C 26875 (Pages : 2) Name.....

Reg. No.....

FOURTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION MAY 2012

CE 09 404/PTCE 09 403—STRUCTURAL ANALYSIS

(2009 Admissions)

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*

1. State Castigliano's theorem.
2. What is lack of fit ?
3. Give examples for force method of analysis.
4. Draw ILD for reactions at supports of S.S. beam.
5. What is radial shear in arches ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

1. Obtain the expression for strain energy due to torsion.
2. Explain the principles of superposition and virtual work.
3. Explain the analysis of circular beams over simple supports.
4. Draw the ILD for S.F. and B.M at any section of a cantilever beam.
5. Prove that the increase in temperature reduces the horizontal thrust in cables.
6. A three hinged semicircular arch carries u.d.l over the entire span. Determine the maximum B.M. and draw the B.M.D.

(4 × 5 = 20 marks)

Part C

Answer **four** *questions.*

1. Determine the horizontal and vertical deflections at D of the rigid jointed frame shown in Fig (1) by principle of virtual work. $E = 2 \times 10^5$ N/mm^2 and $I = 3 \times 10^8$ mm^4.

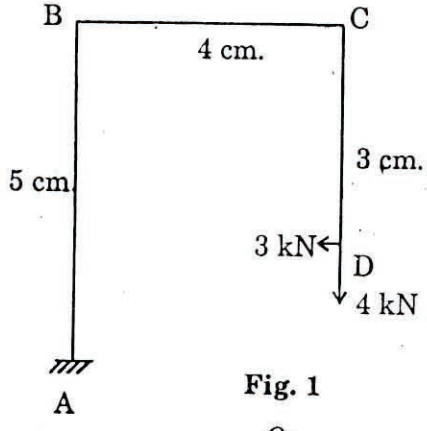

Fig. 1

Or

2. Find the deflection at free end of the overhanging beam shown in Fig. (2) by unit load method.

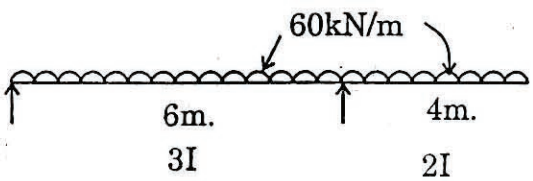

Fig .2

3. Determine the fixed end moments developed in a fixed beam when one of the supports settles down.

Or

4. Determine the reaction components of the continuous beam loaded as shown in Fig (3)

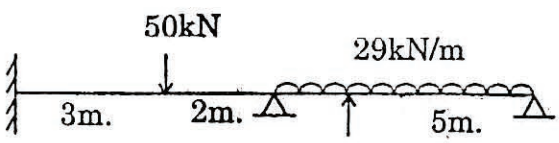

Fig. 3

5. Four concentrated loads 25 kN, 30 kN, 20 kN and 18 kN, 2m 4m and 3m apart respectively crosses a girder of span of 50 m from left to right with 25 kN load leading. Find maximum B.M at 20 m from left support. Also find absolute maximum B.M.

Or

6. U.d.l of 30 kN/m and 5m long crosses a girder of 25 m span. Determine the maximum SF and BM at a section 12m from left. Draw maximum SFD and BMD.

7. A three hinged stiffening girder of a suspension bridge of span 100 m is subjected to two point loads of 200 kN ad 250 kN at distances of 20 m and 40 m from left end. Find SF. and B.M at a distance of 25m from left. The supporting cables has a central dip of 10 m. Find maximum tension and its slope in the cable.

Or

8. The span and central rise of a three hinged parabolic arch are 100 m and 20 m respectively. It carries a u.d.l of 10 kN/m over a length of 30 m from left. Calculate BM, normal thrust, and radial shear at a distance 25 m from left.

(4 × 10 = 40 marks)