

Duration : 3.00 Hrs.

[Total 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

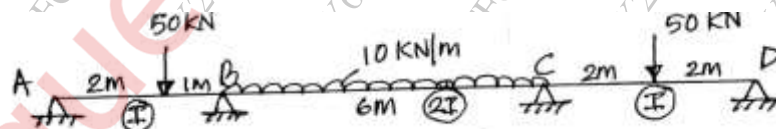
Q1 Answer any four from following:

20 Marks

- Define Influence Line diagram and give its applications in civil engineering. Draw ILD for reactions, SF and BM for simply supported beam
- Explain the application of Unit Load Method for finding deflection in trusses
- Define flexibility and stiffness and state the relation between them
- Draw the stress diagrams of elastic state, elastoplastic state, and fully plastic state for a beam of rectangular cross section.
- Draw following structures
  - Beam with Static Indeterminacy = 3
  - Truss with Static Indeterminacy = 2
  - Frame with static indeterminacy = 5
  - Beam with Kinematic Indeterminacy = 0
  - Frame with Kinematic Indeterminacy = 4

Q2 (a) Analyse the continuous beam loaded and supported as shown in figure by Three Moment Theorem and draw BMD

10 Marks



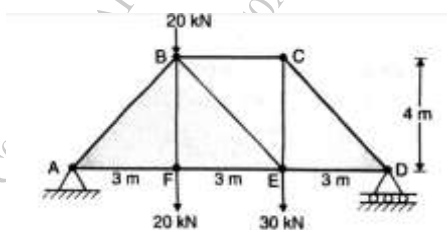
(b) A three hinged symmetrical parabolic arch has a span of 30 m and a central rise of 5m. It is loaded with 20 kN/m on the left half of the arch

- Calculate Normal Thrust and Radial Shear force at 5m from left hand support and
- Draw BMD

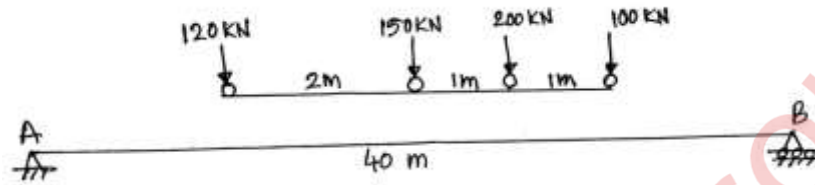
10 Marks

Q3 (a) Find the forces in the truss as shown in figure using Method of joints

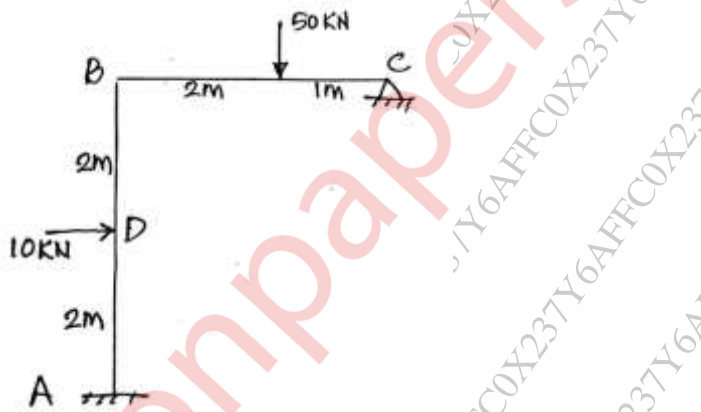
10 Marks



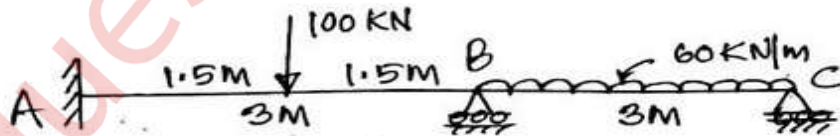
- (b) Find the absolute maximum BM on the girder with 100 kN load leading and moving from left to right 10 Marks



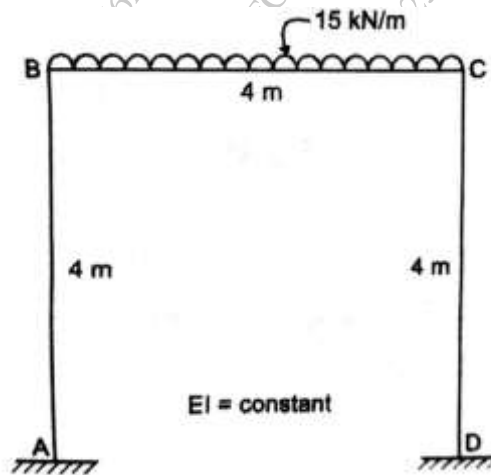
- Q4** (a) Analyse the given frame as shown in Figure using Flexibility method and draw BMD 10 Marks



- (b) Analyse the given beam as shown in Figure using Stiffness Method and draw BMD 10 Marks

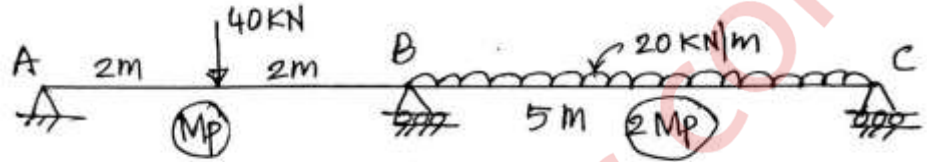


- Q5.** (a) Analyse the given frame as shown in Figure using Moment Distribution method and draw BMD 10 Marks



- (b) Calculate the plastic moment capacity required for the continuous beam with working loads as shown in figure. Take load factor as 1.5

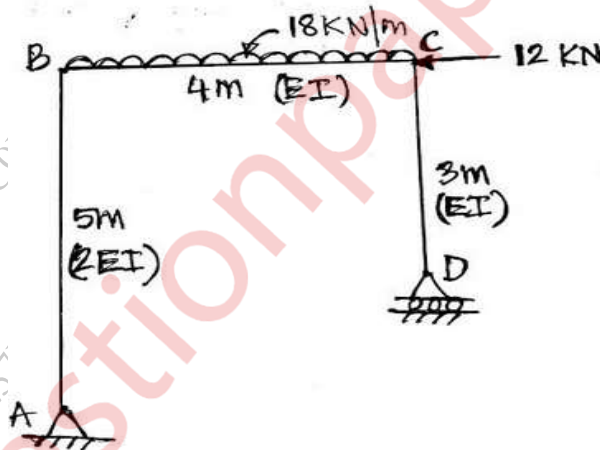
10 Marks



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  $EI = 40,000 \text{ kN.m}^2$

10 Marks



- b) Draw I.L.D for member HG and BG of the truss as shown in figure, Assume that the load is moving along bottom chord

10 Marks

