S – 2555

Total No. of Pages : 3

Seat No.	

T.E. (Civil) (Semester - VI) Examination, December - 2015
STRUCTURAL MECHANICS - III
Sub. Code : 45542

Day and Date : Tuesday, 01 - 12 - 2015 **Total Marks : 100**

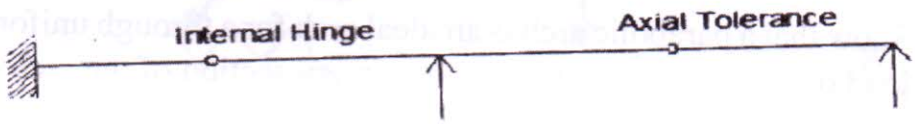
Time :02 .30 p.m. to 05.30 p.m.

Instructions :
1) **Attempt any three questions, each from Section - I and from section - II independantly.**
2) **Figures to the right indicate full marks.**
3) **Use of non-programmable calculators is allowed.**
4) **Assume any suitable data if required and missing, and state it clearly.**

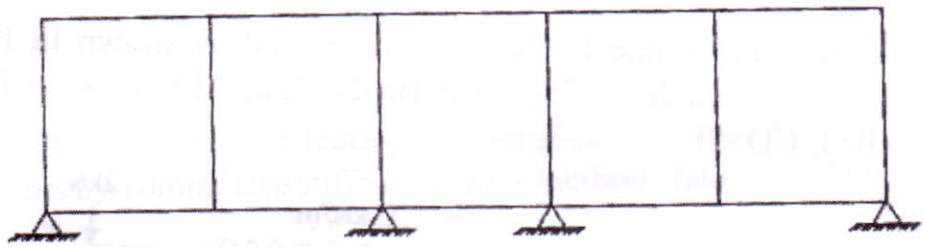
SECTION - I

Q1) a) Estimate the static and kinematic indeterminacies of the following structures. **[6]**

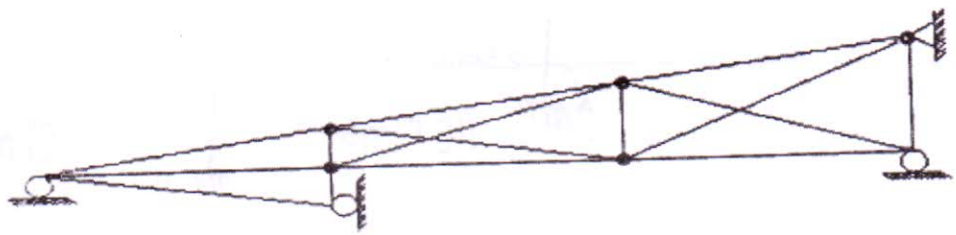
i)



ii)



iii)



b) Find the maximum span moment for a propped cantilever of span 6 metres subjected to a udl of 20 kN/m over its entire length, where the fixed left end rotates by 216/EI and the prop is provided at the right end. Use method of consistent deformation for the analysis. **[10]**

P.T.O.

Q2) a) Derive the expression for the fixing moments of a fixed beam generated due to a relative translation δ between the ends. **[8]**

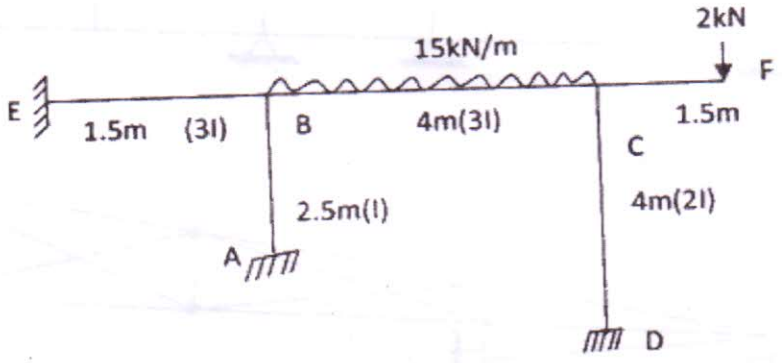
b) A Fixed beam of span 5 metres carries a point load of 50 kN at a distance of 2 metres from the left end. Calculate the fixed end moments by force method. (Use of standard formulae are to be avoided.) Also calculate the BM under the load. **[9]**

Q3) A continuous beam ABC is loaded by an udl of intensity 3 kN/m in the portion BC and a load of 4 kN at centre of span AB. Spans AB and BC are of 4m each, and have E = 200 Gpa and I = 8 x 10^6 mm^4. Analyse the beam by using Clapeyron's theorem if the supports at B and C are found to settle by 5 mm and 2 mm respectively. Draw SFD and BMD. ssssssss**[17]**

Q4) Show that a parabolic arch is an ideal arch for a through uniformly distributed load over its span. (Show M = 0 at every section of the arch) **[16]**

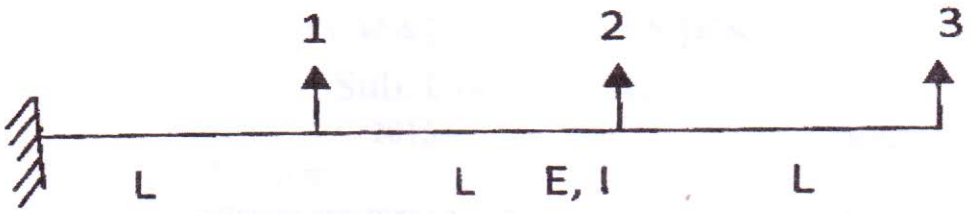
SECTION - II

Q5) Analyze the frame loaded and supported as shown in figure by slope deflection method. Construct BMD. Take M.I for span EB=BC=3I and AB=I, CD=2I. **[16]**

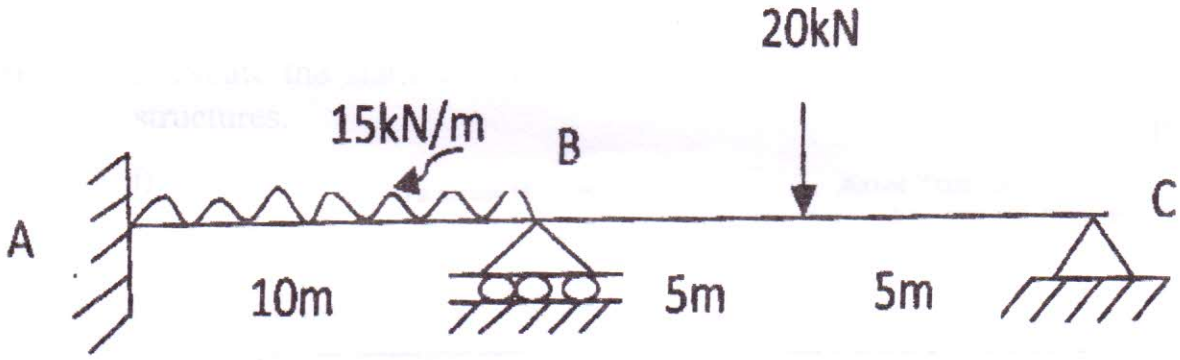


Q6) A continuous beam ABCDE 14m long, such that AB=5m, BC=4m, CD=3m and overhang DE=2m.The beam is fixed at A and simply supported at B, C and D. It carries point load of 40kN and 20kN at 3m, 7m from support A respectively. Also subjected to UDL of intensity 10kN/m over span CD and point load of 10kN at E. Analyze the beam by using moment distribution method. Take EI =constant. Draw bending moment diagram. **[17]**

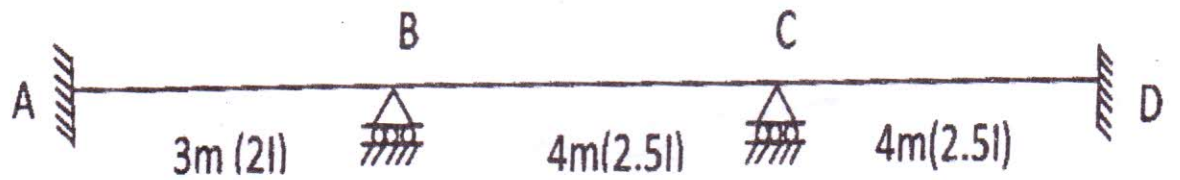
Q7) a) Develop the flexibility matrix [F] for coordinates 1,2 and 3 of the cantilever beam shown in figure. **[5]**



b) Analyze the beam loaded and supported as shown in figure, by using flexibility matrix method. **[12]**



Q8) Analyze the continuous beam loaded and supported as shown in figure, if support B sinks by 10mm. Use stiffness matrix method. Take EI= 6000 kNm^2 **[16]**



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