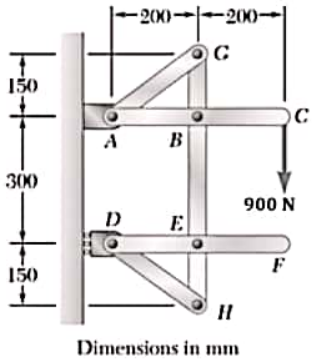
28. For the frame shown below, if the reaction at roller support D is 1200 N (rightward), the magnitude of resultant reaction at A = ……N.



Dimensions in mm

a) 1200
b) 1500
c) 900
d) 2500

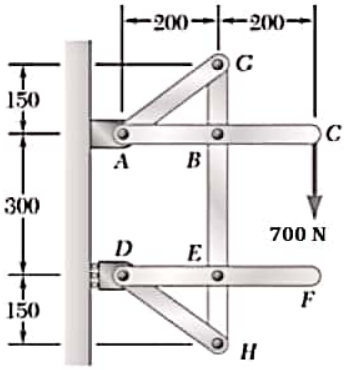
29. For the frame shown below, if the reaction at roller support D is 1200 N (rightward), determine the force in member in DH.



Dimensions in mm

a) 800 N
b) 400 N
c) 100 N
d) 0

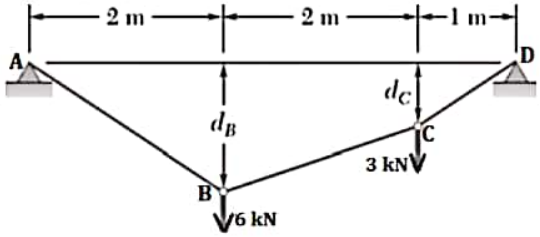
30. For the frame shown below, knowing that the support reaction at roller support D = 933.33 N (rightward), horizontal and vertical components of reaction at A as 933.33 N (leftward) and 700 N (upward), respectively, determine the force in member AG.



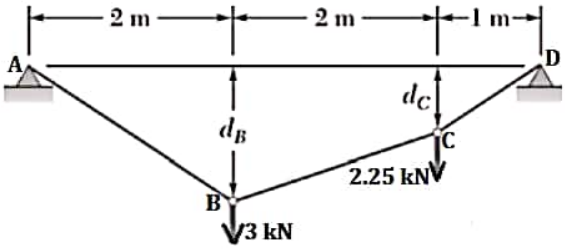
Dimensions in mm

a) 2333.33 N (C)
b) 3333.33 N (C)
c) 1333.33 N (C)
d) 4333.33 N (C)

31. Which of the following assumption is wrong in the analysis of cables:
    a) Any portion of the cable between successive loads is subjected to a force of tension directed along the cable.
    b) Any portion of the cable between successive loads is subjected to a force of compression directed along the cable.
    c) Cable is flexible, that is, its resistance to bending is small and can be neglected.
    d) The weight of the cable is negligible compared to the loads supported by the cable.
32. For a cable supporting vertical loads only, which of the following statement is correct:
    a) the horizontal component of the tension force is the same at any point.
    b) the horizontal component of the tension force is not same at any point and it depends on slope of cable.
    c) Both (a) and (b)
    d) None of the above
33. For a cable supporting vertical loads only, which of the following statement is correct:
    a) The maximum tension occurs in the cable having minimum slope.
    b) The minimum tension occurs in the steepest cable.
    c) the maximum tension occurs in the steepest portion of the cable
    d) none of the above
34. For the cable *ABCD,* knowing that $d_C = 0.89$ m and $d_B = 1.5$ m, the maximum tension will occur in which portion of the cable:

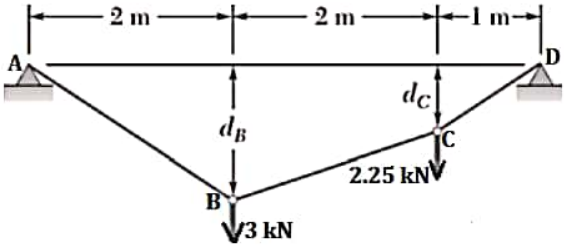


    a) AB, CD
    b) AB, BC
    c) AB
    d) CD
35. For the cable *ABCD,* knowing that $d_C = 0.75$ m and $d_B = 1.125$ m, the magnitude of reaction at $A =$ ..... kN.



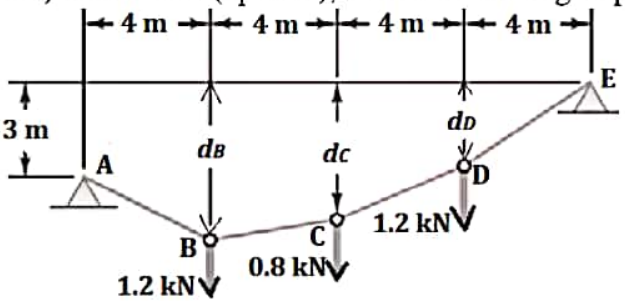
a) 6.85
b) 4.59
c) 5.09
d) 10.78

36. For the cable *ABCD*, knowing that $d_C = 0.75$ m and $d_B = 1.125$ m, the magnitude of reaction at $D =$ ..... kN.



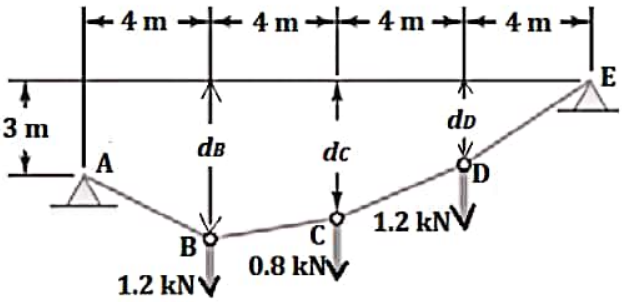
a) 5.00
b) 8.25
c) 4.65
d) 3.25

37. For the cable *ABCDE*, knowing that $d_C = 4$ m, vertical and horizontal components of reactions at E are 3.2 kN (rightward) and 2.2 kN (upward), determine the sag of point D, d_D.



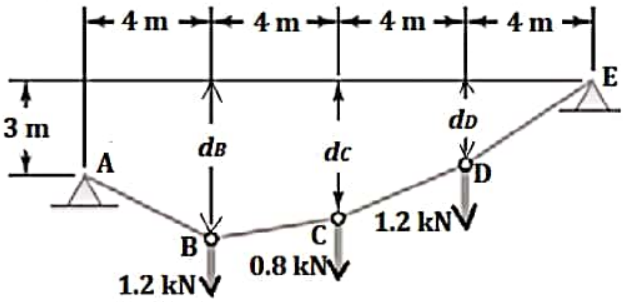
a) 1.87 m
b) 3.15 m
c) 2.75 m
d) 3.89 m

38. For the cable *ABCDE*, knowing that $d_C = 4$ m, $d_B = 4.25$ m, determine the magnitude of reaction at A.



a) 4.75 kN
b) 3.35 kN
c) 1.89 kN
d) 6.25 kN

39. For the cable *ABCDE*, knowing that $d_C = 4$ m, $d_B = 4.25$ m, determine the tension in portion BC.



a) 3.21 kN
b) 4.58 kN
c) 2.21 kN
d) 1.29 kN