

BACHELOR OF CONSTRUCTION ENGINEERING EXAMINATION, 2017

(3rd Year, 1st Semester, Supplementary)

Design of Structure Steel (Old Syllabus)

Time : Three hours

Full Marks : 100

(50 marks for each Part)

Use a separate Answerscript for each Part

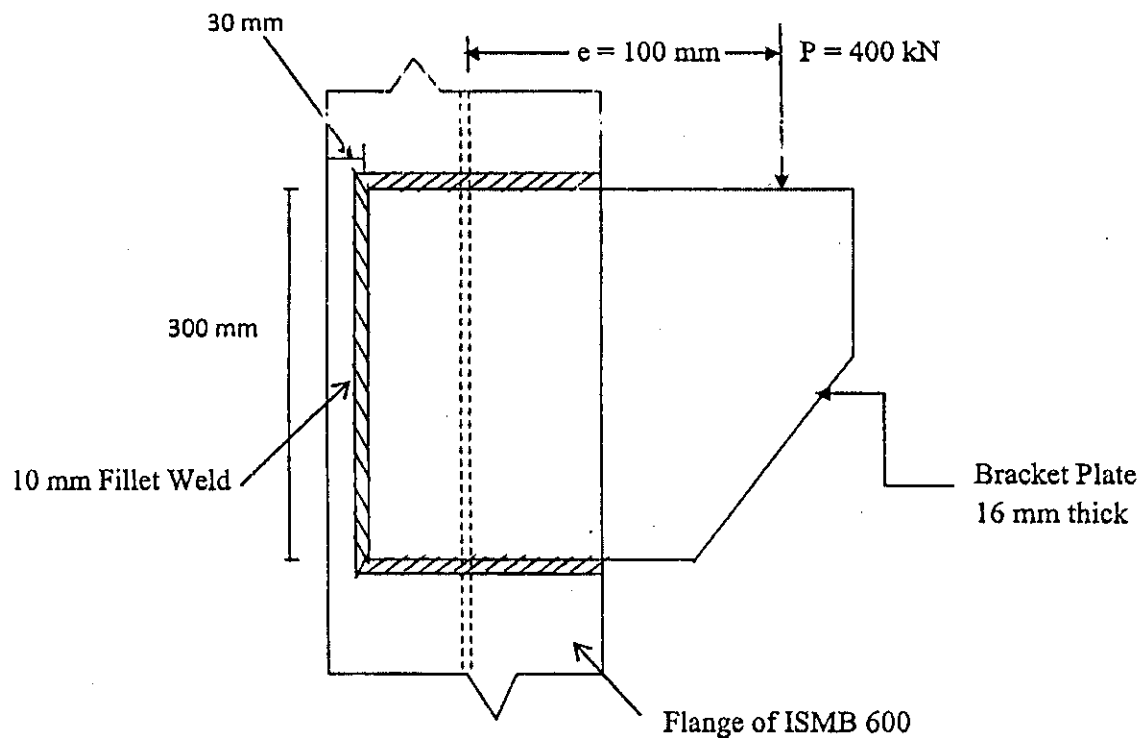
PART - I

Answer *any two* questions. Assume suitable data not provided.

Use of IS 800 and SP (6) are allowed. Draw neat sketches to clarify your answers.

- 1 a) Discuss the type of stresses and its resultant developed on the welded connection? 5
- b) Check the safety of the double bracketed weld connection as shown in Fig.1, subjected to a total load of 400 kN at an eccentricity of 100 mm. Use 10 mm fillet weld.

20



-Fig. 1: Schematic Diagram of the Double Bracket

[Turn over

- 2 a) What are the advantages and limitations of steel structures over concrete structures? 6
- b) What are the different modes of failure of Rivet and Bolt? Discuss in brief. 7
- c) Four member of a steel roof truss are meeting at the crown and connected with 12 mm thick gusset plate by 22 mm diameter power driven shop rivets. The rafters made of double angle sections are subjected to 350 kN (Compressive) and 290 kN (tensile) loads. The diagonals made of single angle section are subjected to 90 kN (Compressive) and 130 kN (tensile) loads. Find the number of rivets required for each member. 12
- 3 a) What do you mean by "Rivet Value"? Discuss in brief. 5
- b) Check the safety of the double bracket connection as shown in Fig.2, subjected to a total load of 250 kN at an eccentricity of 80 mm. Use 20 \varnothing MS Bolts. The pitch of the bolt is 75 mm C/C. 20

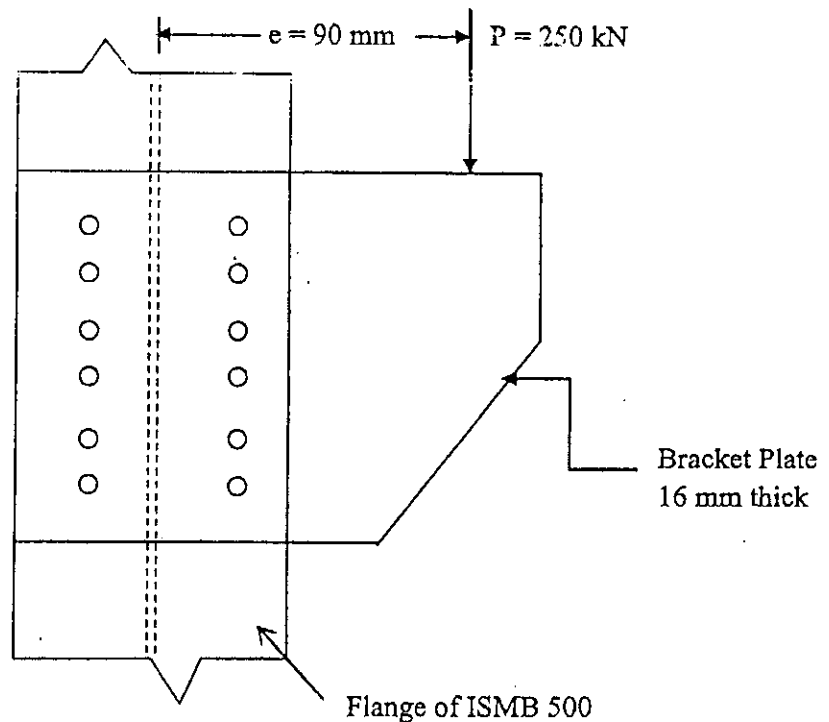


Fig. 2: Schematic Diagram of the Bolted Bracket Connection

PART-II

Answer Question No.1 & any two from the rest[20+15X2=30]

Use Limit State method of Design.

1. Design a column of 8 meter length in a building subjected to factored load of 1500KN. One end of the column is Fixed and other end is free. Use grade of steel Fe-250.
2. A Simply supported Steel Joist of 10 meter effective span is laterally supported throughout. It carries a UDL of 30KN/m inclusive of its Self Weight. Design an appropriate section using Steel of Grade Fe-250.
3. A column of ISMB 500 carries an axial compressive factor load of 2500KN. Design a suitable bolted base. The Grade of concrete is M25. Use 24 mm diameter of Grade 4.6 for making the connection.
4. Design a simply supported plate girder of span 20 meter and carries a UDL of 30KN/m . The compression flange is fully restrained laterally. Design the cross section of the girder only.