B.E. Eighth Semester (Civil Engineering) (C.B.S.)

Elective - II : Advanced Structural Analysis

P. Pages : 3 **NKT/KS/17/7530**

Time : Three Hours * 0 7 2 6 * Max. Marks : 80

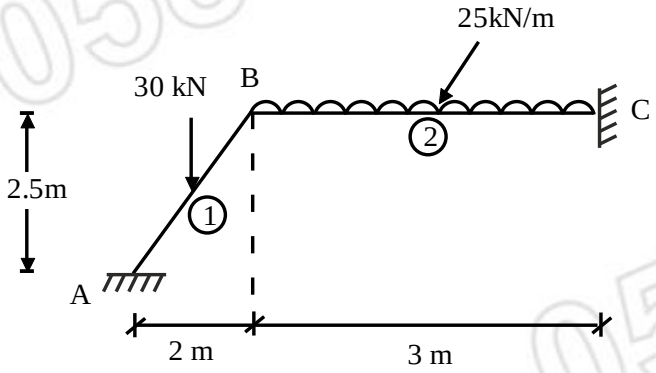
Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Assume suitable data whenever necessary.
9. Illustrate your answers whenever necessary with the help of neat sketches.
10. Use of non programmable calculator is permitted.

1. Write the computer program for beam on elastic foundation by giving suitable example. **13**

OR

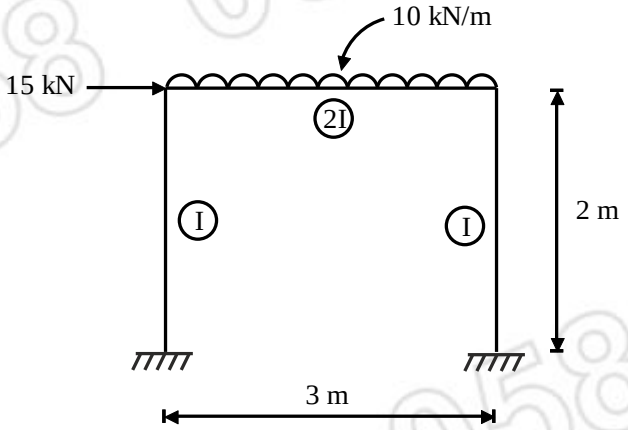
2. Derive the expression for circular beam subjected to uniformly distributed load 'w' in kN/m and supported on symmetrically placed column. Find maximum bending moment and maximum torsional moment. **13**

3. Analyse the plane frame as shown in fig. 1. **14**



OR

4. Assemble the global stiffness matrix and joint load vector for the plane frame shown in fig. 2 considering axial deformation. **14**



5. Find the displacement at node 2 of the grid structure shown in fig. 3. Member 1 is loaded with uniformly distributed load of intensity 20 kN/m and members 2 is loaded with concentrated load of 20 kN acting at center. **14**

$E = 2.54 \times 10^7 \text{ kN/m}^2$ C/S of beam $= (250 \times 500)$ mm

$G = 8.8 \times 10^6 \text{ kN/m}^2$

$I_{XX} = db^3/3$

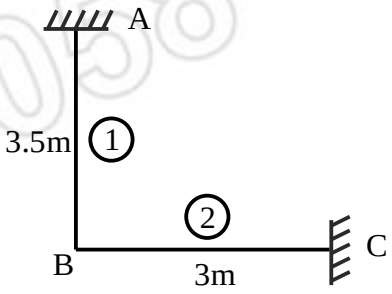


Fig. 3

OR

6. Analyse the plane grid shown in fig. 4 using direct stiffness method. **14**

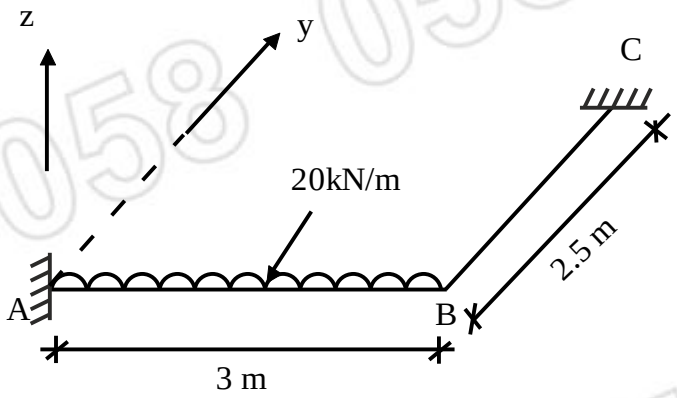


Fig. 4

$E = 2.1 \times 10^5$ MPa

$G = 1 \times 10^5$ MPa

$I_{YY} = 1500 \text{ cm}^4$, $I_{XX} = 2000 \text{ cm}^4$

7. Explain the following terms :

i) Single degree of freedom system. **4**

ii) D' Alembert's principle. **2**

iii) Equation of motion. **4**

iv) Inertia force **3**

OR

8. Explain following terms in detail.

i) Effect of Gravitational force. **3**

ii) Transmissibility ratio. **4**

iii) Damping **2**

iv) Natural Frequency **4**

9. a) Draw the first three mode shapes for a beam fixed at one end and free at the other. Use Euler - Bernoulli equation. **6**

b) Explain "Duhamel" integral on reference to impulsive loading and derive the expression for DLF for a triangular load. **7**

OR

10. a) Explain approximate method of analysis of impulsive loading. **6**

b) Explain "Duhamel" integral on reference to impulsive loading and derive the expression for DLF for a rectangular loading. **7**

11. a) Explain the need of earth quake analysis of structure and need of standard code. **6**

b) Explain codal coefficient method in brief and write different IS 1893 codal based procedure for seismic analysis? **7**

OR

12. a) Explain the guidelines of earthquake resistance design? **6**

b) Explain in brief about seismic zone of India. **7**

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