Roll No. .....

# 23377

## M. Tech. Ist Semester (Civil Engg.)

## (Specialization in Structural Engg.)

## Examination – January, 2016

### ADVANCED STRUCTURAL ANALYSIS

Paper : CE-611/MTSD-102

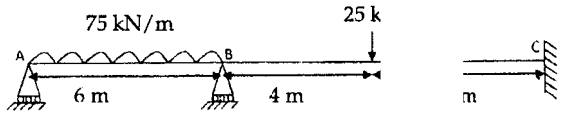
*Time : Three Hours ]* *[ Maximum Marks : 100*

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

*Note :* Attempt any *five* questions. All questions carry equal marks.

1. What is matrix method of analysis ? Why flexibility method is called a force method ? Write down the difference between force and displacement method. 20

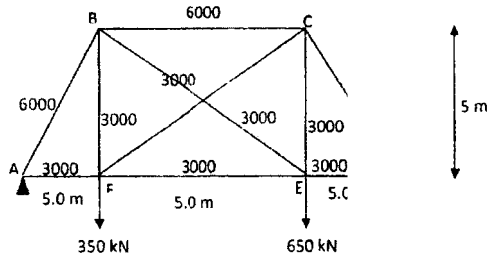
2. Analyze the continuous beam shown by flexibility method in which support reaction at A and B are treated as the redundant. Hence calculate the bending moment at B. Assume flexural rigidity EI as constant for all the beams. 20







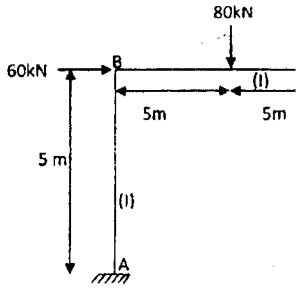
**3.** Analyse the pin-jointed plane fr ıown in fig. by flexible matrix method. The nu in parenthesis are cross-sectional area of the me in mm$^2$. 20



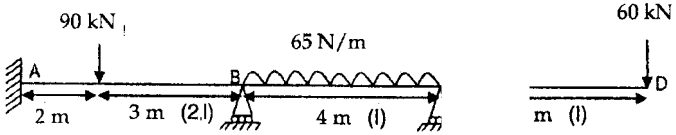




**4.** Analyze the rigid frame shown i ;iven below by flexibility matrix method. 20




**5.** Analyze the beam by stiffness ma ethod. 20



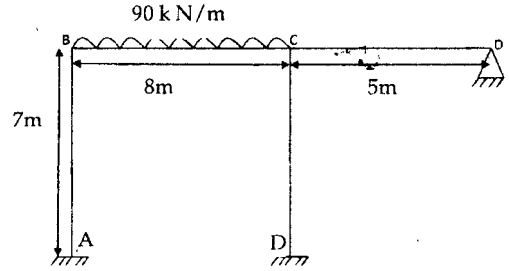








**6.** Using stiffness matrix method, analyses the frame shown in fig. Take EI constant throughout. 20




**7.** Explain the following in detail : 20

(a) How do the flexibility and stiffness matrices depend on static and kinematic indeterminacies ?

(b) The stiffness matrix of a liner elastic structure is symmetric. Why ?

**8.** Analyze the pin-jointed truss shown in fig. by stiffness matrix method. Take area of cross-section for all members = 1000 mm$^2$ and modulus of elasticity E = 200 kN/mm$^2$. 20