

**B. TECH**  
**(SEMESTER-IV) THEORY EXAMINATION 2017-18**  
**STRUCTURE ANALYSIS I**

Time: 3 Hours

Total Marks: 70

Note: Attempt all Sections. If require any missing data; then choose suitably.

## SECTION A

1. Attempt all questions in brief.

2 x 7 = 14

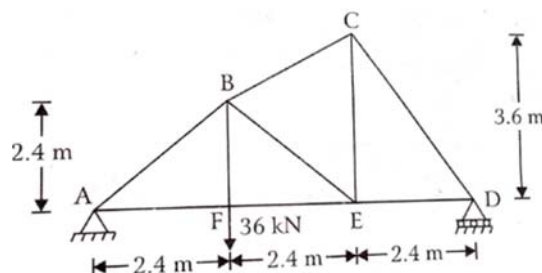
- a) What do you mean by static and kinematic indeterminacy of a structure?
- b) Define space truss with suitable example.
- c) Draw the influence line diagram of bending moment for a simply supported beam at a section D.
- d) State the Eddy's theorem.
- e) Three hinged arch is a determinate structure. Why?
- f) Write statement of Castigliano's first and second theorem.
- g) What do you mean by principal axes?

## SECTION B

2. Attempt any three of the following:

7 x 3 = 21

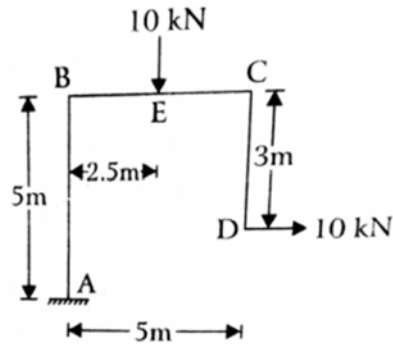
- a) The loading and support condition of a plane truss is shown in fig. find the forces in member AB and AF.



- b) A uniformly distributed load of 50 kN/m longer than the span rolls over a girder of 30 m span. Determine the maximum S.F. and B.M. at a section 12 m from left hand support.
- c) A three hinged parabolic arch of span 40 m and rise 10 m carries concentrated loads of 20 kN and 70 kN at a distance 8 m and 16 m from the left and a uniformly distributed load of 50 kN/m on the right half of the span. Find the horizontal thrust.
- d) Determine the slope and deflection at free end of cantilever beam of span L, and uniformly loaded with load 'ω'. EI = constant
- e) A channel section has overall depth of 250 mm, flange width of 125 mm, and flange thickness of 20 mm and also web thickness of 20 mm. find the location of shear centre.



- b) Determine the horizontal deflection at a free end of the frame as shown in figure, by using unit load method.



7. Attempt any *one* part of the following:

7 x 1 = 7

- a) A beam of rectangular section 80 mm wide and 120 mm deep is subjected to a bending moment of 12 KN-m. the trace of the plane loading is inclined at  $45^\circ$  to the YY- axis of the section. Calculate the maximum bending stress induced in the beam.
- b) A cast iron beam of T-section as shown in figure. The beam is simply supported on a span of 8 m. the beam carries a UDL of 1.5KN/m length on the entire span. Determine the maximum tensile and compressive stresses.

