

15635

Name: .....

Reg. No. ....

FOURTH SEMESTER B.TECH. DEGREE EXAMINATION, DECEMBER 2018

CE.09.404/PTCE.09.403 – Structural Analysis  
(2009 Admission)

Time: Three hours



**PART - A**  
(Answer all questions)

1. What is principle of virtual work?
2. State Maxwell's reciprocal theorem.
3. Differentiate force and displacement methods.
4. State Muller Breslau's principle.
5. What is Eddy's theorem?

(5x2=10 marks)

**PART - B**  
(Answer any four)

1. Derive expression for strain energy due to bending.
2. Explain static and kinematic in determinancies with examples.
3. Explain internal and external redundancies of trusses.
4. Draw ILD for Reactions; SF and BMD for simply supported beams.
5. Explain absolute max. B.M.
6. Determine the horizontal thrust at supports of a three hinged arch parabolic carry u.d.l on half span.

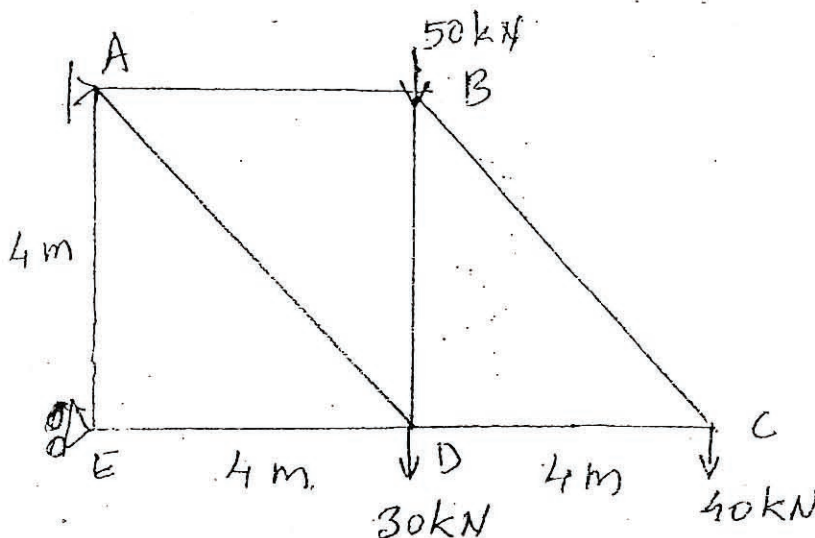
(4x5=20 marks)

**PART - C**

1. Determine the support reactions of a two span continuous beam of equal span carrying u.d.l by Castigliano's theorem.

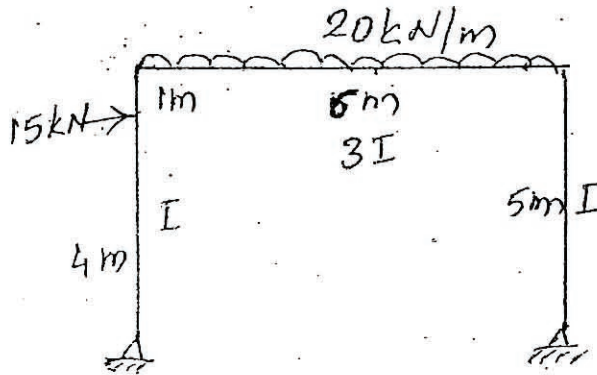
OR

2. Determine the vertical deflection of C of the truss shown in figure (i). The C/S areas of horizontal members are  $3000 \text{ mm}^2$ ; vertical members  $4000^2$ ; inclined members  $5000 \text{ mm}^2$ ,  $E = 2 \times 10^5 \text{ N/mm}^2$ .



(Fig-1)

3. Analyse the frame shown in figure (2) by consistent deformation method.



(Fig - 2)

OR

4. A square section bar with 5 cm side is curved to a mean radius of 12 cm. Find the maximum bending stress if the bar is subjected to a bending moment of 500 Nm tending to reduce curvature.
5. Uniform load of 25 kN/m and 6 m long crosses a girder of span 30 m. Determine the max. SF and BM at sections 5 m, 10 m, and 15 m from left end. Draw max. SFD and BMD.

OR

6. A train of wheel loads 10kN, 8kN, 12kN, 15kN and 25kN moves on a girder of span 20 m with 25kN load leading. Distance between each load is 2 m. Find the absolute maximum bending moment.

7. A light flexible cable 18m long is supported at two ends at same level. The supports are 16 m apart. The cable is subjected to a u.d.l of 1kN/m over its entire span. Find the reactions at supports.

OR

8. A segmental arch has a span of 40 m and rise of 8 m hinged at ends carries a load of 100 kN at crown. Determine the horizontal thrust and max. B.M.

(4x10=40 marks)