53 (CE 702) STAN-III

2018

STRUCTURAL ANALYSIS-III

Paper : CE 702

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1. *(a)* Analyse the building frame using approximate method as shown in *Figure 1.* 10

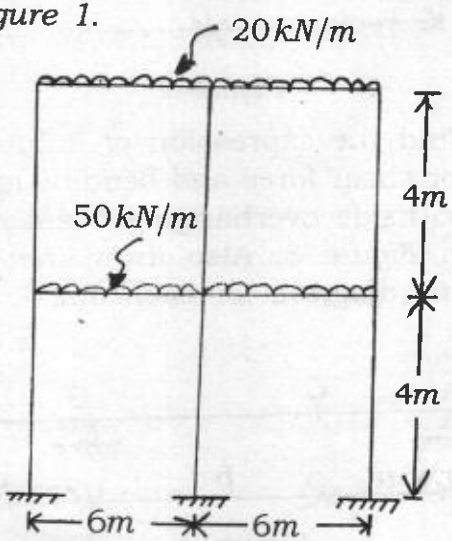

Figure 1

Contd.

(b) Determine (approximately) the reactions including moment at the base of the column of the frame shown in *Figure* 2. Use portal method of analysis. 10

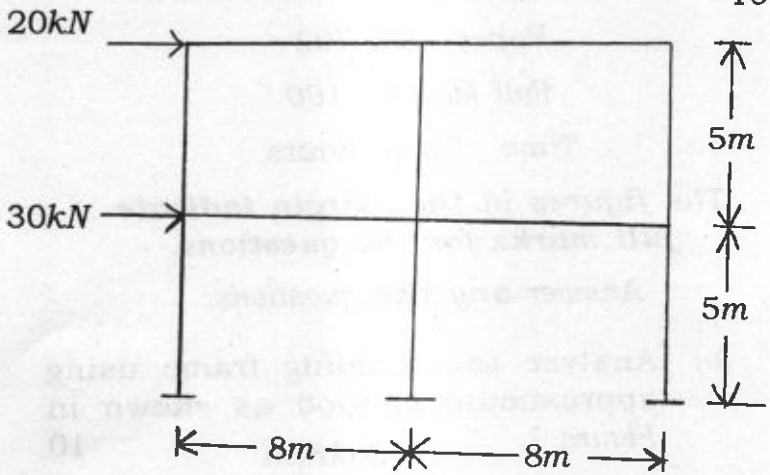

Figure 2

2. (a) Find the expression of influence lines for shear force and bending moment of bothside overhanging beam as shown in *Figure* 3. Also draw the influence line diagram for each one. 10

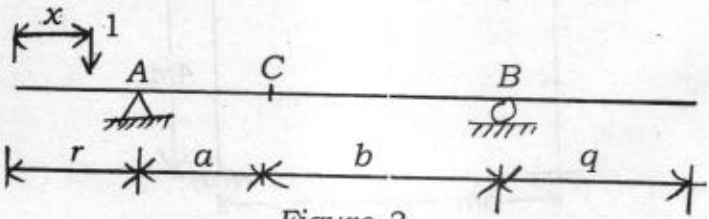

Figure 3

(b) Two point loads of $50kN$ and $75kN$ spaced $3m$ apart with the $50kN$ load leading passes over a simply supported beam of span of $12m$ from left to right. Using ILD calculate the maximum shear force and bending moment at a section $4{\cdot}8m$ from the left hand support. 10

3. Draw ILD for the forces in the members of the bridge truss as shown in the *Figure* 4. 20

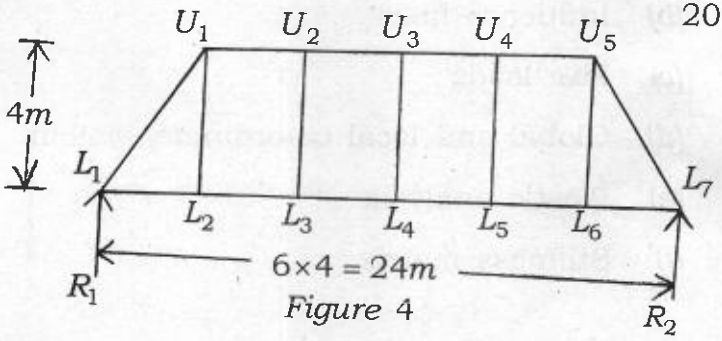

Figure 4

4. (a) Derive the expression for shape factor due to section modulus. 10

(b) Show that load factor = factor of safety X shape factor. 10

5. (a) In which cases plastic hinges may occur in a structural member ? 5

(b) Show that shape factor for a rectangular section of a beam is 1·5. 5

(c) Write down the step-by-step procedure for the analysis of structure by the matrix stiffness method. 10

6. Write short notes on : ***(any four)*** 20

(a) Portal frame

(b) Influence lines

(c) Live loads

(d) Global and local co-ordinate system

(e) Plastic analysis

(f) Stiffness matrix.
