Total No. of printed pages = 4

CT-602/DSS/6th Sem/2013/M

DESIGN OF STEEL STRUCTURES

Full Marks – 70

Pass Marks – 28

Time – Three hours

The figures in the margin indicate full marks for the questions.

Answer any *five* questions.

1. (a) Analyse which rivet is under extreme pressure and also determine the value of P, so that the rivet system will not fail. Take, τ_{vf} = 100 Mpa, σ_b = 300 Mpa. 10

Refer Fig.1.

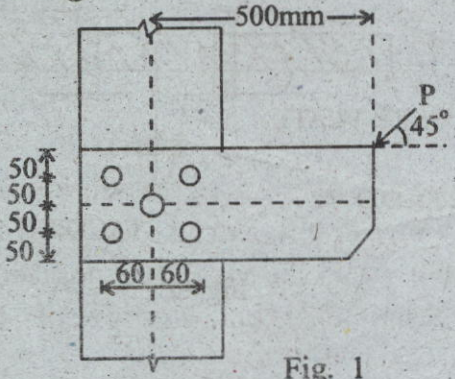

Fig. 1

[Turn over

(b) How does eccentric loading on a column affects the riveted connection associated with the column ? Explain. 4

2. (a) A tie member which consists of four ISA-200×200×12 as shown in figure 2. Assume diameter of the rivets as 20ϕ power driven shop rivets. Calculate the tensile strength of the section if

(i) No tacking rivets are used

(ii) Tacking rivets are used along A and B only

(iii) Tacking rivet is done along C and D only. 10

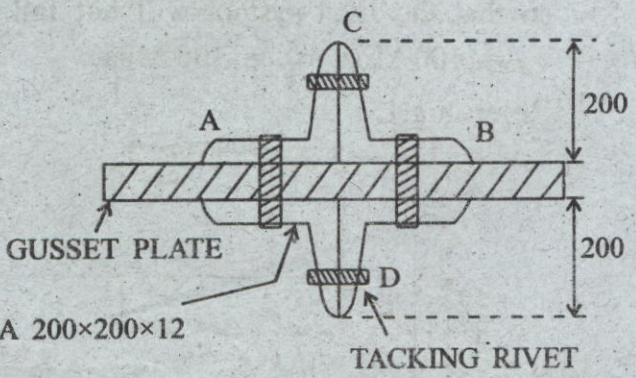

Fig. 2

(b) Describe briefly about net sectional area for angles. 4

3. (a) Define web crippling and web buckling. 4

(b) Design a simply supported beam to carry a uniformly distributed load of 44 kN/m. The effective span of beam is 8 metres. The elective length of compression flange of the beam is also 8m. The ends of beam are not free to rotate at the bearings. 10

4. (a) What is meant by built-up beams ? 3

(b) Design a simply supported plated rolled steel beam section to carry a uniformly distributed load of 50 kN/m inclusive of self-weight of beam. The effective span of beam is 10 metres. The depth of beam should not be more than 500 mm. The compression flange of the beam is laterally supported by floor construction. 11

5. A column 5 metre long is to support a load 9500 kN. The ends of the column are effectively held in position and direction. Design the column if rolled steel beams and 18m plates are only available. 14

6. A column effectively held in position but not in direction at their end is 4 metres long and carries an axial load of 700 kN and an end moment of 35000 mm kN. Design the column if only rolled steel beam sections are available. Adopt stresses as per IS : 800-1984. 14