b) A moving load of 50 kN/m and 3.6m long crosses a girder of 15 m span. Calculate maximum B.M. at a section 4.2 m from L.H.S.

OR

Five wheel load 60 kN, 80 kN, 200 kN, 180 kN and 120 kN spaced at 2.5 m cross a simply supported beam of span 22.5 metres. Calculate the maximum positive and negative shear force value at the centre of the span and the absolute maximum bending moment anywhere in the span.

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Roll No .....

CE - 505

B.E. V Semester

Examination, December 2014

Theory of Structure - I

Time : Three Hours

Maximum Marks : 70

Note: i) Answer five questions. In each question part A is compulsory and B part has internal choice.

ii) All parts of each questions are to be attempted at one place.

iii) All questions carry equal marks, out of which part A-4 marks and part B-10 marks.

iv) Except numericals, Derivation, Design and Drawing etc.

1. a) State and explain castigliano's theorem of strain energy.

b) Determine the reactions for the Portal frame as shown in figure (1) by strain energy method.

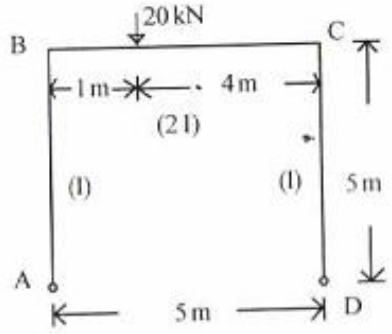

figure (1)

OR

Find the fixed end moments for the fixed beam loaded as shown in figure (2) by using strain energy method.

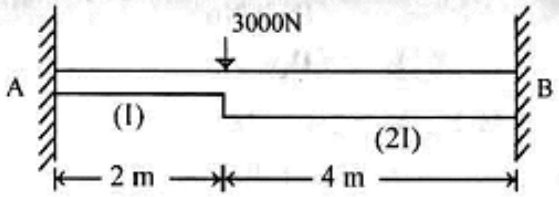

figure (2)

2. a) Explain difference between fixed beam and simply supported beam.

b) Find the fixed end moments and plot the B.M. diagram for the beam loaded as shown in figure (3).

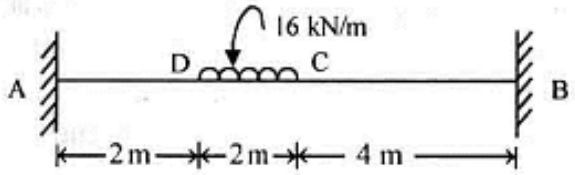

figure (3)

OR

Analyse a beam as shown in figure (4) by using theorem of three moments. During loading, support B sink down by 10mm. Take EI = 12000 kN-m^2. Draw shear force and bending moment diagram.

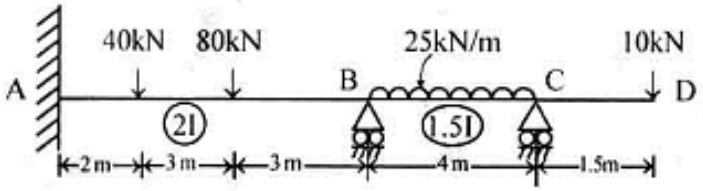

figure (4)

3. a) Explain static and kinematic indeterminancy with example.

b) Analyse a continuous beam ABC by slope deflection method. Span AB = BC = 6m. EI constant the beam carries a, u.d.l of 150 kN/m over its entire length supports A and C are simply supported and support B is continuous.

OR

Analyse the fixed beam shown in figure (5) by column analogy method and draw BMD.

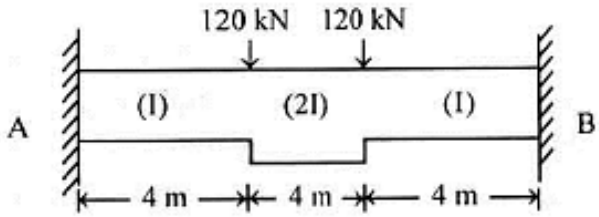

figure (5)

4. a) Explain Eddy's theorem.

b) A uniformly distributed load of 40 kN/m covers left hand half of the span of a parabolic arch, span 36m and central rise 8m. Determine the position and magnitude of maximum bending moment. Also find shear force and normal thrust at the section. Assume that moment of inertia at a section varies as recant of slope at the section. Neglect effect of rib shortening.

OR

A suspension bridge with three hinged stiffening girder has a span of 100m and a central dip of 10m and carries dead load of 3000 kN. It is to be designed to carry a single rolling load of 10 tonnes. The load may be assumed to be equally divided between the two suspension cables. Determine the sectional area of one cable if working stress is 15 kN/cm^2. Also find maximum B.M. in the stiffening girder.

5. a) Distinguish between bending moment diagram and influence line diagram.