C 80767

(Pages : 4)

Name.....

Reg. No.....

SIXTH SEMESTER B.TECH. (ENGINEERING) [09 SCHEME] DEGREE EXAMINATION, APRIL 2015

CE/PTCE 09 603—STRUCTURAL ANALYSIS—III

Time : Three Hours

Maximum : 70 Marks

Part A

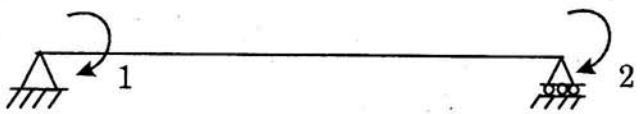
Answer **all** *questions.*

1. (a) Show that flexibility matrix is symmetric.

   (b) Show that $[F][K]=[I]$.

   (c) Explain the relation between slope-deflection method and stiffness method.

   (d) Develop the stiffness matrix for the given co-ordinates.



   (e) What is 'Logarithmic decrement' ? What is it used for ?

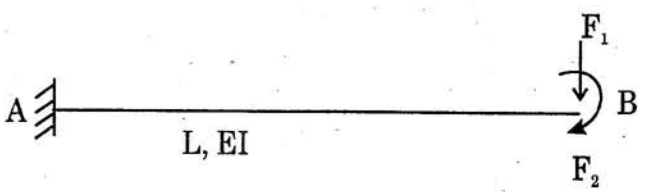
(5 × 2 = 10 marks)

Part B

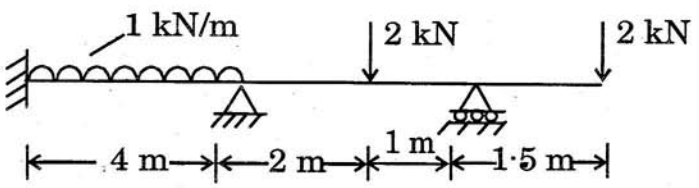
Answer any **four** *questions.*

2. (a) Distinguish between determinate and indeterminate structures briefly with the help of neat figures.

   (b) Develop the flexibility matrix for the cantilever beam shown below :



   (c) Determine the equivalent joint load s for the structure shown below :



Turn over

(d) Describe the advantages of using direct stiffness method of analysis.

(e) Define clearly the terms :

(i) Critically damped systems.

(ii) Under damped systems; and

(iii) Overdamped systems.

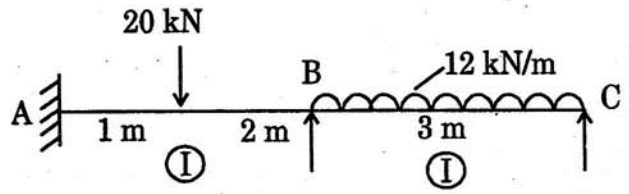
(f) What is resonance and indicate its effect in an undamped forced vibration ?

(4 × 5 = 20 marks)

Part C

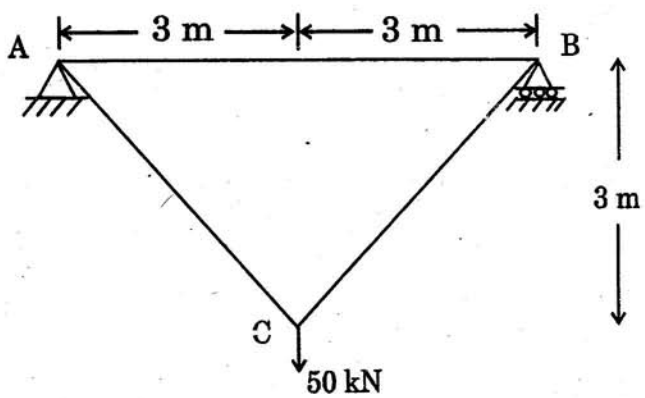
Answer **all** *questions.*

3. (a) Analyse the continuous beam shown below by flexibility method and draw the SFD and BMD.

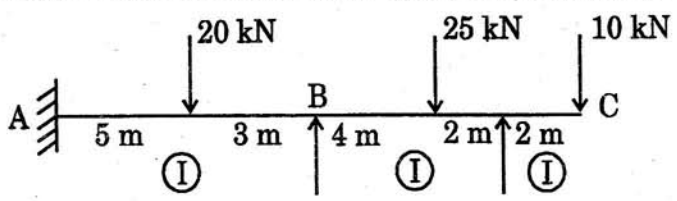


Or

(b) Find the horizontal and vertical deflection at 'C' of the pin-jointed frame shown below using flexibility method. AE/L same for all the members.



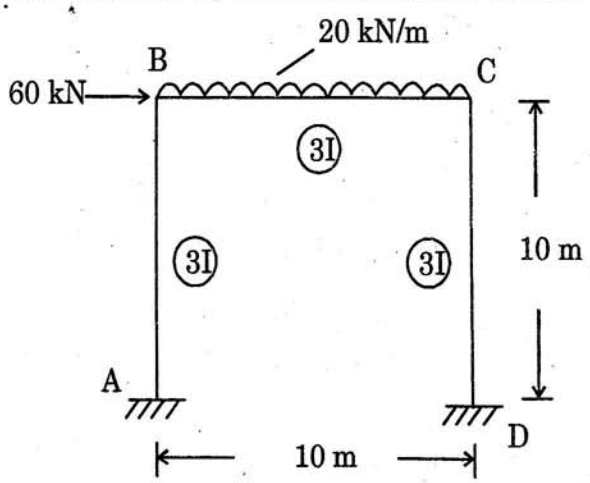
4. (a) Analyse the continuous beam shown below by stiffness matrix method and draw the BMD.



EI—Constant.

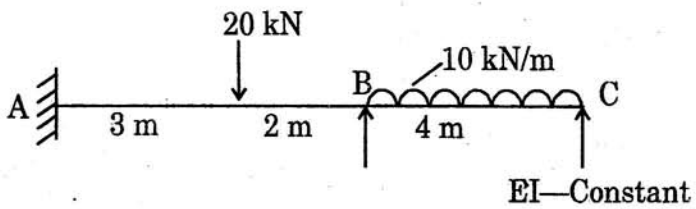
Or

(b) Analyse the frame shown below by stiffness and draw the BMD.



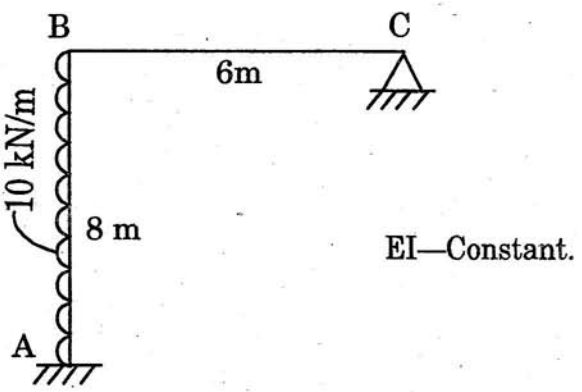
(10 marks)

5. (a) Analyse the continuous beam shown below by direct stiffness method and draw the BMD.



Or

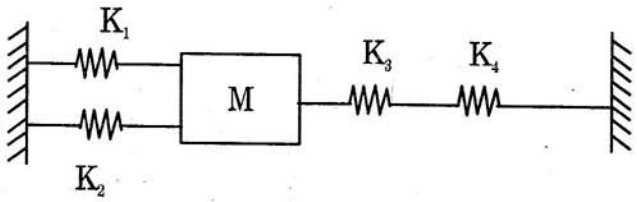
(b) Analyse the plane frame shown below by direct stiffness method and draw the BMD.



(10 marks)

6. (a) (i) Derive the equation of motion for a SDOF system. (4 marks)

(ii) For the system shown below, what should be the value of mass to have a frequency of 30 cps. Given K_1 = 3000 N/m, K_2 = 2000 N/m, K_3 = 500 N/m, K_4 = 2500 N/m



(6 marks)

Or

(b) (i) Explain critically damped, underdamped and overdamped systems. (4 marks)

(ii) A vibrating system consisting of a weight of 20 kN and a spring with stiffness 16·2 kN/cm is viscously damped so that the ratio of two consecutive amplitude is 1·0 to 0·85. Determine the natural frequency of vibration of undamped system, logarithmic decrement, damping ratio, coefficient of damping and damped circular frequency.

(6 marks)

[4 × 10= 40 marks]