Total number of printed pages–5

53 (CE 503) STA–II

2021

STRUCTURAL ANALYSIS–II

Paper : CE 503

Full Marks : 100

Time : Three hours

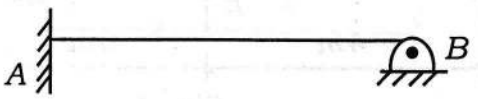
The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1. *(a)* Define statically indeterminate structures. And give the classification of indeterminate structures. 3

   (b) Determine the degree of static indeterminacy for the following : 6

   (i)



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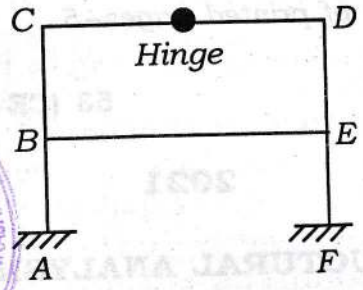
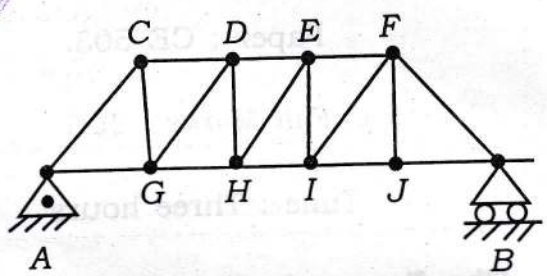
(ii)



(iii)



(c) State Clapeyron's theorem. 2

(d) Determine the moments over the beam in *figure*–1 and draw the bending moment diagram by three moment theorem. Also calculate the reactions at the supports and draw the shear force diagram. 9

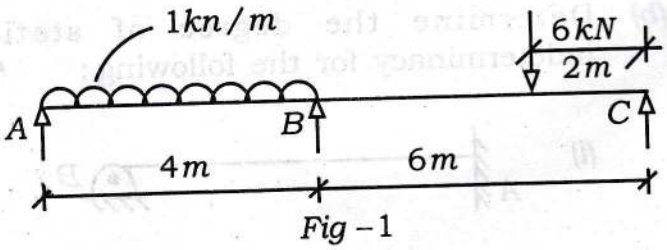
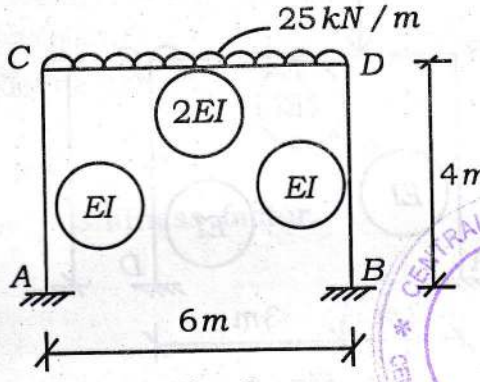


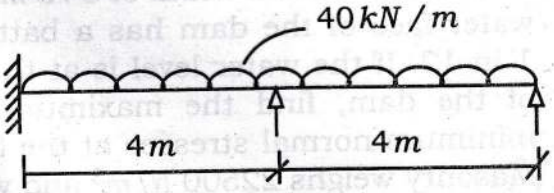
Fig –1

2. Analyse the frame shown in *figure*–2 by slope deflection method. Draw BMD and SFD. 20



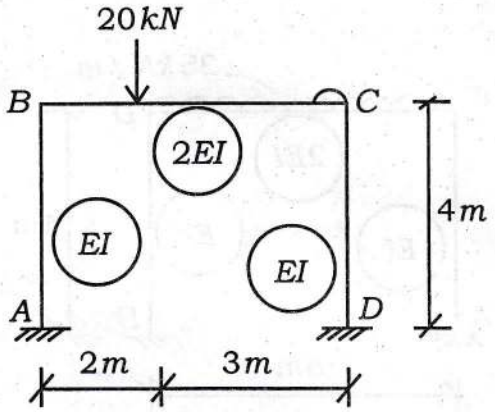
Fig–2

3. Using moment distribution method, analyse the beam shown is *figure*–3. Support *B* sinks by 5 *mm* below *A* and *C*. Take $E = 200\ GPa$ and $I = 400 \times 10^6\ mm^4$. 20



Fig–3

4. Analyse the frame shown is *figure*–4 by Kani's method and draw BMD. 20



Fig–4

5. *(a)* Define the following: 5

(i) Fatigue and *(ii)* Creep.

(b) A masonry dam of trapezoidal section is 12 *m* high. It has a top width of 1·75 *m* and bottom width of 6·75 *m*. The water face of the dam has a batter of 1 in 12. If the water level is at the top of the dam, find the maximum and minimum normal stresses at the base. Masonry weighs 22500 N/m^3 and water weighs 9810 N/m^3. 15

6. *(a)* A fixed beam of span '*l*' carries a point load '*W*' eccentrically on the span at a distance '*a*' from the left end and '*b*' from the right end. Find the fixing moments at the ends of the beam. 16

(b) Define the following: 4

(i) Orthogonal frame and

(ii) Stiffness factor.