

Seat No.: \_\_\_\_\_

Enrolment No. \_\_\_\_\_

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**BARCH – SEMESTER-V – EXAMINATION – SUMMER 2015**

**Subject Code: 1055004**

**Date: 11/05/2015**

**Subject Name: Structure V**

**Time: 2:30 PM – 4:30 PM**

**Total Marks: 50**

**Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Use of IS 800 (2007) is permitted

- Q.1** (a) Distinguish between working stress method and limit state method. **04**  
(b) Write short note on: Web angle connection (beam to beam). **03**  
(c) State and explain various types of column bases used in practice **03**

- Q.2** (a) State and explain various structural members according to transmission of forces in steel structures. **05**  
(b) Explain various failure modes of hot rolled beams. **05**

**OR**

- (b) Design suitable fillet weld to connect a tie plate 75 mm X 8 mm to a 12 mm thick gusset plate. The plate is subjected to load equal to full strength of the member. Assume shop welding and Fe 410 **05**

- Q.3** Two plates 100 mm wide and 12 mm and 18 mm thick are connected by lap joint to resist design tensile load of 80 kN. Design a lap joint using M 16 bolts of grade 4.6 and grade 410 plates **10**

**OR**

- Q.3** A member of a steel roof truss consists of two angles ISA 70 X 70X 6mm placed back to back on either side of 8 mm thick gusset plate. The member carries an ultimate tensile load of 180 kN . Determine the number of 16 mm diameter 4.6 grade ordinary bolts required for the joint. Assume  $f_u$  of plate as 410 MPa. **10**

- Q.4** A single unequal angle 90 X 60 X 6 mm is connected to an 8 mm gusset plate at the ends with six 16 mm diameter bolts to transfer tension. Determine the design tensile strength of the angle assuming that the yield and ultimate stress of steel used are 250 MPa and 410 MPa. Assume that the longer leg is connected to the gusset plate. Also calculate efficiency of the member. **10**

**OR**

- Q.4** Select suitable angle section to carry a factored load of 200 kN assuming a single row of M 20 bolts and  $f_y = 250 \text{ N/mm}^2$ . **10**

- Q.5** Design a simply supported beam of span 6 m carrying working loads of DL = 12 kN /m and LL = 8 kN /m. Assume that the compressive flange of the beam is laterally restrained throughout. **10**

**OR**

- Q.5** Design a steel column to carry factored axial load of 1200 kN. The length of column is 3.6 m and hinged at both ends. **10**

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