Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – I • EXAMINATION – SUMMER • 2014

Subject code: 712005 **Date: 21-06-2014**

Subject Name: Basic Concepts of Structural Behaviour

Time: 02:30 pm - 05:00 pm **Total Marks: 70**

Instructions:

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

Q.1 **(a)** Give Classification of structures in general. **07**

(b) Determine the unknown reaction forces R_A & R_B for the beam loaded as shown in fig.1 **07**

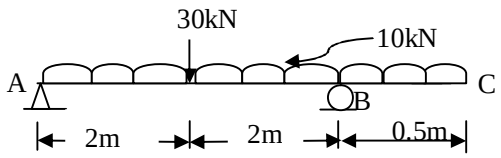

Fig.1

Q.2 **(a)** Explain behavioural pattern of structural members in Tension, compression, bending, and torsion with neat sketches. **07**

(b) Explain various types of loads that are considered in Analysis and design of structures in general. **07**

OR

(b) What is the importance of end (support) conditions in design of a column? Give design steps for design of a column. **07**

Q.3 **(a)** What is óShear Centerõ? Explain the importance of the Shear Center in behaviour of a member. **07**

(b) Draw shapes of Shear force and bending moment diagrams for the following two beams: **07**
Simply supported beam with a concentrated load at mid-span.
Cantilever with udl over entire length.

OR

Q.3 **(a)** Determine maximum bending stress for a simply supported beam of length 4m carrying a concentrated load of 100kN at its mid span. The cross-section of the beam is rectangular (B=300mm, D=450mm). **07**

(b) What is stress an strain? What are the different types of stresses and strains in general. **07**

Q.4 **(a)** Draw and explain various components of cable stayed and cable suspended structures. **07**

(b) Write short note on the design principles for Plates, grids and framed structures. **07**

OR

Q.4 **(a)** Explain behaviour of Arch structures and cable structures with neat sketches. **07**

(b) Draw and explain the behavior of stress-strain curve of a mild steel bar subjected to tensile force. Showing all important points on it. **07**

Q.5 **(a)** Determine internal forces in all members of a truss shown in fig.2 **07**

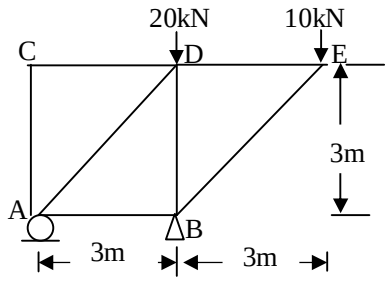

Fig.2

(b) A suspension cable of 100m horizontal span is supported at the same level at both the ends. It is subjected to a udl of 20kN per horizontal metre. If the maximum tension in the cable is limited to 4000kN, calculate the minimum central dip needed. **07**

OR

Q.5 **(a)** Explain general design principles for Design of Beams. **07**

(b) Explain the terms: Resolution of a force, composition of forces, free body diagram, resultant and equilibrant of a force system. **07**

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