(Pages : 3)

Reg. No. : .....

Name : .....

Fourth Semester B.Tech. Degree Examination, September 2018
(2008 Scheme)
08.403 : STRUCTURAL ANALYSIS – I (C)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions from Part – **A**.

1. Discuss statically determinate and indeterminate frames with suitable examples :
   i) Trusses and
   ii) Rigid frames.
2. Explain strain energy. Also state the theorem of minimum strain energy.
3. Explain principle of virtual work with suitable example.
4. Derive the expression for slope at support and deflection at the centre of a simply supported beam carrying uniformly distributed load of intensity w/unit length.
5. Determine the horizontal thrust in a three hinged arch of span l carrying uniformly distributed load for the left half of the length. Take 'r' as the central rise of the arch.
6. Derive the condition for maximum bending moment at any given section of a simply supported girder due to a given system of concentrated loads crossing the girder.
7. What is meant by Influence line diagram ? Explain with suitable example.
8. Determine the crippling load of a 6 m length circular column having 300 mm diameter with both ends hinged. E = 200 Gpa. **(8×5=40 Marks)**

P.T.O.

PART – B

Module – I

9. Find the maximum deflection and maximum slope for the simply supported beam loaded as shown in Fig. 1. Take EI = 15×10^3 kN-m^2.

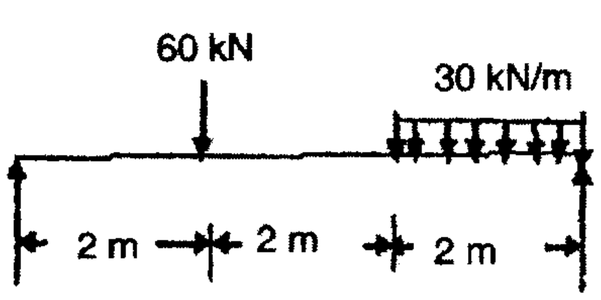

Fig. 1 **20**

OR

10. Determine the vertical deflection at joint C of the frame shown in Fig. 2. Assume uniform flexural rigidity EI throughout.

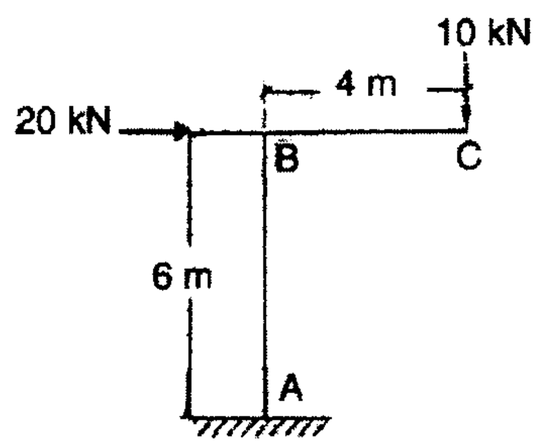

Fig. 2 **20**

Module – II

11. A propped cantilever AB of span 5 m is propped at B and carrying concentrated load of 30 kN at a distance 2 m from the free end. Determine the reactions at A and B and draw SFD and BMD. Use Maxwell's theorem. **20**

OR

12. a) Discuss various types of arches and specify its static indeterminancy. **5**

    b) A three hinged parabolic arch, hinged at ends and at crown having span of 10 m and central rise of 2 m carries udl of intensity 10 kN/m over the entire length and concentrated load of 20 kN at 3 m from the left end. Analyse the arch and draw BMD. Also determine the normal thrust and shear force at section 4 m from left support. **15**

Module – III

13. a) A tubular column of 50 mm external diameter and 40 mm internal diameter is 2.4 m long has hinged ends it carries a compressive load of 30 kN at an eccentricity of 2 mm. Determine the maximum and minimum stress in the column. Also find the maximum eccentricity so that no tension exists in the section. **10**

b) Five point loads 5 kN, 5 kN, 10 kN, 10 kN and 10 kN spaced 2.5 m apart cross a girder of span 30 m. Draw influence line for shear force and bending moment at a point 10 m from left hand abutment and determine the maximum shear force and bending moment at this section. 5 kN load leads and the system may pass over the bridge from either side. **10**

OR

14. Draw influence line diagram for the forces in members P, Q and R of the truss shown in Fig. 3 and determine maximum force in the members due to u.d.l. of intensity w/m length, longer than the span. **20**

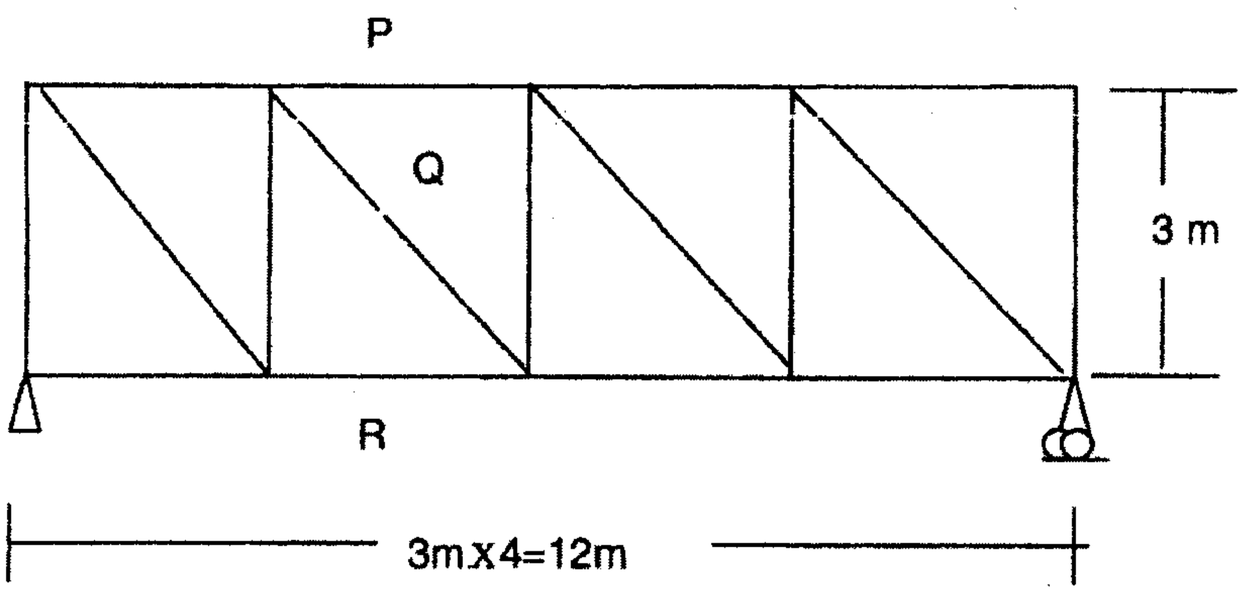

Fig. 3