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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

Semester End Examination; June - 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 degree of static in determinacy for the structures shown in Fig. Q1 (a). 4

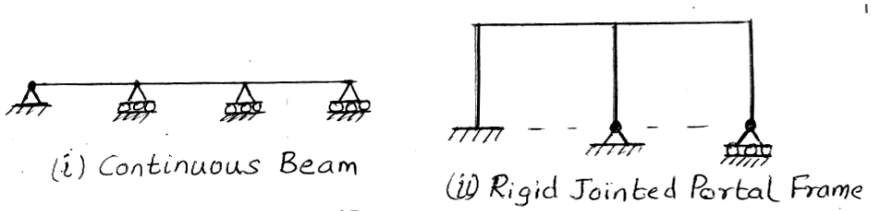

Fig. Q1(a)

b. Determine the degree of Kinematic indeterminacy for the structures shown in Fig. Q1 (b). Assume the members of continuous beam to be inextensible. 4

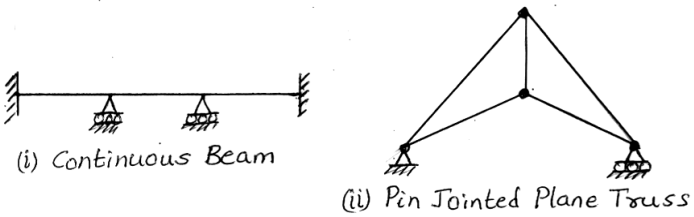

Fig. Q1(b)

c. Find the forces in the members of the pin joined plane truss shown in Fig. Q 1(c). Use method of joints. 12

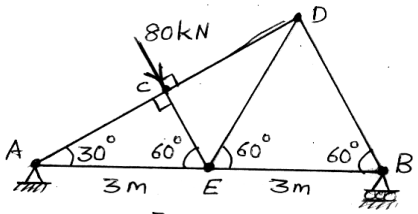

Fig. Q1(c)

2 a. Find the maximum slope and maximum deflection in the cantilever beam shown in Fig Q2 (a). Use Moment-Area method. 10

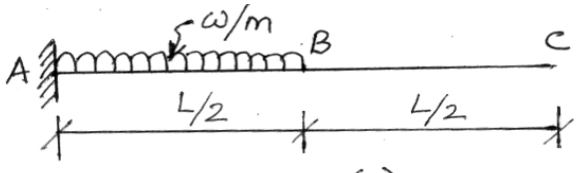

Fig. Q2(a)

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b. Find the forces in members DE, GE and GH of the pin jointed plane truss shown in Fig. Q2 (b) use method of sections. 10

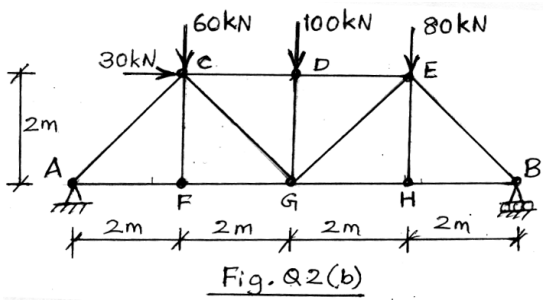

Fig. Q2(b)

UNIT - II

3 a. What is a conjugate beam? Tabulate the relation between the various types of real support and conjugate support? 8

b. Find the maximum slope and deflection in the cantilever beam shown in Fig. Q3 (b).

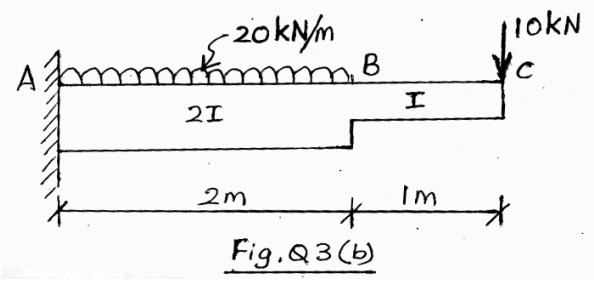

Fig. Q3(b) 12

4 a. State and prove Maxwell's reciprocal theorem. 6

b. A simply supported beam of span 4 m carries a concentrated load of 30 kN at the mid span. Find deflection in the beam. Use unit load method. Take 'ET' to be constant. 14

UNIT - III

5 a. A cable of uniform cross section is hung between two supports at same level which are 80 m apart. The cable carries an UDL of 20 kN/m over the entire horizontal span. The maximum sag in the cable is 10 m. Find;

i) Maximum Tension in the table and its inclination

(ii) Tension in the cable at 25 m from support and its inclination

(iii) Total length of the cable. 8

b. A three hinged circular arch of span 60 m and central rise 15 m carries loads as shown in Fig. Q5 (b).Find the normal thrust and radial shear at 10 m from right support. 12

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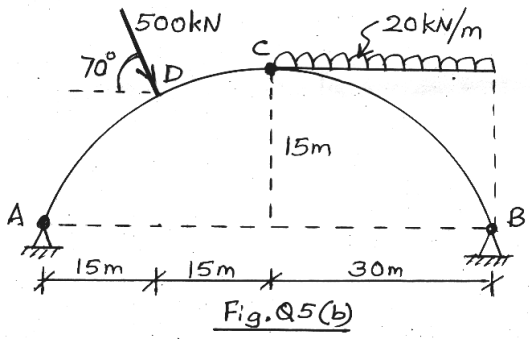

Fig.Q5(b)

6 a. Show that for the case of UDL shorter than span, maximum B.M. at a section occurs, when the section divides the UDL in the same ratio as it divides the span. 8

b. Two wheel loads of 8 kN and 16 kN spaced at 2 m crosses a simply supported beam of span 10 m with 8 kN load leading. Using ILD, find;

(i) Maximum negative SF at 4 m from left support 12

(ii) Maximum BM at 4 m from left support

(iii) Absolute maximum BM developed in the beam.

UNIT - IV

7. Analyse the propped cantilever beam shown in Fig. Q7 by consistent deformation method. Support 'B' sinks by 8 mm. Assume EI = 30,000 kN/-m^2. Sketch BMD, elastic curve and SFD. 20

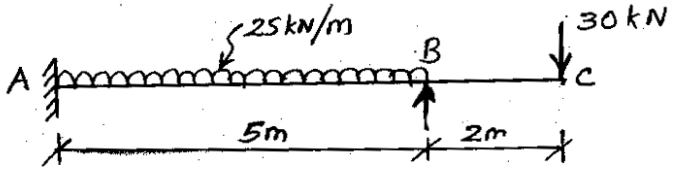

Fig.Q7

8. Analyse the fixed beam shown in Fig. Q8 by consistent deformation method. Sketch BMD, and elastic curve. 20

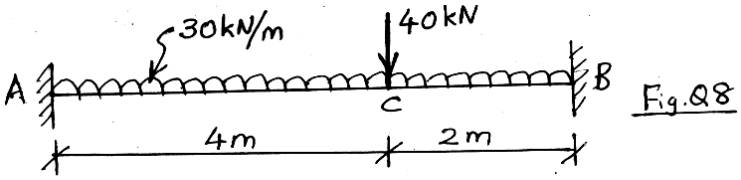

Fig.Q8

UNIT - V

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

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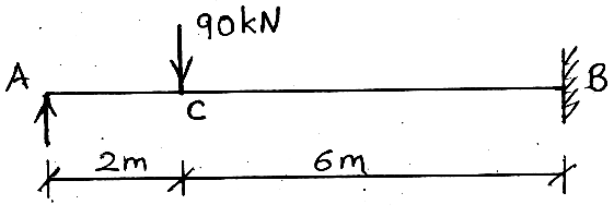

Fig .Q9(a)

b. A fixed beam of span 8 m carries loads as shown in Fig Q9(b). Find the reactions at the support. Use strain energy method.

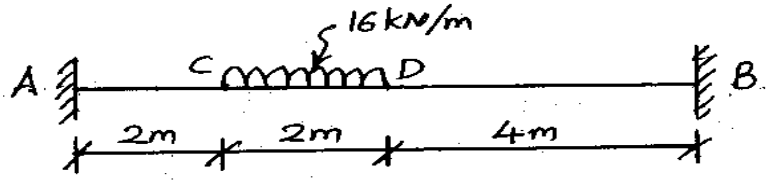

Fig. Q9 (b) 10

10. Analyse the continuous beam shown in Fig Q.10 by theorem of three moments. Sketch BMD, elastic curve and SFD.

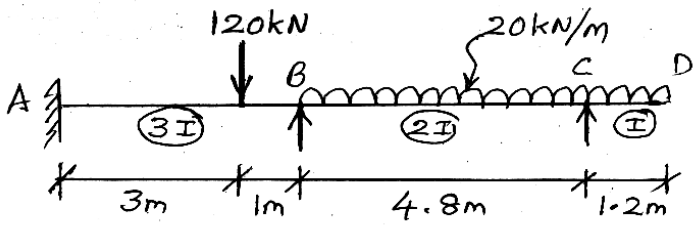

Fig. Q10 20

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