Registration no: | | | | | | | | | | |

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B.TECH
PECI5301

6th 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)**

a) State the advantage of bolted connections in steel structure compared to other connections.
b) What do you mean by *rolled steel section*? State the common examples of some rolled steel sections.
c) State the relationship between *ultimate strength* and *design strength* of a material.
d) What is HSFG bolt? Specify the commonly available nominal diameters of HSFG bolt.
e) Define *efficiency* of a bolted joint. What parameter governs the strength of a solid plate?
f) Draw a figure to show the provisions made for a fillet weld applied to the edge of a plate as per IS code.
g) State the three different types of strength that control the design strength of a tension member.
h) Distinguish between a *strut* and a *column*.
i) Draw two separate figures to distinguish between *single laced system* and *double laced system* in a column.
j) 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 , 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. **(10)**

Q5 Design a simply supported beam of effective span 8 m to carry a maximum 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. **(10)**

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

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

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