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Question Paper Code : 57187

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2016

Sixth Semester

Civil Engineering

CE 6603 – DESIGN OF STEEL STRUCTURES

(Regulations 2013)

Time : Three Hours **Maximum : 100 Marks**

Answer ALL questions.

PART – A (10 × 2 = 20 Marks)

1. What are the limitations of working stress method ?
2. What is meant by strength of fillet weld ?
3. Give some examples of tension members.
4. What is the use of providing lug angles ?
5. Define slenderness ratio.
6. What is the use of providing column base ?
7. What do you mean by castellated beam ?
8. What do you mean by curtailment of flanges ?
9. Name the components of roof truss.
10. What are the loads to be considered in the design of gantry girders ?

PART – B (5 × 16 = 80 Marks)

11. (a) Two plates 10 mm and 14 mm thick are to be jointed by double cover butt joint. Assuming cover plates of 8 mm thickness, design the joint to transmit a factored load of 300 kN. Assume Fe 410 plate and 16 mm diameter bolt of grade 4.6.

OR

(b) A tie member of a truss consist of an angle section ISA 65 × 65 × 6 mm of Fe 410 grade, is welded to an 8 mm gusset plate. Design a suitable weld to transmit a load equal to full strength of the member, providing

(a) weld on two sides of the angle

(b) weld on all three sides. Assume shop welding.

12. (a) A diagonal member of a roof truss carries an axial tension of 300 kN. Design the section and its connection with a gusset plate and lug angle. Use f_y = 250 MPa and f_u = 410 MPa.

OR

(b) A tension member of a truss consists of two angles 75 × 50 × 6 mm which are provided on either sides of a 10 mm thick gusset plate. 20 mm diameter bolts are used in one row for connecting the member to the gusset plate. Determine the design tensile strength of the member and also number of bolts to develop the design tensile strength.

13. (a) Fig. 13 (a) shows a built up column section. The column has an effective length of 4.75 m. find the design compressive load for the column. Take f_y = 250 N/mm^2.

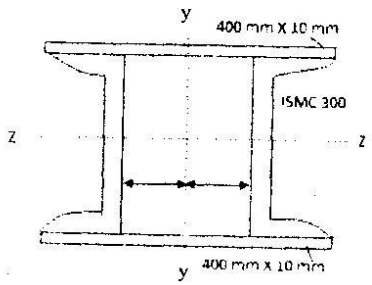

Fig. 13(a)

OR

(b) Design a 8 m long built up laced column to carry a factored axial load of 1250 kN. The column is retrained in position but not in direction at each end. Provide single lacing system making connections with 16 mm diameter bolts of grade 4.6. the column shall consists of two channels placed toe to toe at suitable spacing.

14. (a) A simply supported steel joist of 4 m effective span is laterally supported throughout. It carries a total udl of 40 kN (service load inclusive of self weight). Design an appropriate section using steel of grade Fe 410.

OR

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

15. (a) Calculate the dead load, live load and wind load at the nodes of a pinned end fink truss with the following data :

Span of truss =16 m

Rise of truss = 4 m

Spacing of truss = 4 m

Self weight of purlins = 300 N/m

Height of column = 10 m

Roofing shall be of GI sheets

Building is located in Chennai. Use Fe 410 steel

OR

(b) Explain step by step procedure in the design of gantry girders. Also explain the loads that would be considered in the design.