B. CONS. ENGG. 3rd YEAR 1ST SEM EXAM.-2018

Time : Three hours **DESIGN OF STRUCTURE – I** **Part – I,** Full Marks : 100

Answer any **two questions**. Assume suitable data not provided
Use of IS 800 and **SP** 6 (Steel Handbook) are allowed.

1 a) What are the different modes of failure of a bolted/riveted joint? Define Rivet Value. 5

b) Design a double bracket connection as shown in **Fig.1,** subjected to a total load of 200 kN at an eccentricity of 110 mm. Use 22 Ø power driven field rivets. Permissible stress for shear and bearing are 100 MPa and 300 MPa. 20

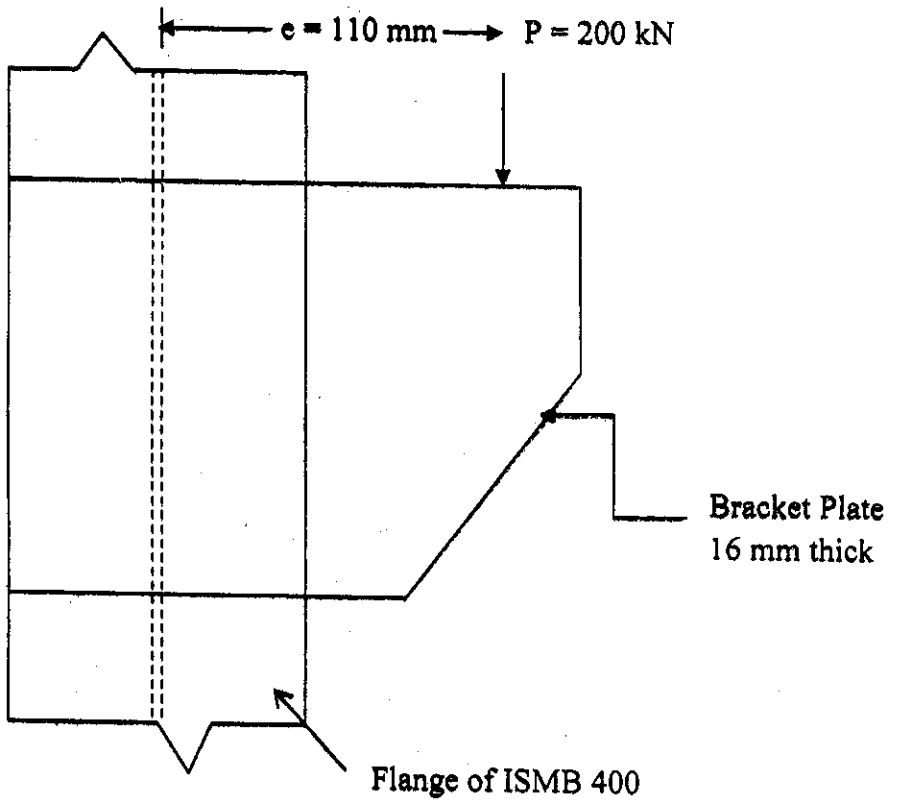

Fig. 1: Schematic Diagram of the Bracket

2 a) What is the Resultant Stress due to **Shear** and Torsion in welded connection? 5

b) Check the safety of the double bracketed weld connection as shown in **Fig.2,** subjected to a total load of 220 kN at an member eccentricity of 125 mm. Use 8 mm fillet weld. **20**

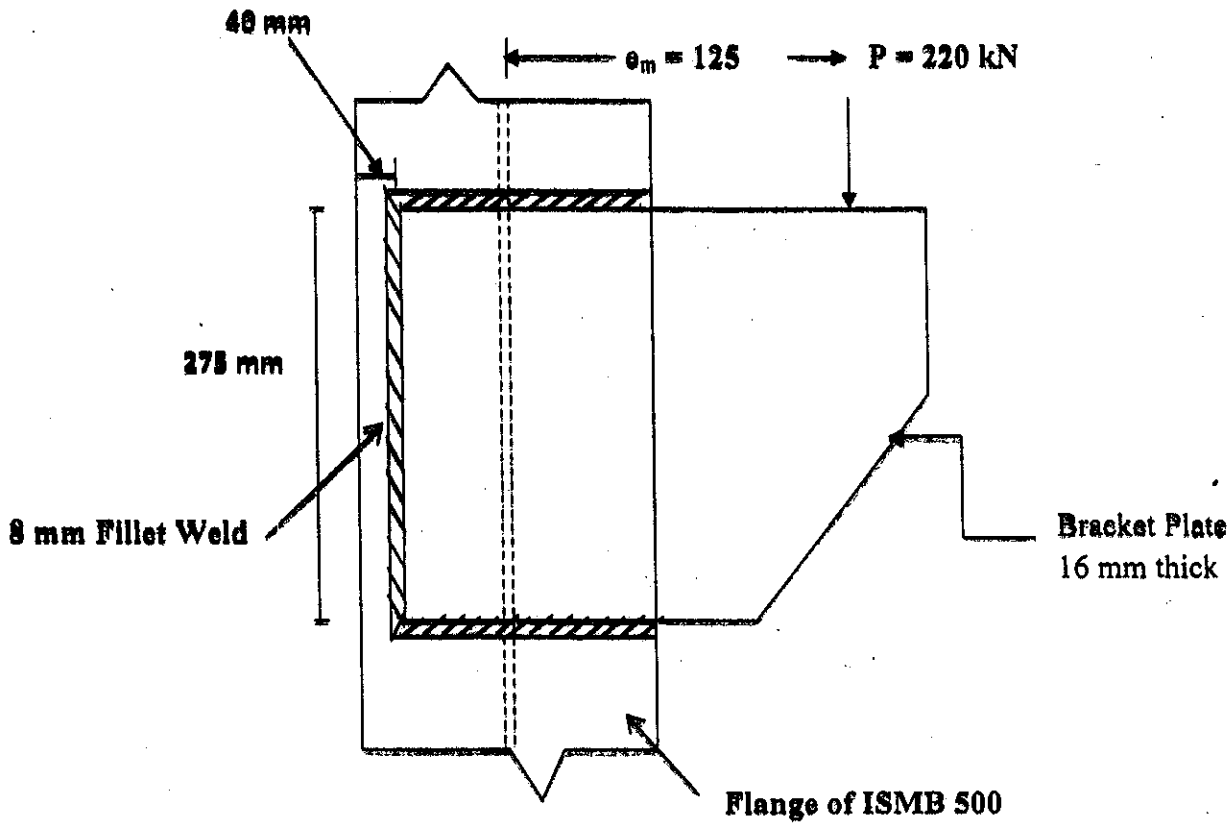

Fig. 2: Schematic Diagram of the Double Bracket

3 a) Discuss British method of Tension Calculation for the bracket connection as shown below. 5

b) One T bracket section is connected to the flange face of the column by 8 Nos of 20 mm dia. MS clear Bolts @ 80 C/C as shown in **Fig 3**. The bracket carries a load of 400 kN at a distance of 120 mm from face of the column flange. Check the safety of the joint and comment if any. The permissible stress for shear & tension of the bolt are 80 Mpa & 120 Mpa respectively. 25

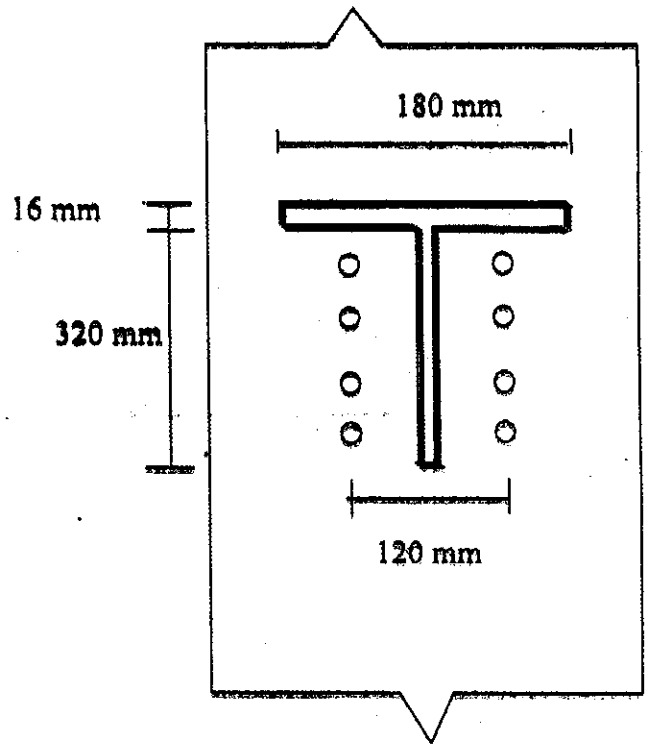

Fig.3: Bolted Bracket Connection

Ref. No. EX/CON/T/315/2018

B.E Construction Engg. 3rd Year 1st Semester Exam 2018.

Sub: Design of Structure -I

PART-II

Total Marks=50

Answer Question No.1 & any two from the rest [20+15X2=50]
Use Limit State method of Design.

1. Design a steel beam section for supporting roof of a big hall for the following data. Assuming Steel grade Fe-410.

   Clear Span =10.0 m
   End Bearing= 150 mm
   C/c of Spacing of Beams=3m
   Imposed Load on the beam=15 KN/m^2
   DL=5 KN/M^2
   Restriction on Beam depth =300 mm
   The compression flange of the beam is laterally supported throughout.

2. Design a column of 8 meter length in a building subjected to factored load of 3000KN. Both end of the column is Fixed. Use grade of steel Fe-250.

3. A Simply supported Steel Joist of 8 meter effective span is laterally supported throughout. It carries a UDL of 25KN/m inclusive of its Self Weight. Design an appropriate section using Steel of Grade Fe-410.

4. A column of ISMB 300 carries an axial compressive factor load of 2000KN. Design a suitable bolted base. The Grade of concrete is M25. Use 24 mm diameter of Grade 4.6 for making the connection.

5. Design a simply supported plate girder of span 20 meter and carries a UDL of 40KN/m. The compression flange is fully restrained laterally. Design the cross section of the girder only.