B.E. CIVIL ENGINEERING THIRD YEAR FIRST SEMESTER - 2019

THEORY OF STRUCTURE - II

Time 3 hours Full marks 100

Use separate answer scripts for each part

Part- II

Answer all questions. **Full marks = 40.**

1. **Obtain the kinematic indeterminacies for the frame in Fig Q1 by slope deflection method.** Assume *EI to be constant* all through whereas support D suffers a *rightward horizontal shift* of 50/EI. 14

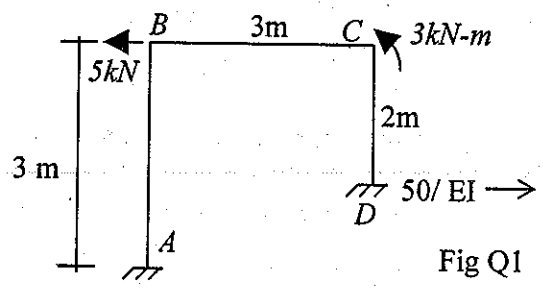

Fig Q1

2. Construct BMD for the beam in Fig Q2 using *moment distribution method.* Note that joint B is subjected to a joint moment of 30 kN-m, while support B settles by 2/EI m. 13

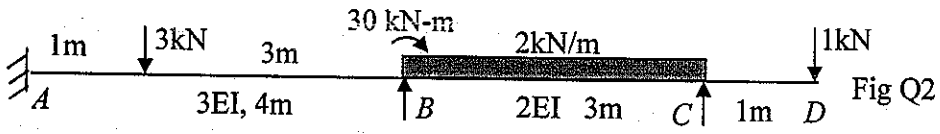

Fig Q2

3. Compute *axial force, B.M. and S.F.* **only for members connected to joints A, B, E and F for** the frame in Fig Q3 by **cantilever method.** The two interior columns have 1.25 times the area of the exterior columns. 13

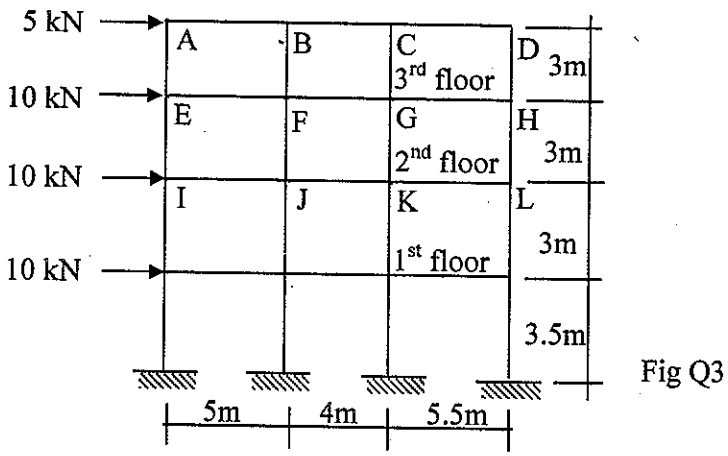

Fig Q3

Ref. No. – EX/CE/T/313/2019

B.E. Civil Engineering , Third Year, First Semester Examination 2019

SUBJECT – Theory of Structure - II

Full Marks 100

Time: Three hours (60 marks for this part)

Use a separate Answer-Script for each part

PART I

Answer Question No. 3 and any one of the rest

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1 A fixed ended (at A and C) knee bow girder ABC having length of each arm (AB=BC) as 4 m carries a point load of 2t at B acting vertically downward. Solve the girder and draw the complete bending moment, shear force and torsion moment diagrams of the girder. Take EI / GJ = 1.5. 30

2 A two hinged parabolic arch has a span of 13 m , the height of point P is 4 m above left support and 3 m above the right support .The horizontal distance between the left support and P is 7 m . The arch is loaded with a point load of 12 t at the P . Solve the arch and draw the complete bending moment, shear force and normal thrust diagrams taking at least 10 equidistant sections apart from the supports. 30

3 A fixed –fixed frame ABCD has the following details . 30
The left support A is 1 m below the right support D .The column AB = 4 m , beam BC = 3 m and the column CD = 3 m . The flexural rigidities are EI , EI and 1.5 EI for AB , BC and CD respectively . A horizontal force of 5 t acts at C in the direction CB .

Solve the frame by column analogy or elastic centre method and hence draw the complete bending moment and shear force diagrams .