

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE Arch. – SEMESTER – II • EXAMINATION – SUMMER • 2014

Subject Code: 1025004

Date: 30-05-2014

Subject Name: Structure - II

Time: 10:30 am - 12:30 pm

Total Marks: 50

Instructions:

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

- Q.1** (a) Define following **05**
(1) Stress, (2) Strain, (3) Modulus of Elasticity (4) Hook's Law,
(5) Poisson's ratio
- (b) A steel bar of 30 mm diameter is 1 meter long. It is subjected to a tensile force of 65 KN. Find stress, strain and elongation of the bar. Take Modulus of Elasticity = $2.0 \times 10^5 \text{ N/mm}^2$ **05**
- Q.2** (a) Define following **05**
(1) Point of Contra-flexure, (2) Shear Force, (3) Bending Moment (4) Statically determinate Beam (5) write down conditions of Equilibrium
- (b) A steel bar 650 mm long is acted upon by forces as shown in fig-1. If the bar assembly is in equilibrium, Find the force P and the change in length of the bar. **05**
- OR**
- (b) A RCC Column 600 mm in dia. is reinforced with 8 nos. of 16 mm dia. steel bars. If a load of 1500 KN is applied on the column, find forces carried by steel and concrete. **05**
 E for steel = $2.1 \times 10^5 \text{ N/mm}^2$ and E for concrete = $1.4 \times 10^4 \text{ N/mm}^2$
- Q.3** (a) Analyze the Cantilever beam shown in Fig-2 and Draw shear force and Bending Moment Diagram **05**
- (b) Analyze the Simply supported beam shown in Fig-3 and Draw shear force and Bending Moment Diagram **05**
- OR**
- Q.3** (a) A Cable is laid in winter at -4°C . The cable is unable to expand in any direction. What stress would be induced in it when the temperature in summer is 34°C ? **04**
Assume $\alpha = 12 \times 10^{-6} / ^\circ\text{C}$ and $E = 2 \times 10^5 \text{ N/mm}^2$
- (b) Analyze the Simply supported beam shown in Fig-4 and Draw shear force and Bending Moment Diagram **06**
- Q.4** (a) Analyze the beam shown in Fig-5 and Draw shear force and Bending Moment Diagram **06**
- (b) Write down assumption made in theory of Plane truss **04**
- OR**
- Q.4** (a) Analyze the Cantilever beam shown in Fig-6 and Draw shear force and Bending Moment Diagram **04**
- (b) Determine the forces in the member of the plane truss loaded as shown in fig-7. **06**
- Q.5** (a) Differentiate between Truss and Frame **03**
- (b) Analyse the truss loaded as shown in fig-8. Find member forces. **07**
- OR**
- Q.5** (a) A bar is loaded as shown in fig-9. Calculate the change in length of the bar. **04**
Take $E_{\text{steel}} = 80 \text{ GPa}$
- (b) Write down different types of Loads, supports and beams **06**


