This question paper contains 4 printed pages.

3326 *Your Roll No.* .....

B. Tech. (C) / IV **J**

Paper ECE-403 : ADVANCED STRUCTURAL ANALYSIS

Time : 3 hours *Maximum Marks* : 70

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt any four questions.
Assume any missing data suitably.

1. (*a*) Evaluate shape factor of a circular section. 7½

   (*b*) Describe three basic theorems of plastic analysis with a suitable example. 10

2. (*a*) What do you understand by a plastic hinge? Explain with a sketch. 7½

   (*b*) Calculate the collapse load for the beam of constant plastic moment capacity M_p, shown in Fig 1. 10

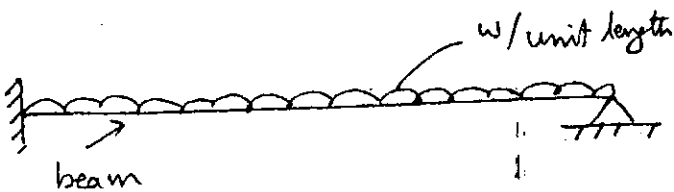

Fig 1.

P. T. O.

3. Find the value of fully plastic moment of frame shown in Fig 2. 17 1/2

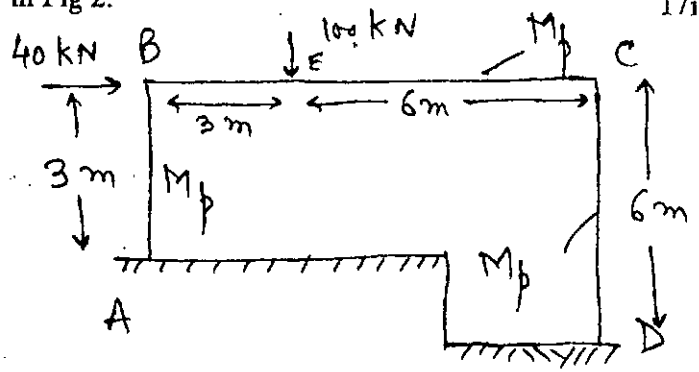

Fig 2.

4. Analyse the beam, shown in Fig 3, by stiffness method. Draw BMD and SFD for the beam. 17 1/2

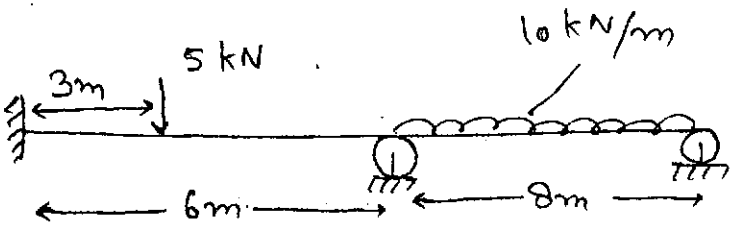

Fig 3

5. (*a*) Compare stiffness and flexibility methods of analysis. 7 1/2

(*b*) What do you understand by beams on elastic foundations? 10

6. Analyse the beam, shown in Fig. 4, by flexibility method. EI is constant. 17½

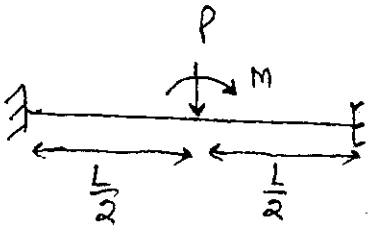

Fig. 4

7. Describe plane stress and plain strain cases, giving stress and strain matrices for each case. Hence, write the principle of minimum potential energy. 17½

8. (*a*) What do you understand by non-linear analysis of structures? Explain. 7½

   (*b*) What do you understand by a shape function in FEM? Explain with an example. 10

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