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Total Number of Pages: 02

**B.TECH**  
**PECI5301**

**6<sup>th</sup> Semester Regular / Back Examination 2015-16**

**DESIGN OF STEEL STRUCTURE**

**BRANCH: CIVIL**

**Time: 3 Hours**

**Max Marks: 70**

**Q.CODE: W324**

**Answer Question No.1 which is compulsory and any five from the rest.**

**The figures in the right hand margin indicate marks.**

**Use of IS 800 and Steel Table is permitted.**

**Assume suitable additional data wherever required.**

**Q1** Answer the following questions briefly: **(2 x 10)**

- State the advantage of bolted connections in steel structure compared to other connections.
- What do you mean by *rolled steel section*? State the common examples of some rolled steel sections.
- State the relationship between *ultimate strength* and *design strength* of a material.
- What is HSFG bolt? Specify the commonly available nominal diameters of HSFG bolt.
- Define *efficiency* of a bolted joint. What parameter governs the strength of a solid plate?
- Draw a figure to show the provisions made for a fillet weld applied to the edge of a plate as per IS code.
- State the three different types of strength that control the design strength of a tension member.
- Distinguish between a *strut* and a *column*.
- Draw two separate figures to distinguish between *single laced system* and *double laced system* in a column.
- Distinguish between *plastic cross section* and *compact cross section*.

**Q2** Calculate the strength of a 20 mm diameter bolt of grade 4.6 of Fe410 for connection of two plates of thickness 12 mm through a single cover butt joint. Calculate the *bolt value*. **(10)**

**Q3** Design a truss diagonal of length 3m subjected to a factored tensile load of 280 kN. The tension member is connected to a gusset plate of 16 mm thickness in one line with 20 mm dia bolts of grade 8.8. Assume  $F_u = 410$  MPa,  $F_y = 250$  MPa. **(10)**

**Q4** A compression member of a roof truss consists of 2 ISA 100 x 75 x 8 , (10)  
connected on either side of 12 mm gusset plate. The member is subjected to a  
factored axial force of 300 kN. Design the welded connection.

**Q5** Design a simply supported beam of effective span 8 m to carry a maximum (10)  
bending moment of 550 kNm and maximum shear force of 200 kN. The  
compression flange of the beam is laterally unsupported. Use steel of grade  
Fe410.

**Q6** Design a slab base for a column [ISHB350 @ 710.2](#) N/m subjected to a (10)  
factored axial compressive load of 1200 kN. Use steel of grade Fe410.  
Draw the figure to show the details of the connection.

**Q7** Derive the formula to calculate the *economic depth* of a plate girder. State the (5+5)  
step wise procedure for design of a plate girder.

**Q8** Write brief notes on any **TWO** of the following (5 X 2)  
a) Intermittent fillet weld  
b) Various components of a plate girder  
c) Framed connection and seated connection  
d) Built up section  
e) Laterally supported beam and laterally unsupported beam