**Roll No……..** **Total No. of Printed Pages: [03]**
**Total No. of Questions: [09]**

**B. Tech. (Civil Engg.) (Semester – 6th)**
**STRUCTURAL ANALYSIS-II**
**Subject Code: BCIE1628**
**Paper ID: [110719]**

**Time: 03 Hours** **Maximum Marks: 60**
**Instruction for candidates:**
1. Section A is compulsory. It consists of 10 parts of two marks each.
2. Section B consist of 5 questions of 5 marks each. The student has to attempt any 4 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

**Section – A** **(2 marks each)**

Q1. Define briefly the followings:
(a) Define the types of static indeterminacy and how it is found out for pin jointed frames?
(b) How much force is developed in a prismatic member when a unit rotation (without translational displacement) is given to its one end and other end is fixed?
(c) What is an influence line? Discuss its applications.
(d) What is basic difference between Portal and Cantilever method?
(e) Differentiate between the distribution and displacement factors.
(f) Differentiate between the absolute and relative stiffness.
(g) State the limitations of consistent deformation method.
(h) Write down the expression of H for 2-hinge semi-circular arch subjected to concentrated load of intensity W at a distance "a" from the left support.
(i) What are the various conditions required to prevent the sway in rigid jointed frames?
(j) What is the displacement factor when columns in a storey have different heights?

**Section – B** **(5 marks each)**

Q2. Analyse the beam shown in Fig. (1) by using three moment equation method, also draw B.M.D and S.F.D. Given E=15 kN/mm$^2$, I= $5\times10^9$ mm$^4$.




Q3. Analyze the continuous beam shown in Fig. (2) by slope deflection method, if support C sinks by 8 mm. Take EI= 4200 kNm$^2$.

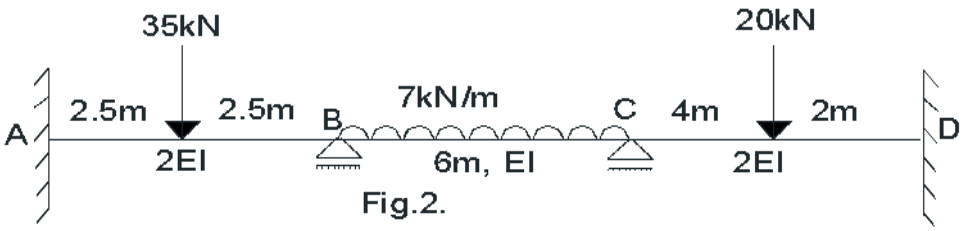


Fig.2.

Q4. A two hinge parabolic arch with a rise of 7.5 m and span of 40 m carries a concentrated load of 63 kN at 16 m from the left support. The moment of inertia of the rib varies as the secant of the slope. Find the horizontal thrust, maximum positive and negative moments of the arch.

Q5. Using Muller Breslau principle, compute the influence line ordinates at 2m intervals for vertical reaction at C for the continuous beam ABC as shown in Fig.3.



Fig. (3)

Q6. Analyse the frame shown in Fig. (4) by Portal method and also draw BMD.

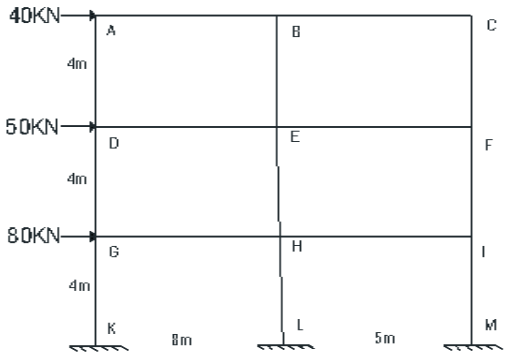


Fig.(4)

**Section – C** **(10 marks each)**

Q7. Analyze the frame shown in Fig. (5) by Rotation Contribution method. Also, Draw B.M.D.

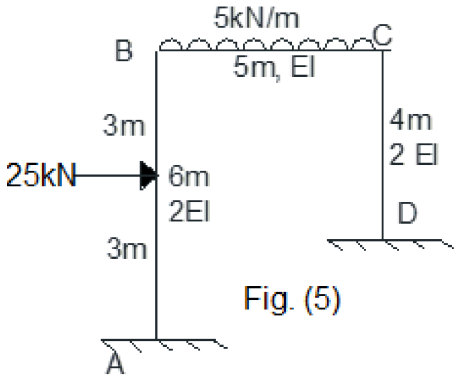



Fig. (5)

Q8. Analyse the portal frame shown in Fig. (6) by moment distribution method. Also, draw the BMD.

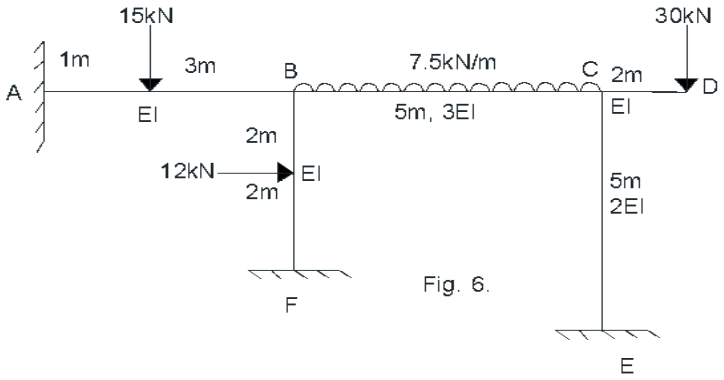



Fig. 6.

Q9. (a) Analyze the beam shown in Fig. (7) by consistant deformation method and treat vertical reaction $R_B$ as redundant. (5)

(b) Analyze the pin connected plane frame shown in Fig. (8). The cross sectional area of each member is 2500 $mm^2$ and E=200 $kN/mm^2$. (5)

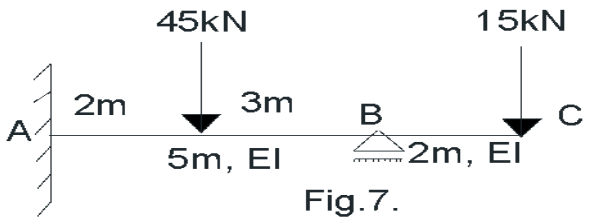



Fig.7.

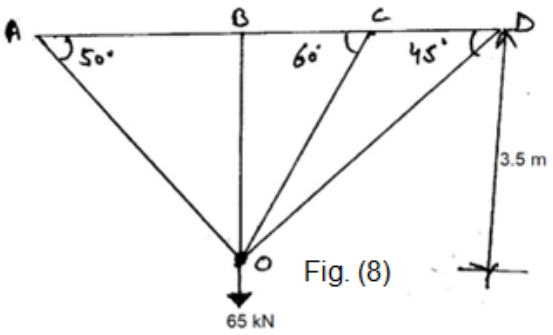



Fig. (8)