

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

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

## GUJARAT TECHNOLOGICAL UNIVERSITY

**B.ARCH. - SEMESTER-V EXAMINATION – SUMMER 2019**

**Subject Code:1055004**

**Date:20/05/2019**

**Subject Name: Structure-V**

**Time:02:30 PM TO 04:30 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) & Steel Tables is permitted

- Q.1 (a) Explain the types of bolted joints with appropriate figures. 05
- (b) Explain the Stress – Strain Curve for mild steel. 05
- Q.2 Two plates 70 mm wide and 10 mm and 12 mm thickness are connected by lap joint to resist factored tensile load of 80 KN. Design a lap joint using M 16 bolts of grade 4.6 and grade 410 plates. 10
- OR
- Q.2 A member ISA 100 x 100 x 6 mm placed back to back on either side of 8 mm thick gusset plate. The member carries an ultimate tensile load of 130 KN. Determine the number of 20 mm diameter 4.6 grade ordinary bolts. Take  $F_u$  of plate is 410 MPa. 10
- Q.3 (a) Explain with neat sketch the single and double lacing system. 05
- (b) Explain the advantages & disadvantages of welded connections. 05
- OR
- (b) A tie plate of 80 x 8 mm is connected to the gusset plate to transmit a factored load of 110 KN. Determine the size and length of fillet weld. Assuming field welds and Fe 410 steel. 05
- Q.4 An unequal angle section 100 x 75 x 6 mm is connected to 10 mm thick gusset plate using 6 Nos. 16 mm diameter bolts to transfer tensile force. Determine the design tensile strength of the angle. Take yield & ultimate stress of steel are 250 MPa and 410 MPa. Assume that the longer leg is connected to gusset plate. 10
- OR
- Q.4 Design a single angle discontinuous strut to carry a factored load of 80 KN. Assume that the distance between its joints is 2.5 m. Take  $f_y = 250$  MPa 10
- Q.5 Design a steel column to carry factored axial load of 1500 KN. The length of column is 3.6 m and hinged at both ends. Take  $f_y = 250$  MPa 10
- OR
- Q.5 Design a simply supported beam of span 6 m carrying working loads of  $DL=15$  kN/m and  $LL=10$  kN/m. Assume that the compression flange of the beam is laterally restrained throughout. Check for deflection & web crippling is not required. 10

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