

N.B: (1) Question No. 1 is compulsory.

(2) Attempt any **three** questions out of remaining five questions.

(3) Assume suitable data wherever required and state it clearly.

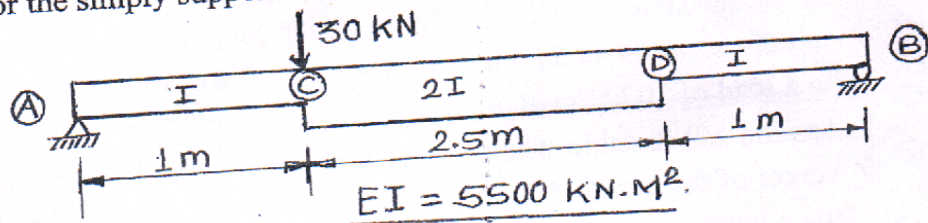
(4) Illustrate your answers with neat component sketches wherever required.

(5) Answers should be written in the legible handwriting, stepwise and in the systematic manner.

1. Attempt any four of the following

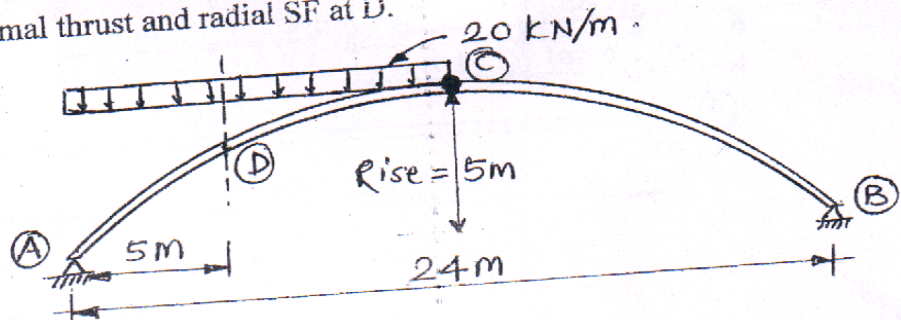
- Enlist various methods for finding deflection in structures. Also state the suitability of each method. 05
- State and explain Maxwell's Reciprocal theorem and Betti's theorem. 05
- Explain unsymmetrical bending and the concept of shear center in brief 05
- A symmetrical cable of span 80m with central dip 12m is loaded with udl of 20 kN/m. Find the maximum and minimum tension in the cable. 05
- Define strain energy. Write the expression for strain energy stored due to shear force, bending moment and twisting moment. 05

2. (a) Using Conjugate beam method, find the vertical deflection at C and slope at B for the simply supported beam as shown in figure. 08



(b) A three hinged symmetrical parabolic arch is loaded as shown in figure. Calculate:

- Support reaction
- Maximum bending moment in the portion AC and BC (Draw neat sketch).
- Normal thrust and radial SF at D.



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