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Question Paper Code: 12063

M.E. DEGREE EXAMINATION, DECEMBER 2013.

First Semester

Structural Engineering

01PSE102 - STEEL STRUCTURES

(Regulation 2013)

Duration: Three hours Maximum: 100 Marks

Use of IS 800 – 2007 and Steel tables are permitted.

Any missing data can be suitably assumed.

Answer ALL Questions.

PART A - (10 x 2 = 20 Marks)

1. List advantages of building with steel over concrete as a construction material
2. Differentiate between gable frame and gable wind girder
3. Write the advantages and disadvantages of HSFG bolted over bearing type bolts.
4. What are the classifications of simple beam connection?
5. List out the loads to be considered for design of self supporting chimney.
6. What are the different types of Towers?
7. Define Shape factor.
8. State Lower bound or Static theorem.
9. What are the different cross sections used as compression members?
10. What is Wall studs?

PART - B (5 x 14 = 70 Marks)

11. (a) Design a channel purlin for the data given below

(i) Location of shed: Chennai (basic wind speed is 50 m/s)

(ii) Spacing of trusses:4.5 m

(iii) Spacing of purlins : 0.95 m

(iv) Pitch of roof 1 vertical for 4 horizontal

(v) Roof Sheeting weighs 0.25 kN/m². (14)

Or

(b) Explain step by step procedure for Design of Moment Resisting Base Plates. (14)

12. (a) Two plates 10 mm and 18 mm thick are to be joined by a double cover butt joint. Assuming cover plates of 8 mm thickness, Design the joint to transmit a factored load of 500 kN. Assume Fe 410 plate and grade 4.6 bolts. (14)

Or

(b) A tie member of a truss consisting of an angle section ISA 65 x 65 x 6 of Fe 250 grade, is welded to an 8 mm thick gusset plate as shown in fig. 1. Design a weld to transmit a load equal to the full strength of the member. Assume shop welding. (14)

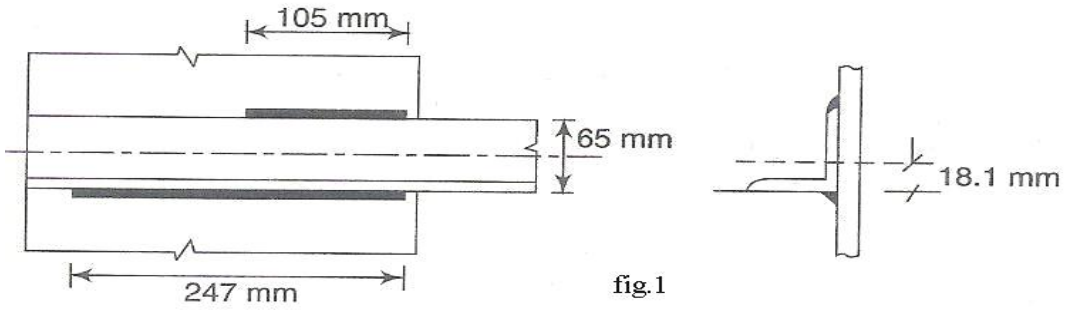

fig.1

13. (a) A member in a transmission line tower is subjected to a maximum compressive force of 210 kN and tensile force of 240 kN. Effective length of member is 2.20 m. Design the member with hot rolled angle section. (14)

Or

(b) (i) When longitudinal loads are produced in the transmission line tower? (6)

(ii) List out the various conditions to be considered in the design of transmission line tower. (8)

14. (a) Determine the elastic section modulus S, plastic section modulus Z, yield moment My, and the plastic moment Mp, of the cross-section shown below. What is the design moment for the beam cross-section? Assume Fe500 steel. (14)

Or

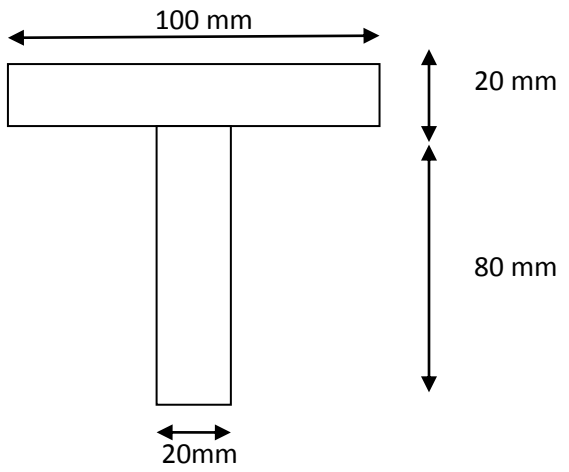

Fig. 2

(b) (i) Explain briefly the Basics of plastic analysis. (7)

(ii) Explain the effect of shear on plastic moment. (7)

15. (a) Explain briefly the behavior of unstiffened and stiffened elements in gauge steel structures. (14)

Or

(b) Explain step by step procedure for Design of Compression members? (14)

Part – C (1 x10 = 10 marks)

16. (a) Design an economical built up column to carry an axial load of 1400 kN using two channels. The unsupported length of column is 6 m. Both ends are held in position and only one end is restrained against rotation. Assume that lacing is to be provided (lacing need not be designed) (10)

Or

(b) Determine the Collapse load for the frame shown in Figure. 3 (10)

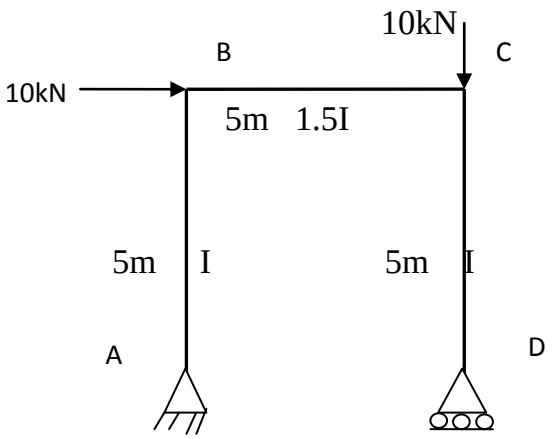

Fig. 3