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Total number of printed pages – 3

B. Tech
PECI 5301

Sixth Semester Regular Examination – 2015

DESIGN OF STEEL STRUCTURE

BRANCH : CIVIL

QUESTION CODE : J 291

Full Marks – 70

Time : 3 Hours

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 are permitted.

Assume suitable additional data wherever required.



1. Answer the following questions :

2×10

- (a) State two advantages and two disadvantages of use of steel structures.
- (b) For Fe 410 W steel, what is the yield stress value and what is the ultimate tensile stress value ?
- (c) Classify various types of rolled steel Tee sections.
- (d) Distinguish between a *standard I section* and a *built up I section* used as steel beam members. What is/are the parameter/parameters to choose the appropriate section ?
- (e) How can you avoid the *shearing* or *crushing failure* of a plate joint subjected to tensile force ?
- (f) Classify the types of *bolted connections*.

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- (g) State the difference between a *slab base* and a *gusseted base*.
- (h) State the various *types of strength* considerations made in design of tension members.
- (i) Name the various types of stiffeners provided in a plate girder.
- (j) How can you calculate the *design strength* of bolts in a joint ?
2. Two plates each of 12 mm thickness are to be connected with each other using M20 bolts of grade 4.6 through a lap joint. Calculate the *bolt value*. Assume any other data if required. 10
3. If two plates of each 10 mm thickness are connected by M16 bolts of grade 4.6 at a spacing of 40 mm, calculate the efficiency of the joint. 10
4. A tie member of a roof truss consists of 2 ISA 100 × 75 × 8, connected on either side of 12 mm gusset plate. The member is subjected to a factored axial pull of 300 kN. Design the welded connection. 10
5. Design a simply supported beam of effective span 8 m to carry a loading of 20 kN/m including the dead load. The compression flange of the beam is laterally supported. The beam rests over stiff end bearings of 150 mm at both the ends. 10
6. Calculate the load carrying capacity of a strut consisting of 2 ISA 60 × 60 × 10 placed back to back if the length of the member is 3 m and it is welded to a gusset plate of 12 mm thickness. 10
7. A steel column ISHB 250 @ 537 N/m carries a factored load of 1200 kN. Design a slab base for the column, if the column is supported on a pedestal of M20 concrete. 10

8. Write brief notes on any four of the following :

2.5×4

- (a) assumptions of welded connections .
- (b) Lug angle
- (c) Web buckling and web crippling
- (d) Lateral torsional bucking
- (e) Limit states of serviceability.

