

GUJARAT TECHNOLOGICAL UNIVERSITY

B.ARCH - SEMESTER- V • EXAMINATION – SUMMER 2017

Subject Code: 1055004

Date: 06/05/2017

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 Stress – Strain Curve for mild steel. **05**
(b) State the Difference between Working stress method and Limit state method. **05**

- Q.2 (a)** Write a note on types of bolted joints with appropriate figures. **05**
(b) A member of a steel roof truss consists of two angles ISA 85 x 85 x 6 mm placed back to back on either side of 10 mm thick gusset plate. The member carries an ultimate tensile load of 200 KN. Determine the number of 20 mm diameter 4.6 grade ordinary bolts required for the joint. Assume f_u of plate as 410 MPa. **05**

OR

- (b)** Two plates 160 x 10 mm of grade 410 are connected by 20 mm diameter bolts using butt joint. Design the bolted connection to transmit a pull equal to the strength of the plate Grade of bolt is 4.6 **05**

- Q.3 (a)** Explain the advantages and disadvantages of welding, **05**
(b) Design suitable fillet weld to connect a tie plate 60 x 8 mm to a 12 mm thick gusset plate. The plate is subjected to load equal to full strength of the member. **05**
Assume field welding, Fe 410. Weld should be provided at sides as well as at end.

OR

- Q.3 (a)** Explain types of welds with sketches. **05**
(b) Design suitable fillet weld to connect a tie plate 75 x 8 mm to a 8 mm thick gusset plate. The plate is subjected to load equal to 100 KN, Assume field welding, Fe 410. Weld should be provided at sides only. **05**

- Q.4** Determine the tensile strength of an angle ISA 100 x 75 x 6 mm connected to the gusset plate by 4 mm welds at toe (140 mm long) and back (310 mm long) also calculate the efficiency of the tension member and Take $f_y = 250$ MPa. **10**

OR

- Q.4** Design a single angle discontinuous strut to carry a factored load of 65 KN. Assume that the distance between its joints is 2.5 m. use $f_y = 250$ MPa **10**

- Q.5** A simply support beam is laterally supported over the span of 6 m and loaded by a all-inclusive factored udl of 30 KN/m over the entire span an 100 KN and centre. Design the beam using ISMB section and check for all the safety. **10**

OR

- Q.5** Design a single lacing system for a column composed of 2 ISMC 300 @ 35.8 Kg/m placed back to back at clear spacing of 200 mm. Axial factored load on column is 1500 KN. Effective length of column is 5 m (Calculation for tie plate is not necessary) **10**
