

Level : B.E./B.Tech.
Year : III

Course : CIEG 305
Semester: I

Exam Roll No.:

Time: 30 mins.

F.M. : 10

Registration No.:

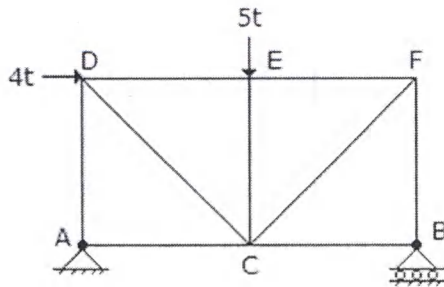
Date

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SECTION "A"

[20 Q.×0.5=10 marks]

1. The force in BF of the truss shown in given figure, is:

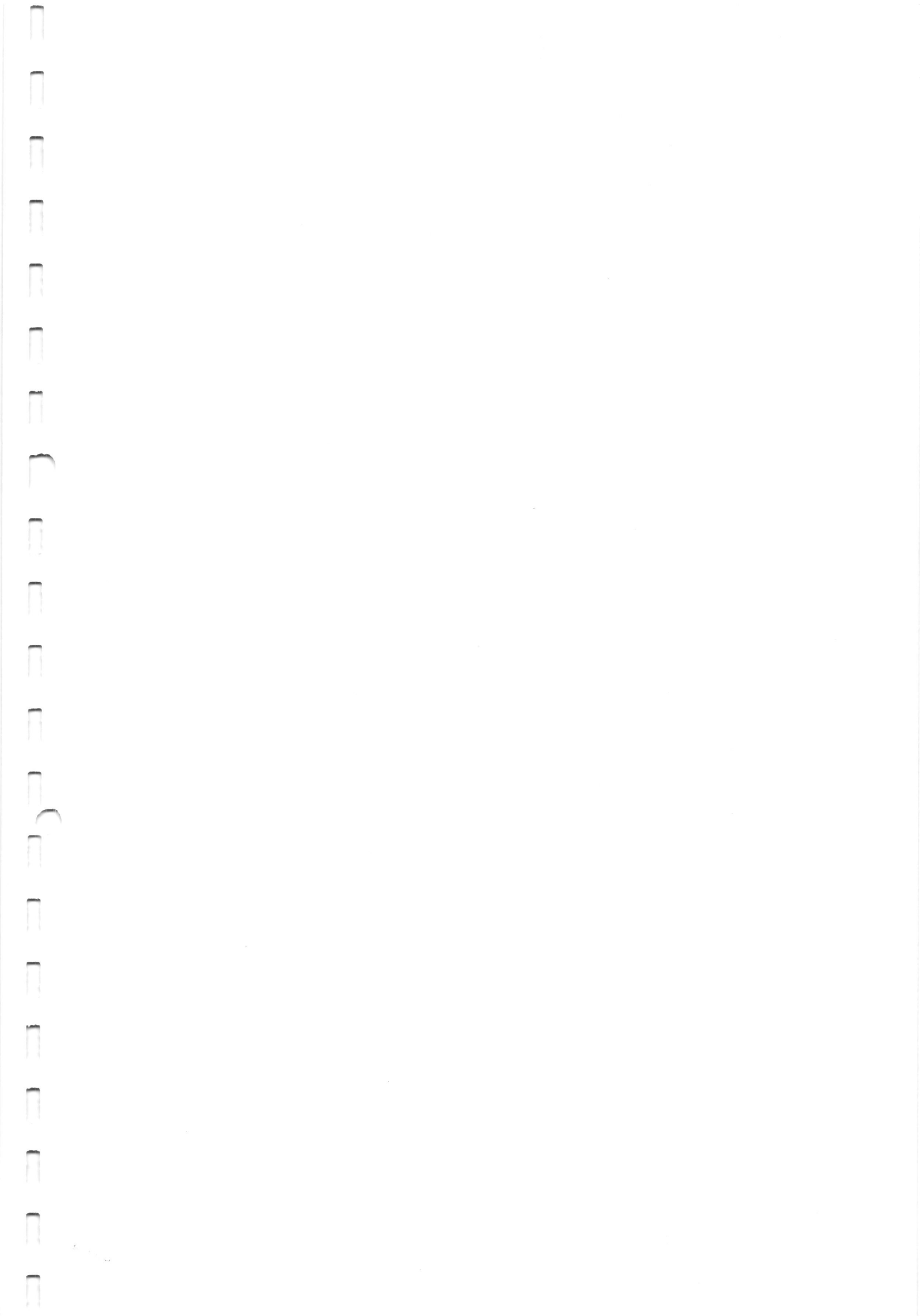


- a. $4t$ tension
b. $4.5t$ tension
c. $4t$ compression
d. $4.5t$ compression
2. A simply supported beam carries varying load from zero at one end and W at the other end. If the length of the beam is a , the maximum bending moment will be
a. $Wa/27$ b. $W^2a/\sqrt{27}$ c. $Wa^2/27$ d. $W^2a/9\sqrt{3}$
3. Beams composed of more than one material, rigidly connected together so as to behave as one piece, are known as
a. Compound beams c. Indeterminate beams
b. Determinate beams d. Composite beams
4. The ratio of the deflections of the free end of a cantilever due to an isolated load at $1/3$ rd and $2/3$ rd of the span, is:
a. $1/7$ b. $3/7$ c. $2/7$ d. $2/5$
5. A three hinged arch is generally hinged at its supports and
a. at one quarter span
b. at the crown
c. anywhere in the rib
d. at the location where the sum of moment is equal to zero
6. A simply supported beam which carries a uniformly distributed load has two equal overhangs. To have maximum B.M. produced, the ratio of the length of the overhang to the total length of the beams is:
a. 0.407 b. 0.207 c. 0.508 d. 0.307
7. The conjugate beam of a cantilever with end A fixed and end B is free is:
a. End A fixed end B free c. End A hinged end B free
b. End A free end b hinged d. End A is free end B is fixed

8. The maximum bending moment at 6 m from end A in a simply supported beam of span 15 m due to a moving udl, spanning 5 m occurs when the tail of load is at _____ distance from A.
- a. 1.8 m b. 2.4 m c. 2.0 m d. 4.0 m
9. A parabolic arch has springings A and B at different levels. The height of crown point C from A is h_1 and from B is h_2 . If L is span, the horizontal distance of AC is:
- a. $\frac{L\sqrt{h_2}}{\sqrt{h_1+h_2}}$ b. $\frac{L\sqrt{h_2}}{\sqrt{h_1+\sqrt{h_2}}}$ c. $\frac{L\sqrt{h_1}}{\sqrt{h_1+h_2}}$ d. $\frac{L\sqrt{h_1}}{\sqrt{h_1+\sqrt{h_2}}}$
10. A circular arch of span 25 m with a central rise 5 m is hinged at the crown and springings. It carries a point load of 100 kN at 6 m from the left support. In this case the horizontal thrust is:
- a. 45 kN b. 75 kN c. 60kN d. 90 kN
11. A single rolling load of 8kN rolls along a simply supported girder of span 15 meters. The absolute maximum bending moment will be:
- a. 8 b. 15 c. 30 d. 60
12. The principle of virtual work can be applied to elastic system by considering the virtual work of:
- a. Internal forces only b. External forces only
c. Internal as well as external forces d. Stresses causing Deflection
13. The ratio of the maximum deflections of a simply supported beam with central load W to that of a cantilever of same length and with a load W at its free end is:
- a. 1/8 b. 1/10 c. 1/14 d. 1/12
14. The maximum tension in a cable occurs at the:
- a. Highest point in the cable c. Lowest point in the cable
b. Centre point of the cable d. At all points in the cable
15. Horizontal reaction in a cable chord of span L having supports at same level and central dip y, subjected to a uniformly distributed load of w is given by:
- a. $wL^2/8y$ b. $wL^2/4y$ c. $wL^2/6y$ d. $wL^2/2y$
16. The influence line diagram for shear force or bending moment at a section is:
- a. The value of SF or BM at that section when the unit load is placed over that section only
b. The value of SF or BM at that section when the unit load is at the centre of the span
c. The variation in the value of SF or BM at that section as the unit load traverses the span from left to right
d. The SF or BM
17. Bending moment at a central span of a cable having length of 10 m, carrying a uniformly distributed load of 10kN/m is:
- a. 0 b. 100 kNm c. 50 kNm d. 200 kNm
18. If there are m unknown member forces, r unknown reaction components and j number of joints, then the degree of static indeterminacy of a pin jointed plane frame is given by:
- a. $m + r + 2j$ b. $m + r - 2j$ c. $m - r + 2j$ d. $m + r - 3j$

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19. When a uniformly distributed load, longer than the span of the girder, moves from left to right, then the maximum bending moment at mid-section of span occurs when the uniformly distributed load occupies:
- a. Less than the left half span
 - b. More than the left half span
 - c. Whole of left half span
 - d. Whole span
20. The deflection at any point of a perfect frame can be obtained by applying a unit load at the joint in:
- a. Vertical direction
 - b. Horizontal direction
 - c. Inclined direction
 - d. The direction in which the deflection is required



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SECTION "B"

Attempt *ALL* questions.
 Assume suitable data wherever necessary.

1. Determine the vertical deflection at point D of the frame loaded as shown in figure 1 (Use virtual work method.) [8]

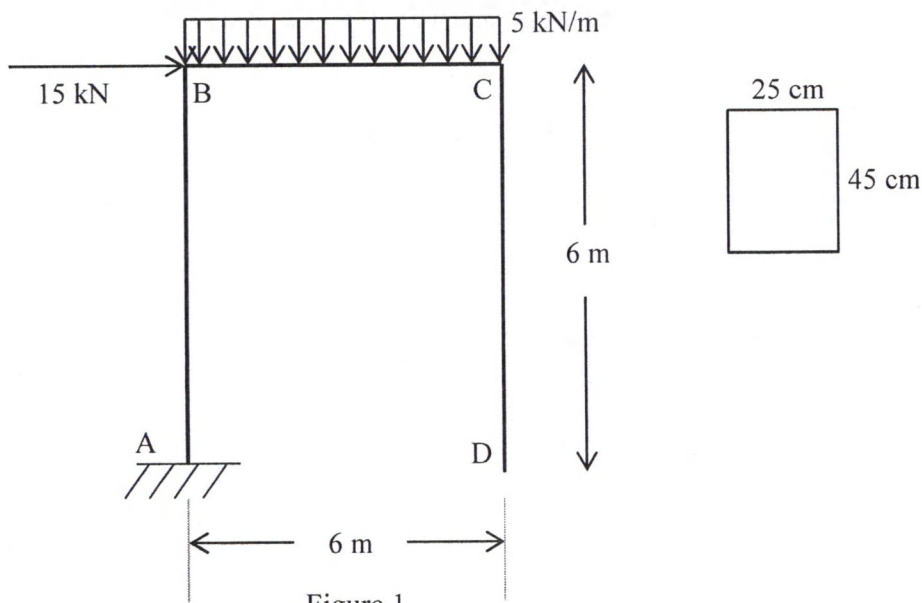


Figure 1

2. Three hinged parabolic arch having span 80m is loaded as shown in figure 2. The inclined 250 kN load shown, acts at quarter span of the arch. Determine bending moment, normal thrust and radial shear force at section D. [8]

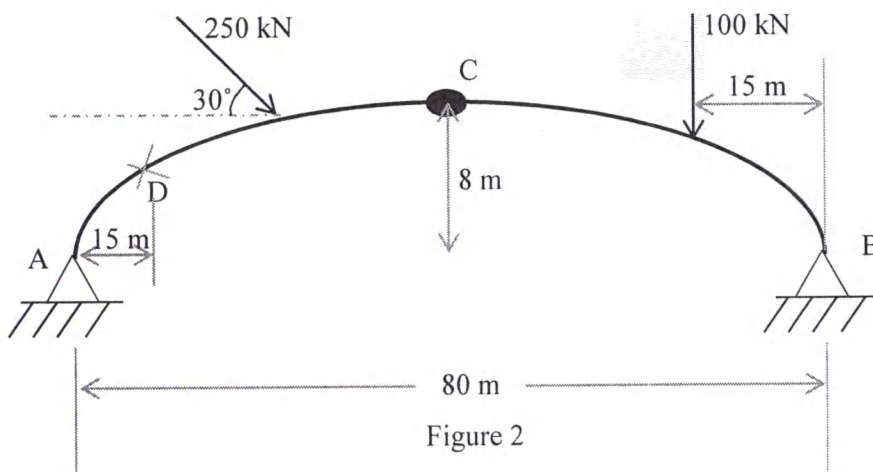
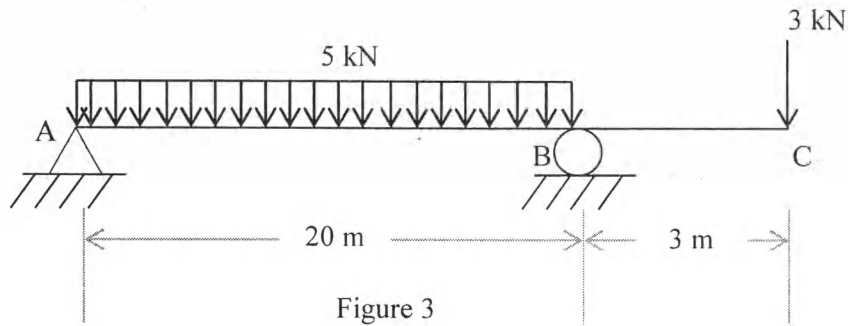


Figure 2

3. A suspension cable bridge has a three hinged girder supported by two cables. The roadway is 6 m wide. The girder has its self-weight 5 kN/m^2 . The live load consists of two concentrated loads 200 kN and 150 kN acting at 20 m and 30 m respectively from the left support. The span is 120 m and central dip is 12 m. the live loads are acting at the central of the girder. Determine shear force and bending moment at section 25 m from left support of the girder. Also determine required cross sectional area of the cable if the allowable tensile stress of cable material is 120 N/mm^2 . [8]
4. Determine the slopes at supports and deflection at E (5 m from support A) of the beam given in figure 3. Use conjugate beam method. [8]



5. Draw the influence line diagrams for reactions at supports A, B, and bending moment at midpoint of span AB for the beam shown in figure 4. Find their maximum values when a travelling load of 20 kN per meter may cover any part of the span. [8]

