Total No. of printed pages = 4

2022

STRUCTURAL ANALYSIS - II

Full Marks -- 100

Time -- Three hours

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

Answer any *five* questions.

1. a) Define the following :   8

   (i) Statically indeterminate structure

   (ii) Stiffness factor

   (iii) Creep of concrete and

   (iv) Flexural rigidity.

  b) Determine the degree of internal and external indeterminacy for the following :   12
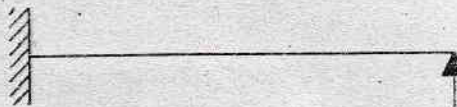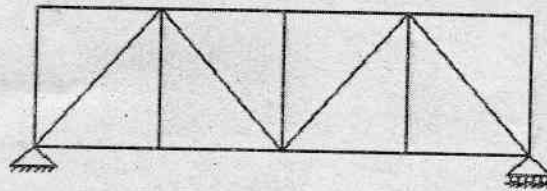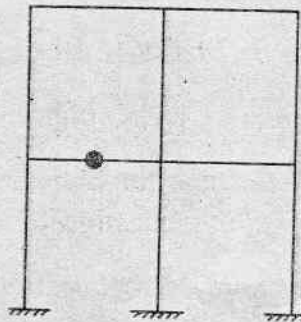

Figure-1a

[Turn over

Figure-1b

Figure-1c

2. Analyze the beam shown in figure-2 by slope deflection method. Support B sinks by 5 mm in the downward direction. The flexural rigidity (EI) of the beam is as indicated in the figure. Also, draw the BMD.   20
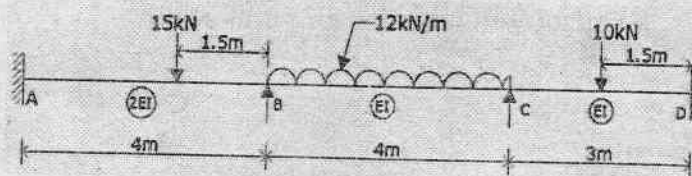

Figure-2

3. For the portal frame shown in figure-3, analyze the frame by moment distribution method. EI of the frame is as indicated in the figure. Also, draw the BMD. 20
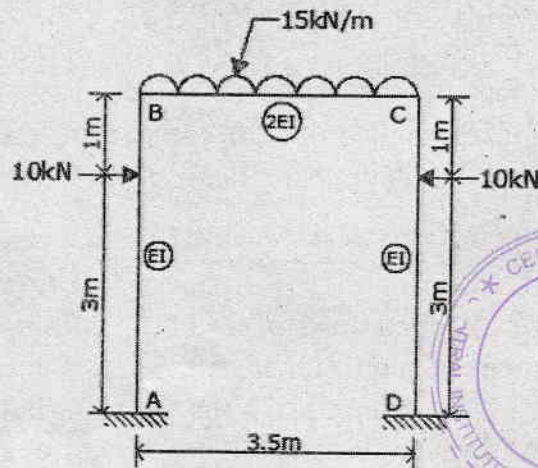

Figure-3

4. For a three-span continuous beam shown in figure-4, determine the end moments by Kani's method. The EI is as indicated in the figure. Also, draw the BMD. 20
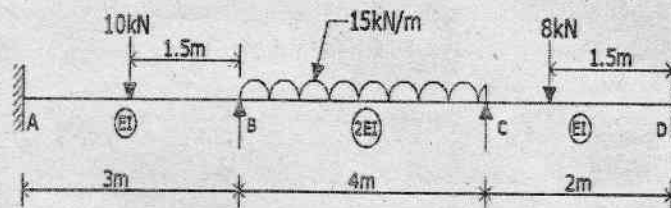

Figure-4

5. (a) Explain briefly under what condition a dam is liable to fail. 6

   (b) A masonry dam of trapezoidal section is 12m high. Top width is 1.5m and bottom width is 7.5m. The water face of the dam has a better if 1 in 10. If the water level is at the top of the dam, find the maximum and minimum normal stresses at the base. Take $\omega_m = 22500$ N/m^3 and $\omega_w = 9810$ N/m^3. 14

6. A fixed beam shown in figure-5 is of span 6m carries a point load of 24 kN at mid span. The moment of inertia of the section is I for the left half of the span and 2I for the right half of the span, find the fixed end moments. Also, draw the BMD. 20
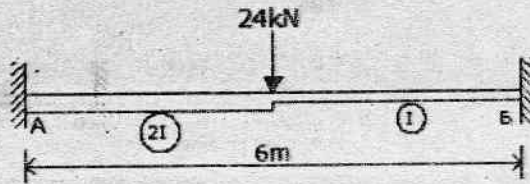

Figure-5