Reg. No.										

MANIPAL UNIVERSITY

FIFTH SEMESTER B. ARCH. DEGREE EXAMINATION – FEBRUARY 2016

SUBJECT: ARC 309 - STRUCTURES V

(2010 & 2007 SCHEME)

Tuesday, February 23, 2016

Time: 10:00 – 13:00 Hrs. Max. Marks: 50

- **Answer any FIVE FULL questions.**
- **Use of IS 800 and Steel Hand Book is permitted.**
- **Assume Yield stress of steel is 250MPa and Young's Modulus as 2×10^5 MPa**
- **Any missing data may suitably be assumed.**

1. Design a strut of an unequal angle section to carry a load of 150kN. Length of the strut is 2.3m. Strut ends are connected by welds.

(10 marks)

2. Determine the load carrying capacity of steel column of channel section ISMC300@35.8kg/m. If the length of the column is 3.5m with
   i) Both end fixed
   ii) One end hinged other end fixed

(5+5 = 10 marks)

3. A simply supported steel beam having a clear span 7.5m is carrying a superimposed load of 22kN/m over entire span. The beam is laterally supported. Width of the support at each end is 250mm. Design the beam for flexure and check for shear and deflection. Draw a neat sketch of the section and mention its properties.

(10 marks)

4. Design a riveted connection for a single angle ISA 90 × 60 × 8 mm connected to 12mm thick gusset plate carrying an axial force of 100kN. Assume permissible shear stress of 90N/mm^2 in rivets and permissible bearing stress of 270N/mm^2 in rivets and permissible bearing stress of 300N/mm^2 in plates. Draw elevation and section of the joint.

(10 marks)

5A. Explain with diagrams single shear failure and double shear failure of rivets.

5B. Design a fillet weld lap joint for two mild steel plates of size 150 × 10mm and 300 × 10mm. Assume permissible shear stress in fillet weld as 110N/mm^2. Draw the diagram of welding pattern.

(4+6 = 10 marks)

6A. Highlight the comparison between riveted joint and welded joint.

6B. Draw labeled diagram of different types of welded joints used in steel construction.

(5+5 = 10 marks)