15.05.2025

E- CIVIL - sem IV - R- 19 - C- scheme

Time: 3 Hours   **Marks: 80**

NOTE:
- Q1 is compulsory. Attempt any three from remaining five questions
- Figure to the right indicates full marks. Draw neat sketches wherever necessary
- Assume suitable data wherever required

**Q1** Answer any **four** from the following: **20 Marks**
- a) Define influence line diagram and give its applications in Civil Engineering. Draw the influence line diagram for shear force and bending moment at point 4 metres from the left support of a simply supported beam of span 10 metres.
- b) Draw the stress diagrams of elastic state, elastoplastic state, and fully plastic state for a beam of rectangular cross section.
- c) Explain the unit load method for determining displacements in trusses with the help of a suitable example
- d) Differentiate between Determinate and Indeterminate structures. State advantages and disadvantages of indeterminate structures.
- e) Explain carry over factor and distribution factor with the help of suitable examples

Q2

(a) Analyse the continuous beam loaded and supported as shown in figure by Three Moment Theorem and draw BMD   **10 Marks**

Assume EI = Constant
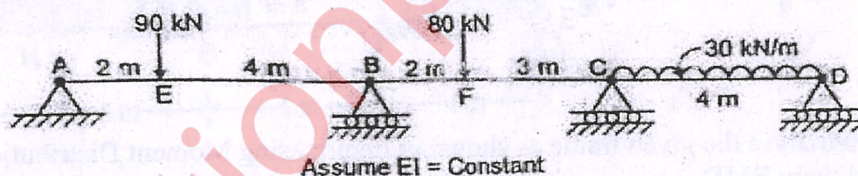
(b)   A three hinged symmetrical parabolic arch has a span of 30 m and a central rise of 3 m. It is loaded with 10 kN/m on the left half of the arch
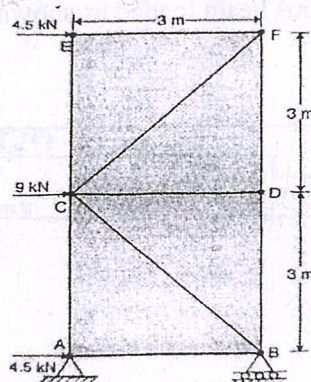   1) Calculate Normal Thrust and Radial Shear force at 7.5m from left hand support and
        2) Draw BMD   **10 Marks**

Q3
(a)   Find the forces in the truss members using Method of Joints.

                                                               10 Marks

QP code
84014

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(b) A simply supported beam of span 50 m is subjected to a train of wheel loads: 20 kN, 50 kN, 60 kN and 10 kN spaced at 2m, 4m and 3m respectively (from left to right). The load train moves from the left end to right end of the beam with 10 kN as the leading load. Determine the location and magnitude of absolute maximum BM on the girder   **10 Marks**
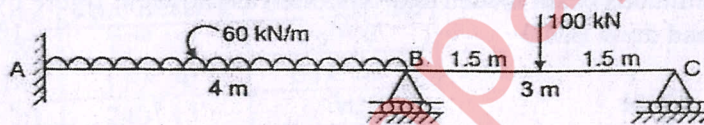
Q4

(a)   Develop flexibility matrix for the coordinates as shown in Figure   **10 Marks**
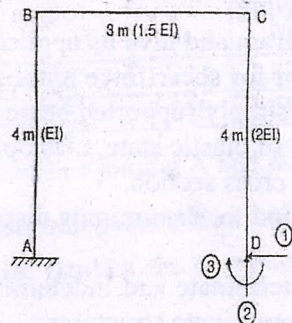
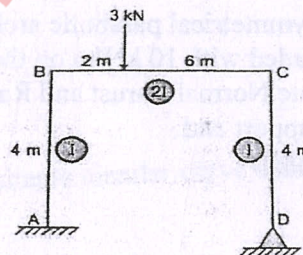**(b)** Analyse the given beam as shown in Figure using Stiffness Method and draw BMD   **10 Marks**
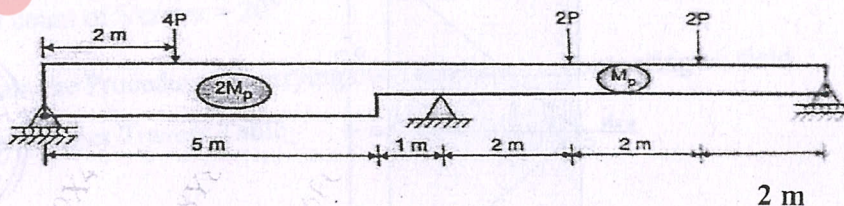

Q5.

(a) Analyse the given frame as shown in Figure using Moment Distribution method and draw BMD   **10 Marks**

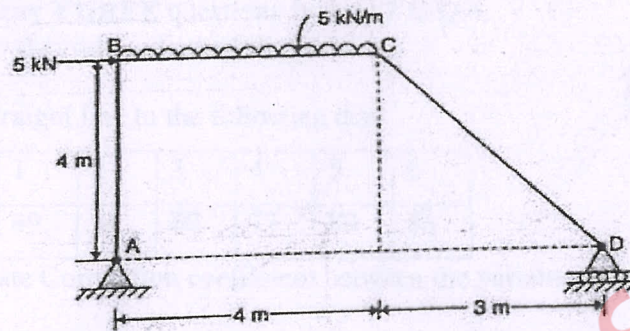**(b)** Find collapse load P for the continuous beam loaded as shown in figure.
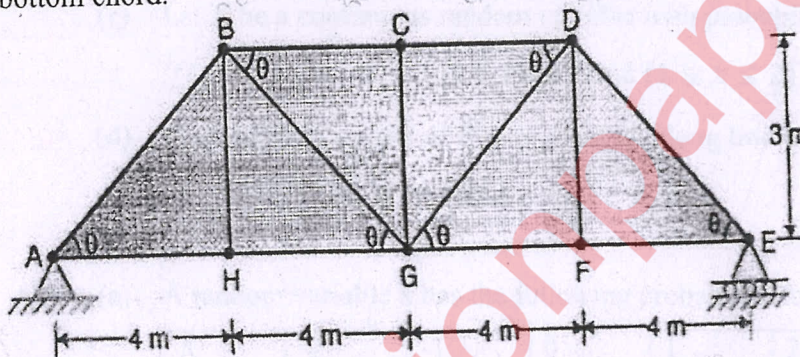
10 Marks

Q6 (a) A rigid jointed frame is loaded as shown in figure. Using unit load method determine horizontal movement of roller support at 'D', Take EI= constant

10 Marks

b) Draw I.L.D. for members CD, GD and GF of the truss when unit load travels over the bottom chord.

10 Marks