Graphic Era HILL UNIVERSITY
Established by an Act of the State Legislature of Uttarakhand (Adhiniyam Sankhya 12 of 2011)
University under section 2(f) of UGC Act, 1956

End Term (Odd) Semester Examination November 2025

Roll no.....

Name of the Course and semester: **B. Tech, Vth Semester**
Name of the Paper: **Advanced Structural Analysis**
Paper Code: **TCE 501**

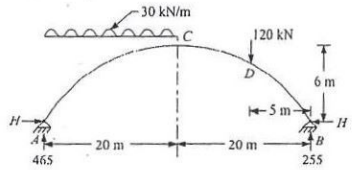
Time: 3 hour Maximum Marks: 100

Note:

(i) All the questions are compulsory.
(ii) Answer any two sub questions from a, b and c in each main question.
(iii) Total marks for each question is 20 (twenty).
(iv) Each sub-question carries 10 marks.

Q1. (2X10=20 Marks)

a. A two-hinged parabolic arch is loaded as shown in Fig. Determine the (i) horizontal thrust, (ii) maximum positive and negative moments,(iii) shear force and normal thrust at 10 m from the left support. CO1

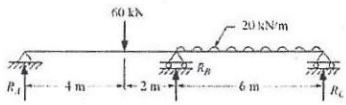


b. A suspension bridge of span 80 m and width 6 m is having two cables stiffened with two, hinged girders. The central dip of cables is 8 m, the dead load on the bridge is 5 kN/m² and the live load is 10 kN/m² which covers the left-half of the span. Determine the shear force and bending moment at 20 m from the left end. Find also the maximum tension in the cable. CO1

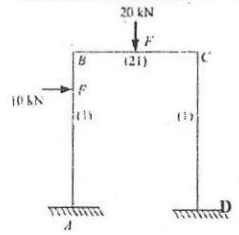
c. A suspension cable, 100 m span and 12 m dip is stiffened with a two-hinged girder. The girder carries a dead load of 10 kN/m over entire span and a concentrated load of 800 kN at 40 m from left support. Determine the maximum tension in the cable and shear force and bending moment at a section 30 m left support. CO1

Q2. (2X10=20 Marks)

a. Determine the reaction components in the continuous beam by Force Method. EI is constant throughout. CO2



b. Analyze the frame as shown in Fig. by consistent deformation method CO2



c. Analyze the following Truss by consistent deformation method (Force Method) CO2

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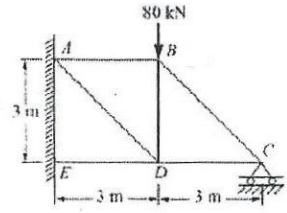
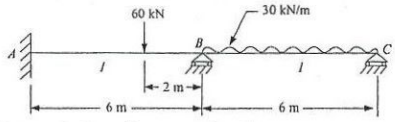
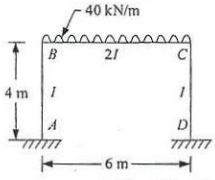


Q3. (2X10=20 Marks)

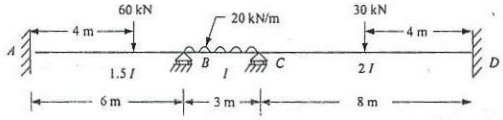
a. Analyze the continuous beam as shown in Fig. by slope deflection method CO3



b. Analyse the following frame by slope deflection method CO3

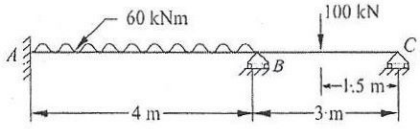


c. Analyze the following continuous beam by moment distribution method. CO3

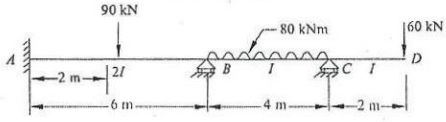


Q4. (2X10=20 Marks)

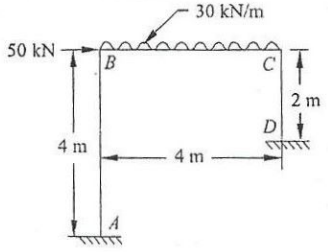
a. Analyze the following beam by stiffness matrix method. CO4



b. Analyze the following beam by stiffness matrix method. CO4



c. Analyze the following frame by stiffness matrix method. CO4



Q5. (2X10=20 Marks)

a. Write the assumptions for Plastic Theory CO5

b. Find the shape factor for rectangular section and circular cross section of a beam CO5

c. Determine the collapsible load for propped cantilever beam carrying UDL in entire span L. CO5