BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE PILANI
I SEMESTER 2023-24
MID SEMESTER EXAMINATION
CE G612 ADVANCED STEEL STRUCTURES (CLOSE BOOK)

Duration: 90 Mins   **Max Marks: 60**

1. A bracket transmits a factored load of 150 kN to a steel column ISWB 300. Load acts **[12M]** at a distance of 300 mm from the center of the column. Design eccentric bolted connection using 22 mm diameter shop-fabricated bolts of grade 4.6 and Fe 410 grade steel. Draw the connection details.

2. Design a suitable welded connection between a beam ISMB 400 and a column ISHB **[12M]** 400. The beam is to be connected to the flange of the column and transmit a factored shear force of 400 kN and a factored bending moment of 30 kN-m.

3. Design a seated angle connection to support a beam ISMB 300 transmitting a reaction **[12M]** of 300 kN to the flange of steel column ISWB 400. Adopt 20 mm diameter bolts of grade 4.6. Sketch the details.

4. Evaluate collapse load for a beam with uniform cross section and having span L. Beam **[12M]** is fixed at one end and simply supported at the other and subjected to a point load at a distance of x from fixed end. In what ratio will collapse load increase if both ends are fixed without any change in load configuration.

5. Design a bridge truss diagonal subjected to factored tensile load of 250 kN. Thickness **[12M]** of gusset plate is 16 mm with availability of 20 mm diameter bolts with grade 4.6. Show final connection sketch.