Printed Pages: 4 | 301 | ECE-701

(Following Paper ID and Roll No. to be filled in your Answer Book)

Paper ID :100701 | Roll No. | | | | | | | | | |

**B.Tech.**

**(SEM. VII) THEORY EXAMINATION, 2015-16**

**DESIGN OF STEEL STRUCTURES**

**[Time:3 hours]** **[MaximumMarks:100**

**Section-A**

Q1. Attempt all parts. Write answer of each part in short. (2×10=20)

(a) (i) The most suitable section for the member subjected to torsional forces is.....

(ii) The guage length of the steel of equal to.....

(b) An electric pole of height 5.0 m is fixed at bottom. It carries a wire at top and free to move sideways. The effective length of pole is.....

(c) (i) The design wind speed for any site is Vz=Vb k1k2k3, the factor k1 is.....

(ii) In a roof truss top chord members are also known as.....

(d) (i) The design wind speed is 10m/s. The desing wind pressure will be equal to.....

(ii) In fillet wleding, if the angle between the fusion face is 101° the value of 'k' is.....

(e) Ultimate tensile strengh for Fe 410 is.....

(ii) Write the interaction equation for checking the bolts for combined shear and tension.

(f) Draw stress strain curve for mild steel.

(g) List assumptiions made in design of bearing bolts.

(h) The yield strengh for mild steel specimen was found to be 250 N/mm$^2$. Taking factor of safety of 3, find out the working stress.

(i) What is a base plate and why is it required.

(j) Neatly sketch the following welded connections:

(a) Butt weld (single V, Double V) (b) Fillet weld.

## Section-B

**Note:** Attempt any five questions from this section.5×6=30

Q2. State and explain the classification of steel sections as per IS:800 (2007)?

Q3. What is lug angle? Illustrate with sketch. Why lug angles are used?

Q4. Calculate the net area for a member as shown in Figure

Q5. Explain in brief various types of loads to be considered in the design of steel structure.

Q6. Determine the design axial load capacity of the column ISHB 300 @ 577 N/m if the length of column is 3m and its both ends are pinned.

Q7. A lap joint between two plates of size (250×16) mm and (250×10) mm thick is to transmit the force. Use E250 grade for plates.

Q8. What are Plate Girders? Discuss thier utility as a flexual member.

## Section-C

**Note:** Attempt any two questions from this section.(5×10=30)

Q9. Two plates 12mm and 20mm thick are to be connected by a double cover butt joint. Design the joint to transfer a factored load of 500 kN using M20 and /or MI64.6 grade bolts. Draw adequate scaled section and plan views with dimensioning.

Q10. Desing a suitable longitudinal fillet weld to connect 120×8mm plate to 150×10 mm plate to transmit a pull equal to the full strength of small plate. Assume welding t\is to be made in the field.

Q11. Design a built up tension member to carry a factored force of 340kN. Use 20mm diamter blackbolts and gusset plate of 8mm thick.

Q12. Design a single angle strut connected to the gusset plate

to carry a factored load of 200kN. The center to center length of the strut between intersections is 3m. It is connected by 2 bolts on each side.

Q13. Design a laced column with two channels connected back to back of length 10m, carries an axial factored load of 1350kN. The column may be assumed to have restrained in position and direction both at each end.

Q14. Determine the design bending strength of ISLB 350 @ 486 N.m considering the beam to be laterally unsupported. The design shear force V is less than the design shear strength. The unsupported length of beam is 3.0m. Assume steel of grade Fe 410.

Q15. Design a simply supported laterally restrained beam of span 5m swith a factored udl over the entire span of 20kN/m. Assume 50% each of dead and live load contribution. Take E250 grade of steel.

## Figure

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