

Time: 3 Hours

G.P. 10095767

Marks: 80

**Instructions:**

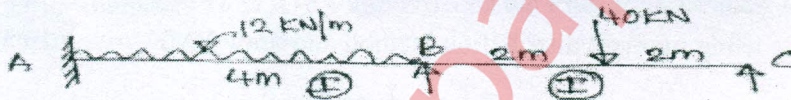
- 1) Q.1 is compulsory. Attempt any three full questions from the remaining.
- 2) Each full question carries 20 marks. Draw neat sketches wherever necessary.
- 3) Assume suitable data wherever required & state it clearly.

**Q.1 Answer any four:**

**20 Marks**

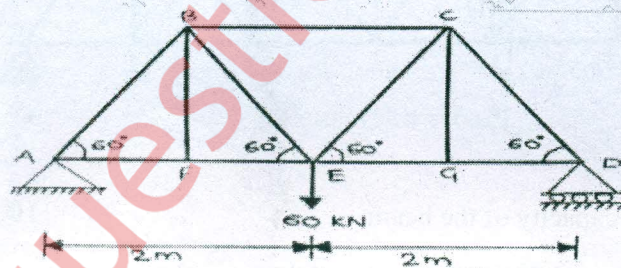
- a) Differentiate between Determinate and Indeterminate structures. Determine the degree of static and kinematic indeterminacy of a fixed beam and a cantilever beam.
- b) Define and explain carryover factor and distribution factor with the help of examples.
- c) A three hinged symmetrical parabolic arch of span 30 m and a central rise of 5 m. is subjected to a point load of 10 kN located at 10 m from the left support. Calculate the horizontal thrust and reactions at the supports.
- d) Determine the shape factor of a circular solid section of radius R.
- e) Define Influence Line diagram and give its applications in civil engineering. How do Influence Line Diagrams differ from bending moment diagrams and Shear Force diagrams?

**Q.2 a) Analyse the continuous beam by Three Moment Theorem and draw BMD. 10 Marks**

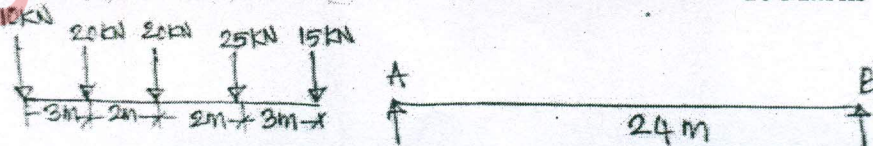


(b) A 3-hinged symmetrical parabolic arch spans for 12 m with a central rise of 3 m. It carries a uniformly distributed load of 15 kN/m over its entire span. Calculate Normal Thrust and Radial Shear force at a section 3 m from the left support. Draw BMD. **10 Marks**

**Q.3 a) Find forces in truss members using Method of joints. AF = 1m & GD = 1m. 10 Marks**



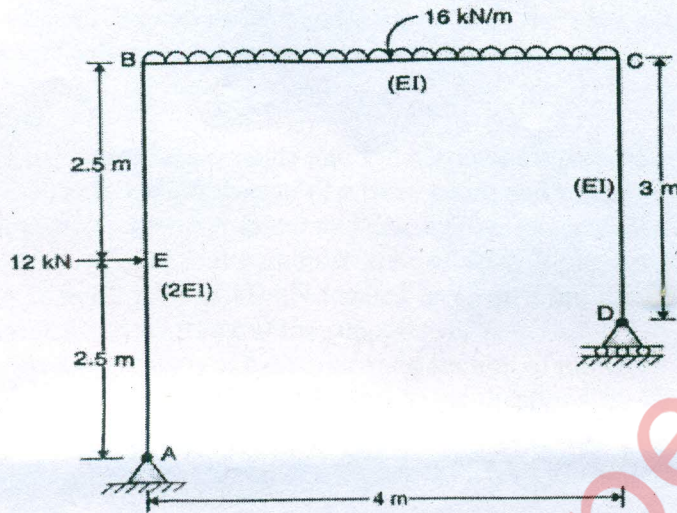
b) A simply supported beam of span 24 m is subjected to a train of wheel loads as shown in fig. The load train moves from left end to right end with 15 kN as the leading load. Find the maximum BM under 25 kN load. **10 Marks**



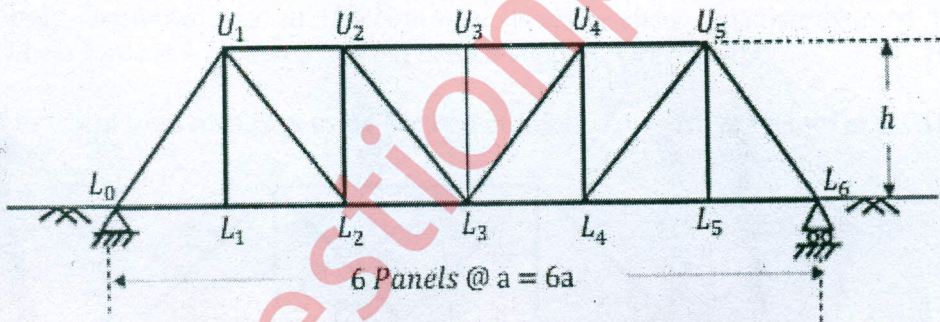


Q. 6. a) A rigid jointed frame is loaded as shown. Using unit load method, determine horizontal deflection at joint B. Take  $EI = 40,000 \text{ kNm}^2$ .

10 Marks



b) Draw ILD for members  $L_2L_3$ ,  $U_2L_2$  and  $U_2L_3$  of the Pratt truss of span 12 m. Consider the unit load to be moving along the bottom chord. Take  $a = 2 \text{ m}$  &  $h = 3 \text{ m}$ . 10 Marks



\*\*\*\*\*