

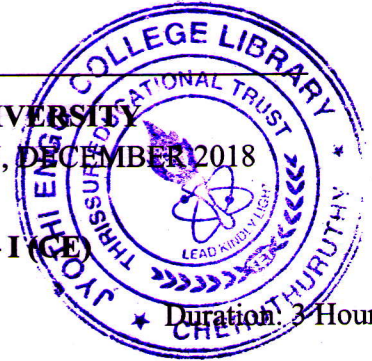
Reg No.: _____

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
FOURTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018

Course Code: CE202

Course Name: STRUCTURAL ANALYSIS – I (CE)



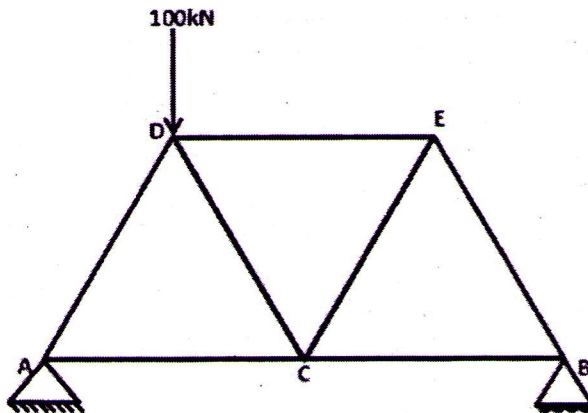
Max. Marks: 100

Duration: 3 Hours

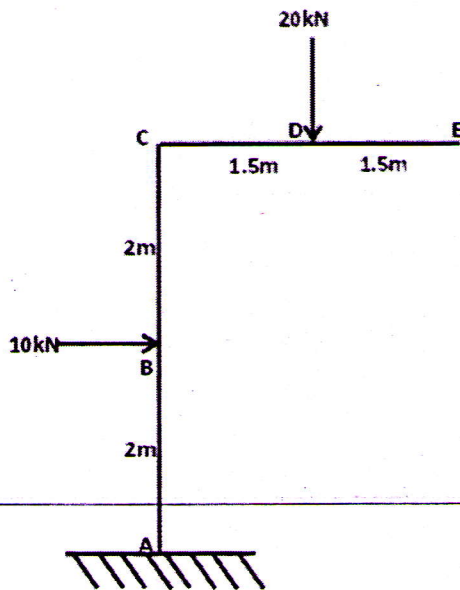
PART A

Answer any two full questions. Each question carries 15 marks.

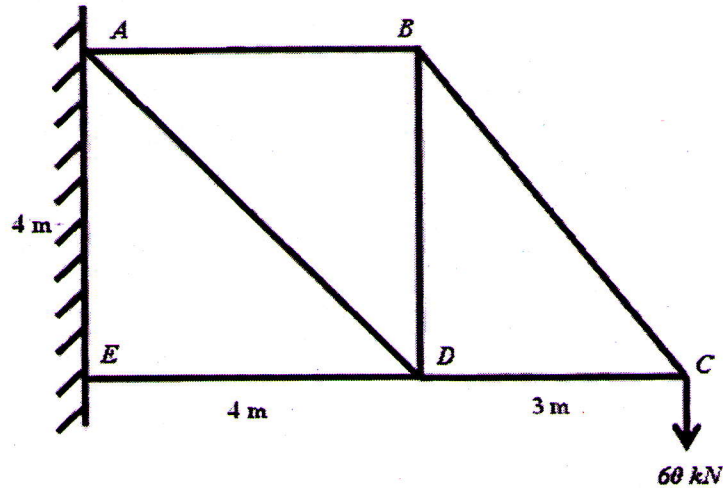
- 1 a) Briefly explain Castigliano's first and second theorems. 5
- b) Analyse the pin-jointed truss given below. All members have the same length and cross sectional area. Tabulate the results. 10



- 2 a) Discuss Maxwell's theorem of reciprocal deflection as applied to structural systems. 5
- b) Determine the horizontal and vertical deflection at point E of the frame shown in figure. Assume uniform flexural rigidity EI. 10



- 3 a) Distinguish between force and displacement method of analysis. 5
 b) Determine the vertical deflection of point D in the pin-jointed truss shown below. The cross sectional area of members AD and AE are 1500 mm^2 while those of other members are 1000 mm^2 . Take modulus of elasticity E as 200 marks

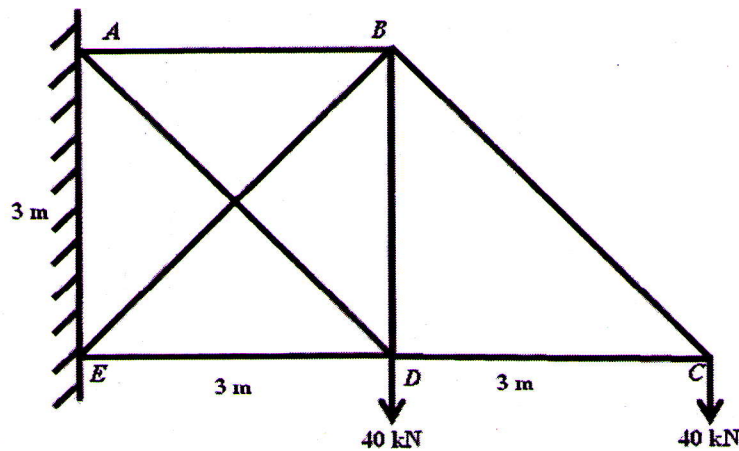


kN/mm^2 .

PART B

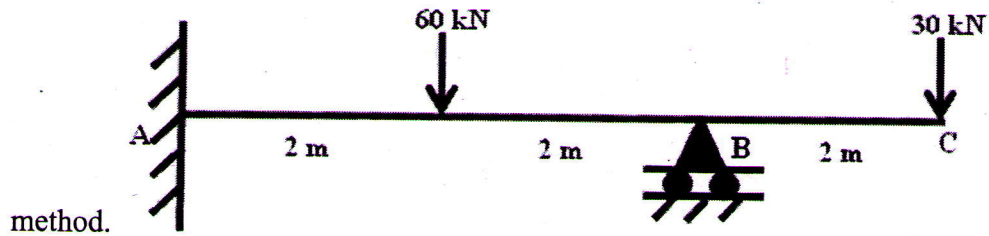
Answer any two full questions. Each question carries 15 marks.

- 4 a) Describe the steps involved in analysis of indeterminate beams subjected to support settlement. 5
 b) Find the member forces in the pin-jointed truss shown in figure. Tabulate the 10

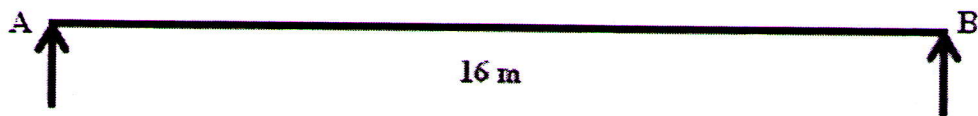
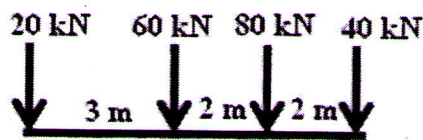


results.

- 5 a) Describe the steps involved in analysis of indeterminate beams by consistent deformation method. 5
 b) Analyse the beam shown in figure using consistent deformation 10



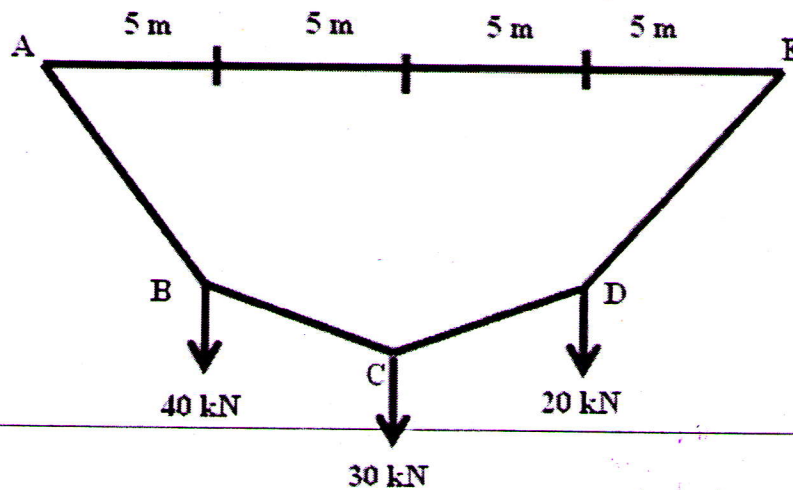
- 6 a) Construct ILD for BM at fixed support for a cantilever beam of span 'l'. 5
 b) A train of concentrated loads moves from left to right on a simply supported girder of span 16 m as shown in figure. Determine the absolute maximum shear force and bending moment developed in the beam. 10



PART C

Answer any two full questions. Each question carries 20 marks

- 7 a) With neat sketch, explain the functions of major components of a suspension bridge. 6
 b) A light cable is supported at two points 20 m apart which are at the same level. The cable supports three concentrated loads as shown in figure. The deflection at first point is found to be 0.8m. Determine the tension in the different segments and the total length of the cable. 14



- 8 a) With neat sketch, discuss the profile/shape of cable subjected to uniformly distributed load 'w' per unit horizontal length. 5
- b) A bridge cable is suspended from towers A and B, 80 m apart and carries a load 30 kN/m on the entire span. If the maximum sag is 8m at point C, calculate the maximum tension in the cable. If the cable is supported by saddles which are stayed by wires inclined at 30 degrees 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. 15
- 9 a) With neat sketches, explain the different types of arches. 6
- b) A three- hinged circular arch hinged at the springing points A and B and crown point C, has a span of 40 m and a central rise of 8m. It carries a uniformly distributed load 20kN/m over the left-half of the span together with a concentrated load of 100 kN at the right quarter span point. Find the reactions at the supports, normal thrust, radial shear and bending moment at a section D 10 m from the left support. 14
