Code No.: 6324

FACULTY OF ENGINEERING

B.E. (III/IV) (Civil) II Semester (Main) Examination, May/June 2010

STEEL STRUCTURES

Time : 3 Hours] [Max. Marks : 75

Answer **all** *questions of part A and any* **Five** *questions of Part B.*
Any data necessary can suitably be assumed.

Part A – (25 Marks)

1. Draw neat sketches of single riveted and double riveted lab joints. 2
2. Illustrate by figures simple and compound beams. 2
3. What will be the effective length of a column fixed in position but free in direction, at both ends.
4. Show by a sketch how an angle purlin will be fixed to the principal rafter. 2
5. State the lower bound theorem. 2
6. How is the strength of a riveted joint determined? 3
7. Draw a neat sketch of a bracket connection subjected to a moment perpendicular to its plane. 3
8. Show the details at the ridge joint of a roof truss by drawing a neat sketch. 3
9. Illustrate by a neat sketch the gusseted base connection in a column. 3
10. Explain what is a mechanism in plastic theory. 3

Part B – (5 × 10 = 50 Marks)

11. A beam is to be designed so that its depth is restricted to 500 mm. It is simply supported over an effective span of 8 m and carries a uniformly distributed load of 60 kN/m inclusive of its own weight. Design the beam assuming that the compression flange is laterally supported.

12. A tie member in a roof truss carries an axial load of 200 kN. It is 2 m long. Assuming the connection is through fillet weld, design the connection using an unequal angle.

[P.T.O.

13. A riveted bracket connection consists of 8 rivets in two rows with four rivets in each row. These are connected to the flange plate of an ISHB column. The bracket carries an eccentric load of 120 kN at a distance of 150 mm such that the bracket carries a moment with the rivets subjected to shearing action. Each rivet is of 25 mm diameter. Find the maximum shear stress induced in the assembly.

14. Design a built up column consisting of two channel sections placed back to back carrying an axial load of 1500 kN. The column is 6.5 m long and can be considered as hinged at both ends. Design a suitable batten connection also for lateral support.

15. A column consists of ISHB 350 and carries an axial load of 1200 kN. Assuming an allowable bearing pressure of 5 kN/sq.m. on concrete, design a suitable slab base. Show the details in a neat sketch.

16. A roof truss transfers an end reaction of 35 kN to the support through a shoe angle. Taking the support width as 300 mm, and the safe bearing pressure as 300 kN/sq.m., design and detail the end connection.

17. A cantilever beam ABC of span 'L', is subjected to a point load of 'W' at the end C. The half span AB from support has an elastic moment of resistance of 2Mp and the other half Mp. Find the collapse load for the beam.
