U.S.N | | | | | | | | | | |

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

(An Autonomous Institution affiliated to VTU, Belagavi)

Fourth Semester, B.E. - Civil Engineering

Semester End Examination; May/June - 2018

Analysis of Structures - I

Time: 3 hrs *Max. Marks: 100*

***Note**: Answer **FIVE** full questions, selecting **ONE** full question from each unit.*

UNIT - I

1 a. Explain static and kinematic indeterminacy with an example. 6

b. Determine the forces in the members of truss by method of joints. 14

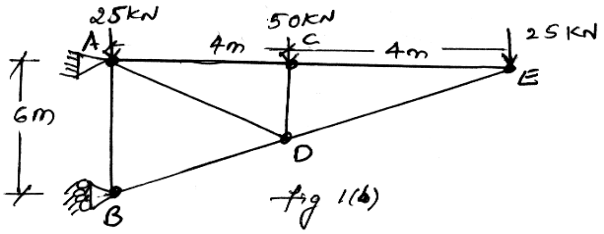

Fig 1(b)

2 a. Determine the forces in AC, AD and BD shown in Fig. 2(a) by method of sections. 10

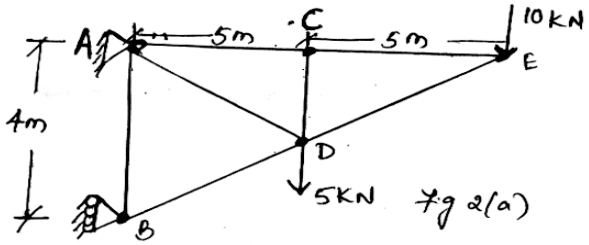

Fig 2(a)

b. Determine the slope and deflection at free end of a cantilever beam shown in Fig. 2(b) by moment area method. 10

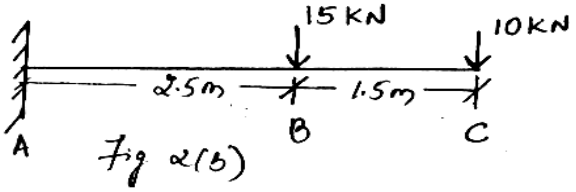

Fig 2(b)

UNIT - II

3 a. State and prove conjugate beam method. 8

b. Calculate deflection at C and slope at D for beam shown in Fig. 3(b). Using conjugate beam method. Take E = $2x10^5$ N/mm^2, I = 4000 cm^4. 12

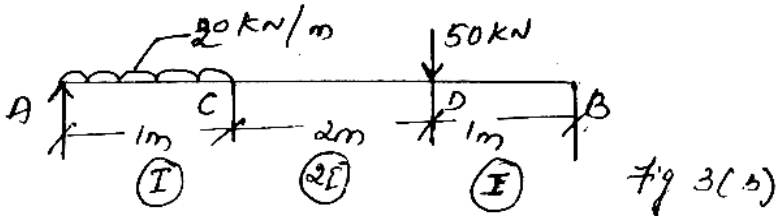

Fig 3(b)

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

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

Contd…2

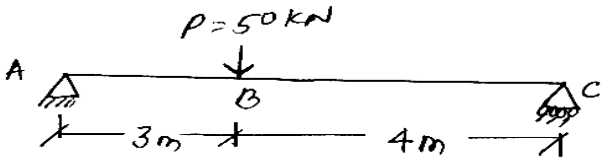

Fig. Q 4(b)

UNIT - III

5 a. Show that bending moment at any section of a three hinged parabolic arch of span '*l*' subjected to UDL of W/m throughout the span is zero. 8

b. A three thinged symmetrical parabolic arch of span 30 m and central rise of 6 m, caries a UDL of 30 kN/m over the left half portion and a concentrated load of 60 kN at 9 m from right support. Compute normal thrust, radial shed and bending moment at 9 m from left support. 12

6 a. A cable of span 20 m and dip 4 m carries a UDL of 20 kN/m over the entire span. Find; 8

i) Maximum tension in cable ii) Length of cable

b. A° suspension cable of span 100 m and maximum sag of 8 m is loaded with 10 kN/m for entire span. Find the maximum tension in the cable and inclination of cable at the support. Find the force transmitted to the supporting pier, if the cable passes over a smooth pulley on the top of the pier. The inclination of anchorage cable is 28º to horizontal. Determine the B.M for pier, if H = 12 m. 12

UNIT - IV

7. Draw bending moment and shear force for the beam shown in Fig. Q (7) by consistent deformation method. Draw electric curve. 20

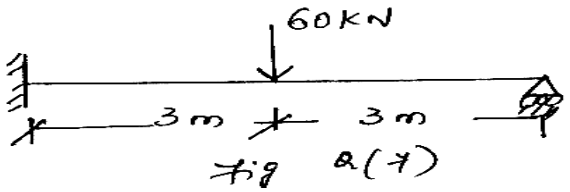

Fig Q(7)

8. Draw bending moment diagram and elastic curve for a fixed beam ABC fixed at *A* and *C* length AB = 4 m, BC = 4 m. The portion BC supports a UDL of 16 kN/m. The value of EI is constant. Use consistent deformation method. 20

UNIT - V

9. Determine the propped end reaction for beam in Fig. Q (9) by strain energy method. 20

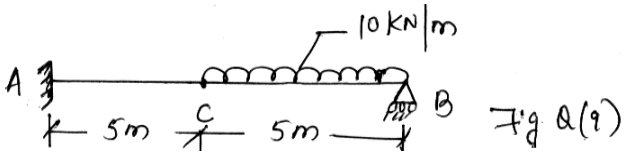

Fig Q(9)

10. Analyse the continuous beam shown in Fig. Q. (10) by three moment theorem. Draw SFD, BMD and elastic curve. 20

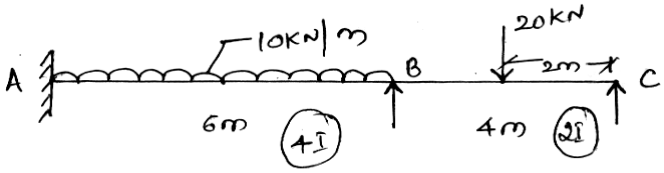

Fig Q. 10

* * * *