

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– V(OLD) EXAMINATION – SUMMER 2019

Subject Code:150605

Date:06/06/2019

Subject Name:Structural Analysis - III

Time:02:30 PM TO 05:00 PM

Total Marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

Q-1 (a) Derive an expression for S.F. and B.M. at support for a circular beam supported symmetrically. **7**

(b) Derive an expression for Meridional thrust and Hoop force for a conical dome. **7**

Q-2 (a) Differentiate between stiffness method and flexibility method. **7**

(b) Explain the concept of plastic analysis and design. **7**

OR

(b) Distinguish between elastic section modulus and plastic section modulus. **7**

Q-3 (a) Formulate flexibility matrix for a cantilever beam shown in fig-1. **7**

(b) Find the value of R_B in fig-2. Using by flexibility method. **7**

OR

Q-3 (a) Formulate Stiffness matrix for a cantilever beam shown in fig-1. **7**

(b) Generate stiffness matrix for a beam shown in fig-3. **7**

Q-4 (a) A spherical dome, span 10m and rise 2m, has a shell which is 120mm thick. The wind load on the dome is estimated to the equivalent to 1.2 kN/m^2 . Estimate stresses in the dome. **7**

(b) Derive an expression for meridional thrust and hoop force for a spherical dome subjected to UDL. **7**

OR

Q-4 (a) A spherical dome with 20m span and 6m central rise has an opening of 4m horizontal diameter at top. If all inclusive UDL of 6 kN/m^2 is acting on it. Calculate the maximum value of hoop compression in top ring beam. **7**

(b) List various uses of domes and what are the loads acting on domes? **7**

Q-5 (a) For a square beam section shown in fig-4. find shape factor and fully plastic moment. Take $f_y = 250 \text{ N/mm}^2$. **7**

(b) Distinguish between a straight beam and a beam curved in plan. 7

OR

Q-5 (a) Determine shape factor for the triangular section shown in fig-5. 7

(b) Give the uses of curved beam. 7

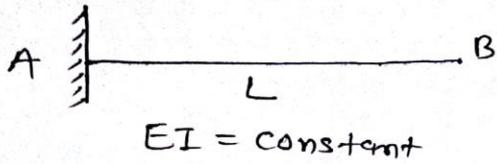


Fig-1

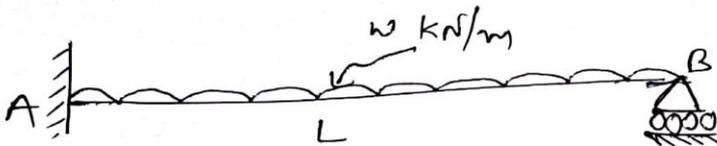


Fig-2

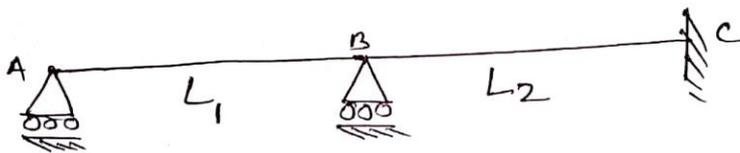


Fig-3

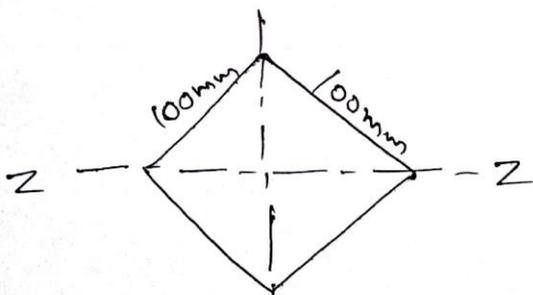


Fig-4

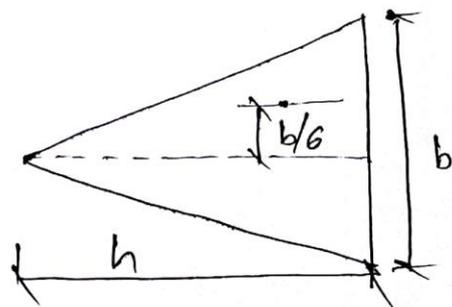


Fig-5