

KATHMANDU UNIVERSITY
End Semester Examination
February/March, 2019

Marks Scored:

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

Course : CIEG 305
Semester : I

Exam Roll No.:

Time: 30 mins.

F.M. : 10

Registration No.:

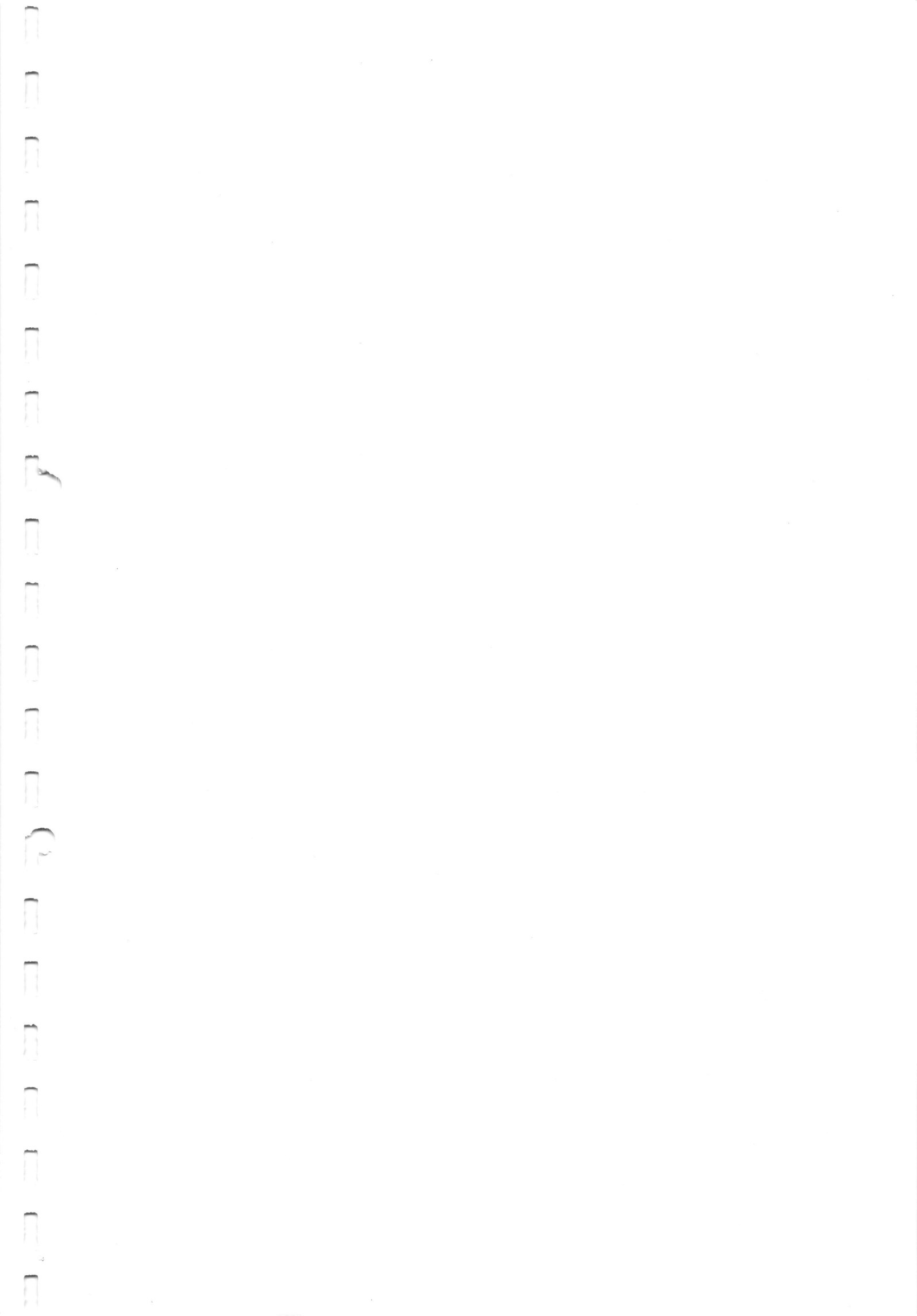
Date FEB 27 2019

SECTION "A"

[20 Q.×0.5=10 marks]

Encircle the most appropriate answer among the given choices.

- A rigid prop is one which _____.
 - permits 50% of free deflection, that would have occurred if the prop were not there.
 - does not permit any displacement perpendicular to the plane of prop.
 - does not offer any reaction.
 - supports the entire load and relieves all other supports completely.
- In moment area method, for finding deflection at a section in a beam _____.
 - the position of at least one tangent to the elastic curve, at any section, should be known.
 - the M/EI diagram must be a triangle.
 - the beam must be of uniform moment of inertia.
 - the BM diagram if known is sufficient.
- The loading on the conjugate beam will be _____.
 - loading on the real beam divided by EI .
 - BM diagram multiplied by EI .
 - BM diagram divided by SF diagram.
 - BM diagram divided by EI .
- The basic form of a pin jointed frame is _____.
 - triangle
 - rectangle
 - trapezium
 - parallelogram
- Two inclined struts connected by a hinge at the ends and supporting a load at the joint cannot be supported over two masonry walls because _____.
 - the walls cannot bear the compress stress.
 - the walls cannot take up horizontal component since tension develops due to bending.
 - the walls get crushed due to lateral thrust.
 - the struts will get crushed.
- In a pin jointed frame all the loads are assumed to act _____.
 - in the plane of the frame.
 - perpendicular to the plane of the frame.
 - in the plane inclined at 45 degrees to the plane of frame.
 - any angle to the plane of the frame.



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Level : B.E./B.Tech.
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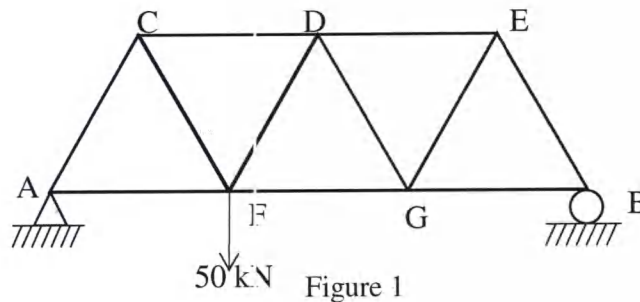
Course : CIEG 305
Semester : I
F.M. : 40

SECTION "B"

Attempt *ALL* questions.

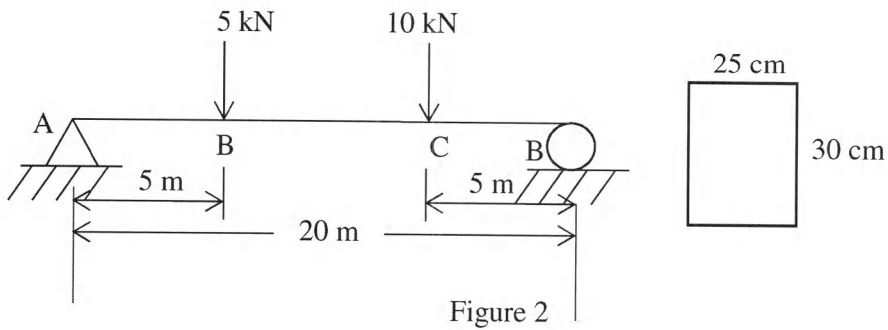
Assume suitable data wherever necessary.

1. Determine the vertical deflection of joint E of the truss shown in Figure 1, due to given loading, using Virtual Work method. Given for all members, length of each chord is 2 m, cross sectional area = 100 mm^2 , Young's modulus = 200 kN/mm^2 . [10]



2. A three hinged parabolic arch ACB is hinged at the supports A and B which are below the crown hinge C by 3 m and 6.75 m respectively. The span of the arch is 22.5 m. The arch carries a uniformly distributed load of 30 kN/m from A to C. Find the reactions at the supports, radial and tangential thrusts at 5m from support A and the maximum positive and negative bending moments. [8]
3. A suspension cable bridge has a three hinged girder supported by two cables. The roadway is 7.5 m wide. The girder has its self-weight 4.5 kN/m^2 . The live load consists of two concentrated loads 100 kN at 15 m and 200 kN at 30 m from left support. The span is 120 m and central dip is 12 m. The live loads are acting at the centre 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 10 m from support A of the beam given in Figure 2. Cross Section of the beam is given in the figure and $E = 200 \times 10^6 \text{ kN/m}^2$. Use moment area 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 3. Find their maximum values when a travelling load of 6 kN per meter may cover any part of the span. [6]

