Total No. of printed pages = 3

CT-602/DoSS/6th Sem/2017/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 *all* the questions.

(Use of IS code and Steel Table permitted.)

1. A single riveted double cover butt joint in plates 16 mm thick is made with 22 mm diameter rivets at a pitch of 100 mm. Find the safe load per pitch length and also the efficient of the joint.

   Take

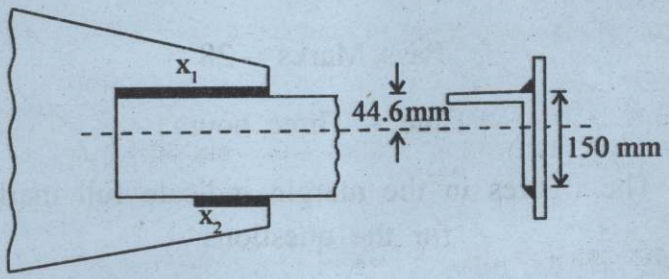
   $f_t = 150 \text{ N/mm}^2$

   $f_s = 100 \text{ N/mm}^2$

   $f_b = 300 \text{ N/mm}^2$. 10

[Turn over

2. A 150mm × 115mm × 8mm angle carrying a tensile load of 200 kN is to be connected to a gusset plate by 6mm fillet welds at the extremitties of the longer leg as shown in the figure below. Design the joint allowing a shear stress of 110 N/mm^2 in the welds. 10



3. Explain the different types of weld in steel connection with suitable sketch of each type. Also state the determination of throat thickness for each weld type. 10+5=15

4. A double angle discontinuous strut consist of 125mm×75mm×10mm angles. The longer legs are connected on either side of the gusset plate at each end by 2 rivets. The strut is 3.50m long between panel joints. Find the safe compressive load for the member. The gusset plate is 10mm thick. 10

5. A tension member consists of two angles (60×60×8) mm, the angles being placed back to back on the same side of the gusset plate. One leg of each angle is connected to a gusset plate. The outstanding legs are also connected by tack rivets. Find the safe tension for the member. Rivets are 16 mm in diameter.

   Take $f_t = 150\ N/mm^2$. 10

6. What is Lacing ? Explain with suitable figures the different lacing systems used in steel structures. 2+3=5

7. What do you understand by web buckling and web crippling of a beam ? A simply supported beam carries a superimposed load of 30 kN/m run on an effective span of 4.75m. Design the beam. Safe stresses in bending and shear may be taken as 165 N/mm^2 and 100 N/mm^2 respectively. 4+6=10