Reg. No._____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FOURTH SEMESTER B.TECH DEGREE EXAMINATION, MAY 20

Course Code: **CE202**

Course Name: **STRUCTURAL ANALYSIS – I (CE)**

Max. Marks: 100 Duration: 3 Hours

PART A

Answer any TWO questions. 15 marks each.

1. a) Enumerate the methods of analysing a determinate truss and illustrate along with sketches, the significance of the methods. (7)

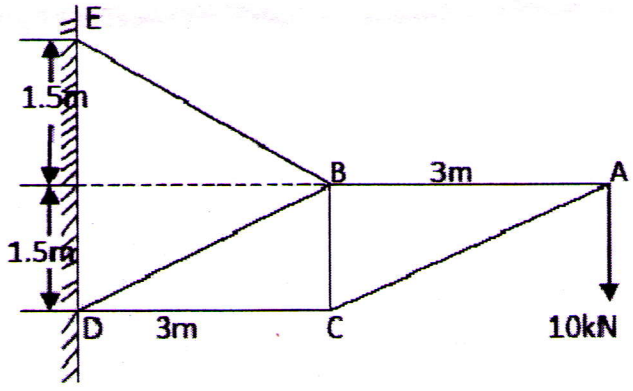
   b) Using Castigliano's theorem, determine the deflection under the load. A simply supported beam of span 'L' carries a concentrated load P at a distance 'a' from left hand support. Assume uniform flexural rigidity. (8)

2. a) Elucidate Maxwell's theorem of reciprocal deflection and Betti's theorem. (5)

   b) Differentiate static and kinematic indeterminacies with one example each. (5)

   c) Demonstrate unit load method as applied to the analysis of a rigid frame. (5)

3. Analyse the pin jointed frame and tabulate the results.



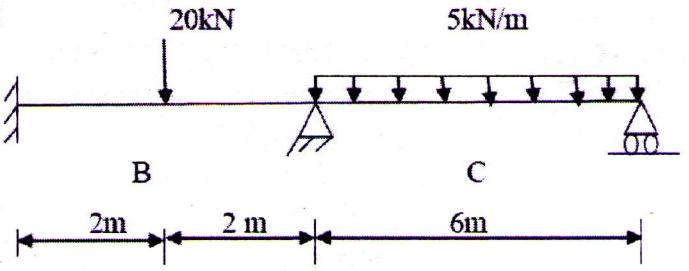
(15)

PART B

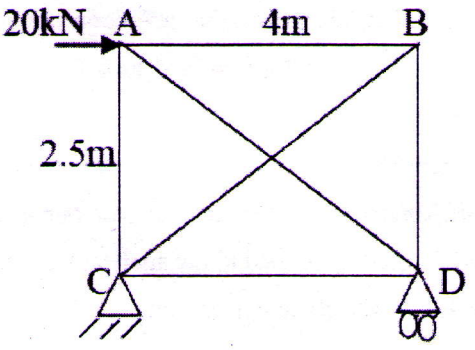
Answer any TWO questions. 15 marks each.

4. Determine the reaction components in the beam shown using Consistent deformation method. EI is constant throughout.

(15)



5. Compute the forces in the members. Given for all members, cross-sectional area = 1000 mm^2, Young's modulus = 200 kN/mm^2.



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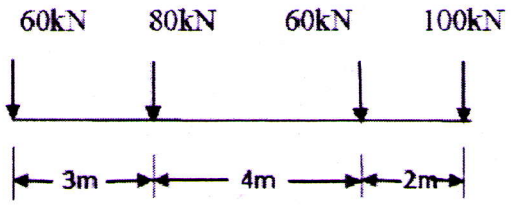
6. A load system as shown crosses a girder of span 25m from right to left with 60kN load leading. Find the max.BM at 15m from left end. Also find the absolute maximum BM and state where it occurs.



(15)

PART C

Answer any TWO questions. 20 marks each.

7. a) Justify that an arch is more economical compared to a SS beam of same span carrying the same load. (6)

b) A 3 hinged parabolic arch has a horizontal span of 36m with a central rise of 5m. A udl of 1kN/m acts at right half of the span. Calculate the magnitude and position of maximum positive BM in the arch. Also calculate the BM, NT and RS at left quarter point. (14)

8. a) A bridge cable is suspended from towers 80 m apart and carries a load of 30 kN/m on the entire span. If the maximum sag is 8 m, calculate the maximum tension in the cable. If the cable is supported by saddles which are stayed by wires inclined at 30^0 to the horizontal, determine the forces acting on the towers. If the same inclination of back stay passes over pulley, determine the forces on the towers. Height of the tower is 10m. (14)

b) Illustrate Eddy's theorem in arches. (6)

9. a) A 3 hinged semi-circular arch ACB of uniform section and radius 'r' carries a udl of w/m run over the whole span. Find the position and magnitude of maximum bending moment. Draw the BMD. (14)

b) For a cable carrying concentrated loads, estimate the maximum and minimum tensions and their locations. (6)

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