Code: 13A01404

R13

B.Tech II Year II Semester (R13) Regular Examinations May/June 2015

STRUCTURAL ANALYSIS – I

(Civil Engineering)

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory Question)

*****

1 Answer the following: (10 X 02 = 20 Marks)

(a) Write about advantages of fixed beams.
(b) Write equations for slope and deflection of fixed beam with point load at centre.
(c) Write slope deflection equation to find moments of each member of span AB.
(d) Define stiffness.
(e) Define strain energy.
(f) Define Castigliano's I theorem.
(g) Define absolute maximum shear force.
(h) Explain about influence lines.
(i) What is kinematic indeterminacy?
(j) What is redundant frame?

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

2 (a) Derive an expression to find BM and SF of fixed beam carrying an eccentric load.

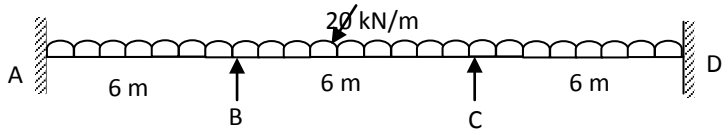
(b) A load of 3 kN is placed at the centre of fixed beam of length 4m. If E = 2 × 10^6 N/cm^2 and I = 20000 cm^4, determine the end moments and BM at centre as simply supported beam and deflection under load.

OR

3 Determine fixed and moments of a fixed beam of span 4 m. If support at right end sinks by 1 cm due to UDL of 1500 N/m. I = 40000 cm^4, E = 2 × 10^6 N/mm^2.

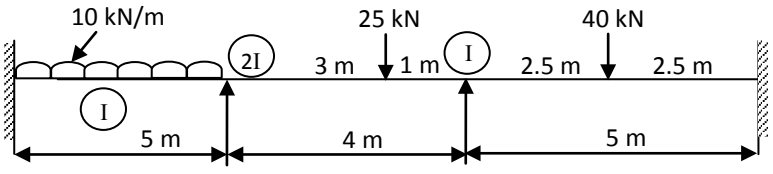
UNIT – II

4 Analyze the continuous beam shown in figure below by slope deflection method and sketch SFD and BMD. EI is constant.



OR

5 Analyze the continuous beam shown in figure below by moment distribution method and sketch BMD.

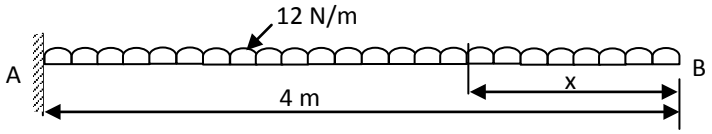


Contd. in page 2

UNIT – III

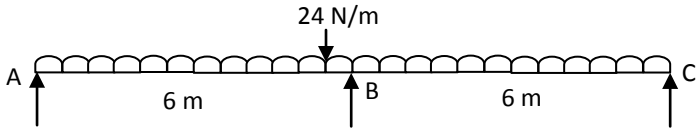
6 (a) Determine the deflection at the free end of a cantilever lever beam of span L.

(b) Determine the deflection of a cantilever as shown in figure below at its free end. Take EI = 12000 Nm^2.



OR

7 Analyze the continuous beam shown in figure below by strain energy method. EI is constant.

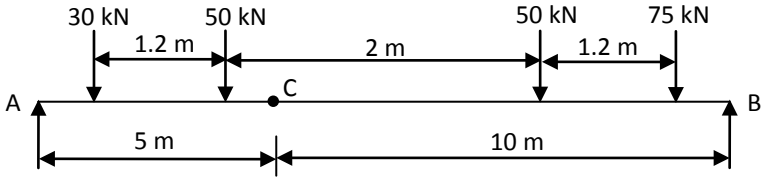


UNIT – IV

8 A UDL of length of 5 m and intensity 25 kN/m moves across a simple beam of span 30 m. Determine the maximum negative and positive SF and maximum BM at 3 m, 7 m and 12 m from left support. Draw maximum SFD and BMD.

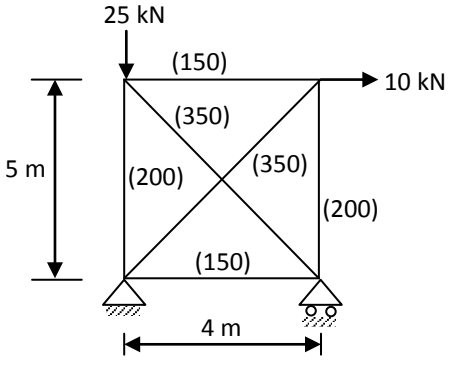
OR

9 A simple beam of span 15 m with a series of loads as shown in figure below. Determine the absolute maximum moment using the influence wise.



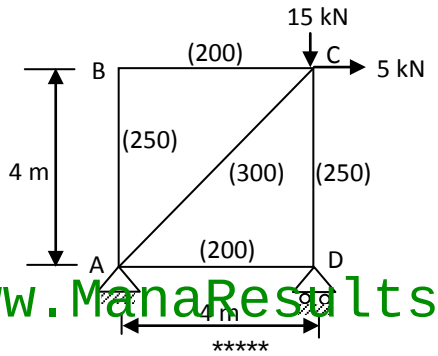
UNIT – V

10 Analyze the truss shown in figure below by Castigliano's theorem. Area of cross section of members in mm^2 is shown in brackes. E is constant throughout.



OR

11 Determine the vertical displacement of the joint B and the relative displacement of the joints A and C is the pin-jointed plane frame shown in figure below, E = 2 × 10^5 MPa. Areas are indicated alongside the members.



*****