Reg. No.											

INTERNATIONAL CENTRE FOR APPLIED SCIENCES
(Manipal University)
IV SEMESTER B.S. DEGREE EXAMINATION - MAY 2016
SUBJECT: STRUCTURAL ANALYSIS (CE 242)
18TH MAY, 2016

Time: 3 Hours **Max. Marks: 100**

- ✓ **Answer ANY FIVE full Questions.**

1A. Explain moment area method for determining slope and deflection in beams. **(5 marks)**

1B. Find the slope and deflection at B for the cantilever beam shown in Fig. Q. No. 1B using conjugate beam method. Take E = 200 GPa, I = 6 X 10^{-6} m^4. **(15 marks)**

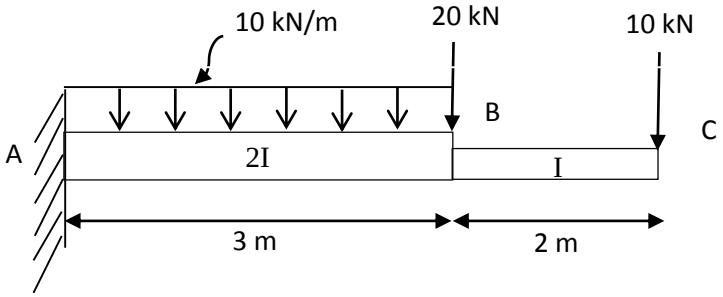

Fig. Q. No. 1B.

2. Using the unit load method, find the vertical deflection of the joint E for the truss shown in Fig. Q. No. 2. The cross sectional area of each member is 1500 mm^2. Take E = 200 GPa. **(20 marks)**

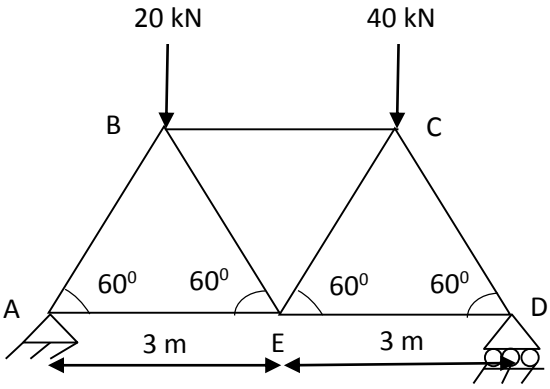

Fig. Q. No. 2.

3. A three hinged parabolic arch of span 20 m and rise 4 m carries a uniformly distributed load of 20 kN/m run on the left half of the span. Find the axial thrust and radial shear at a section 5m from the right support. Determine the maximum bending moment in left half of the span. Also, draw the BMD. **(20 marks)**

4A. Determine the vertical deflection at C in the right angled bend shown in Fig. Q. No. 4A using strain energy method due to bending. Take E = 200 GPa, I = 47.54 X 10^{-6} m^4. **(10 marks)**

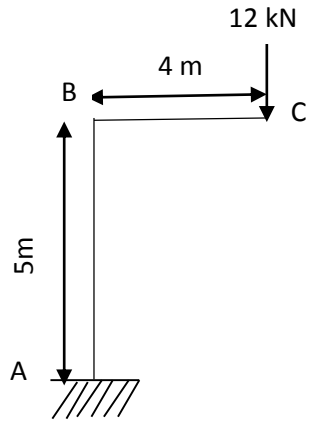

Fig. Q. No. 4A.

4B. Using Castigliano's theorem prove that deflection at mid span of a simply supported beam of span 'L' loaded with UDL W/m over full span is ($5WL^4/384EI$)

(10 marks)

5. A continuous beam is loaded as shown in Fig. Q. No.5A. Analyze the beam by Castigliano's method. Draw BMD. **(20 marks)**

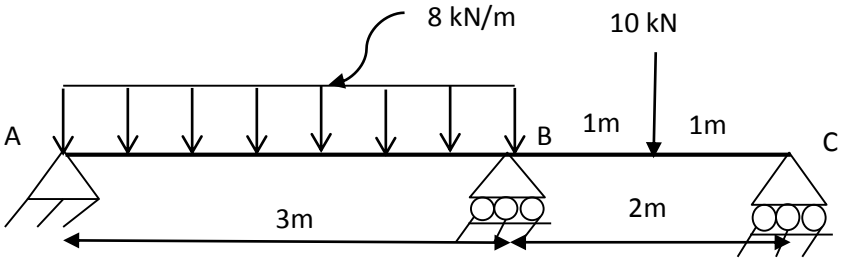

Fig. Q. No.5A.

6. A propped cantilever beam of span 8 m carries a uniformly distributed load of 15 kN/m run on the left half of the span and a concentrated force of 20 kN at 2 m from the right hand support. Analyze the beam using consistent deformation method. Draw BMD. **(20 marks)**

7. Obtain the end moments of the frame shown in Fig. Q. No. 7 by slope deflection method.

(20 marks)

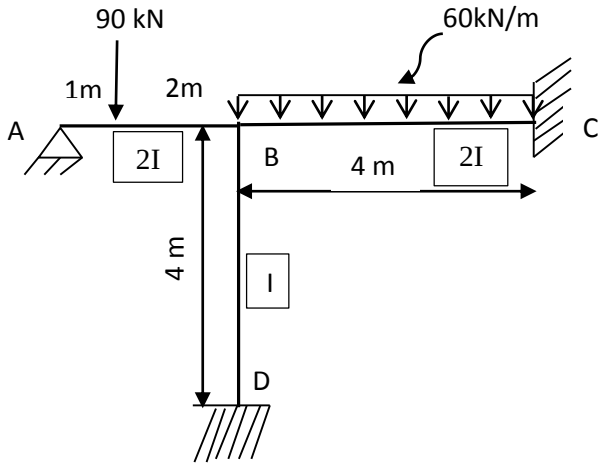

Fig. Q. No. 7.

8. Obtain the end moments of the continuous beam shown in Fig. Q. No. 8 by moment distribution method. **(20 marks)**

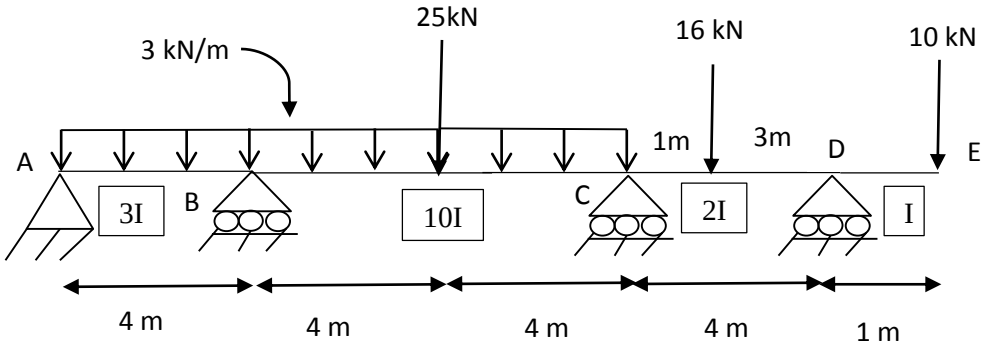

Fig. Q. No. 8.