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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belgaum)

Fourth Semester, B.E. - Civil Engineering

Make-up Examination; July - 2016

Analysis of Structures - I

Time: 3 hrs *Max. Marks: 100*

***Note**: i) Answer **FIVE** full questions, selecting **ONE** full question from each unit.*
ii) Missing data may suitably be assumed.

UNIT - I

1 a. Determine the magnitude and indicate the nature of forces of the pin jointed truss shown in Fig. Q1(a) by using method of joints. 14

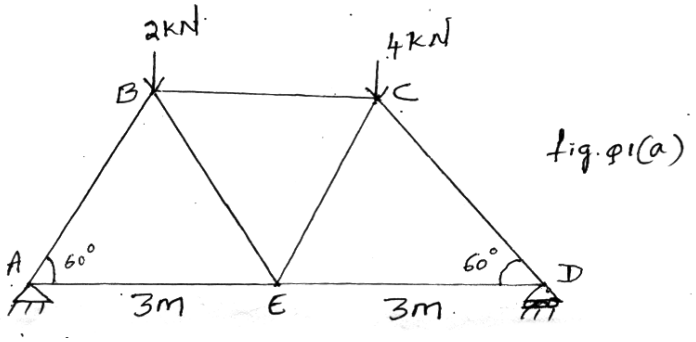

fig. q1(a)

b. Differentiate between statistically determinate and indeterminate structure with two examples each. 6

2 a. Determine the slope and deflection at the free end of a cantilever beam shown in Fig. Q2(a) by moment area method. 8

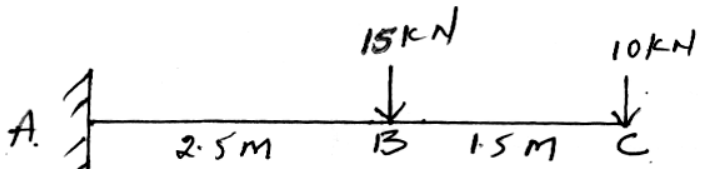

fig. q2(a)

b. Determine the forces of AC, AD and BD shown in Fig. Q2(b) by method of section. 12

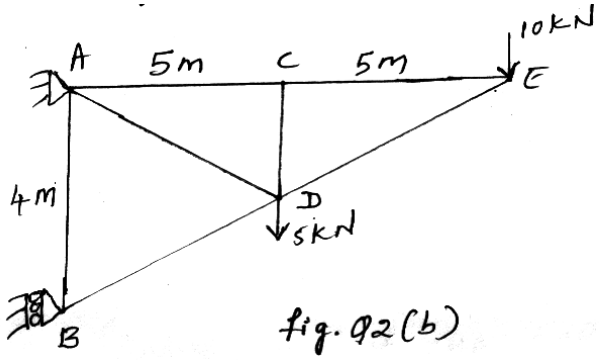

fig. q2(b)

Contd…..2

UNIT - II

3 a. A simply supported beam of length '*l*' carries a load 'W/m' over the entire span. Find the slope and deflection at centre by conjugate beam method. Take; EI as constant. 8

b. Using conjugate beam method, calculate slope and deflection at 'C' and minimum deflection under the point load of a simply supported beam shown in Fig. Q3(b). 12

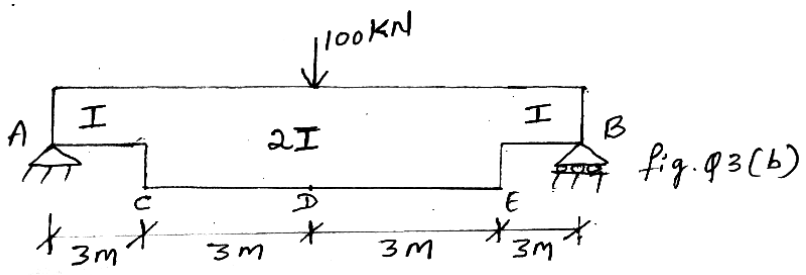

Fig. Q3(b)

4 a. State and prove Maxwell's reciprocal theorem. 8

b. Find the deflection under the concentrated load for the beam shown in Fig. Q4(b) using Costilgliano's first theorem. Take; $E = 2x10^8$ kN/m^2 and $I = 14x10^{-6}$ m^4 12

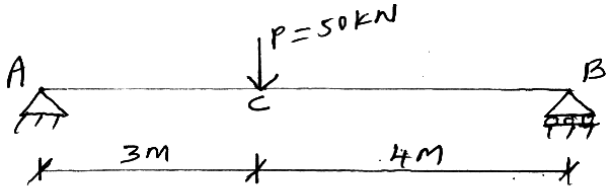

Fig. Q4(b)

UNIT - III

5 a. A three hinged symmetrical parabolic arch has a span of 30 m and a central rise of 6 m. The arch carries a UDL of 30 kN/m over a left half position and a concentrated load of 60 N at 9 m from right hand support. Compute the Bending moment, Normal thrust and Radial shear at 9 m from left hand support. 12

b. A three hinged symmetrical parabolic arch of span '*l*' rise 'r' subjected to UDL 'w/m' throughout the span. Prove that bending moment is zero at all the points. 8

6 a. A cable of span 100 m and dip 8 m carries a load of 5 kN/m of horizontal span. Find the maximum tension in the cable and the inclination of the cable at the support. Find the forces transmitted to the supported pier if the cable passes over smooth pulleys on the top of the pier. The anchor cable is at 30º to the horizontal. Determine the maximum bending moment for the pier if the height of the pier is 12 m. 12

b. A suspension bridge of 120 m span has a central dip of 12 m and supports a UDL of 15 kN/m over a span Evaluate;

i) The minimum and maximum tension in the cable. 8

ii) The size of the cable if the permissible stress of the cable material is 200 N/mm^2

iii) The length of the cable

Contd…..3

UNIT - IV

7 . Analyse the propped cantilever beam shown in Fig. Q7 by consistent deformation method. Sketch S.F.D., B.M.D. and elastic curve 20

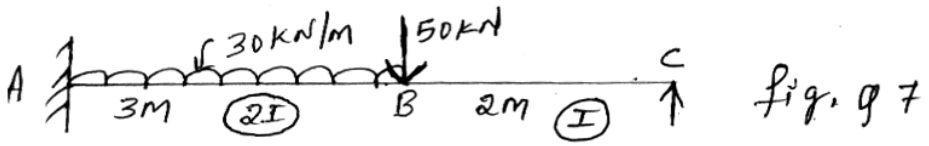

fig. q 7

8. Determine the fixed end moment in the beam shown in Fig. Q8 by consistent deformation method. Sketch S.F.D. B.M.D and elastic curve. 20

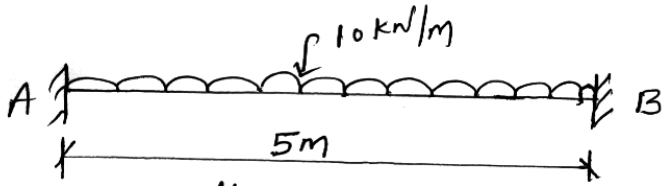

fig. q 8

UNIT - V

9 a. Analyse the propped cantilever beam shown in Fig. Q9(a) by strain energy method. Sketch the B.M.D. and elastic curve. 10

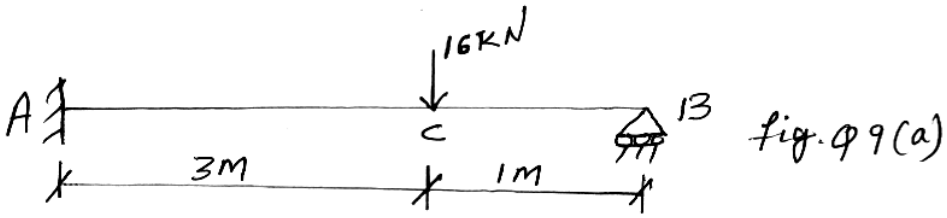

fig. q 9 (a)

b. A Fixed beam of span 5 m carries a UDL of 20 kN/m over the entire span. Find the reactions at the supports. Use strain energy method. 10

10 . Analyse the continuous beam shown in Fig Q.10 by three moment theorem. Support 'B' settles by 10 mm and support 'C' settled by 5 mm. Draw S.F.D. and B.M.D. Take EI = $12x10^3$ kN-m^2 20

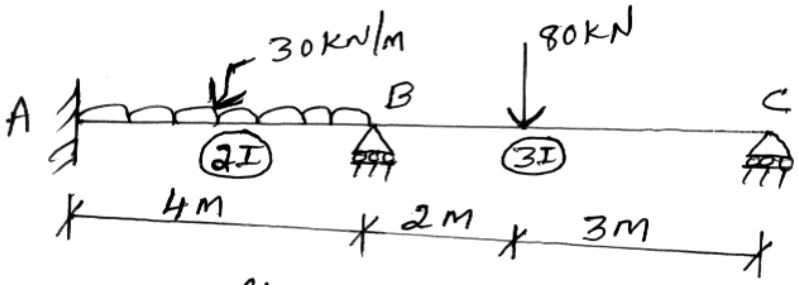

fig. q 10

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