

Total No. of Questions : 4]

SEAT No. :

PC-17

[Total No. of Pages : 2

[6360]-17

T.E. (Civil) (Insem)

**DESIGN OF STEEL STRUCTURES**  
**(2019 Pattern) (301003) (Semester - I)**

*Time : 1 Hour 15 Minutes]*

*[Max. Marks : 30*

*Instructions to the candidates:*

- 1) *Assume suitable data if necessary.*
- 2) *Figures to the right indicate full marks.*
- 3) *Use of non-programmable electronic calculator is allowed.*
- 4) *Use separate answer book for each course.*
- 5) *Attempt only that paper for which you have appeared.*

**Q1) a)** A Single ISA 90×60×6 @6.79 Kg/m is connected to 10 mm thick gusset plate at the ends with 5 numbers of 18 mm bolts to transfer tension. Determine the design tensile strength of angle section if the gusset plate is connected to the longer leg. **[10]**

b) Explain various type of a bolted joint. **[5]**

OR

**Q2) a)** Design the tie of a roof truss subjected to factored design load 280 kN using double equal angle section. The C/C length of intersection is 2.5 m. Assume angle is connected to 8 mm thick gusset plate by 4 number of M20 bolt. **[10]**

b) Explain in detail gauge line, gauge distance, pitch, edge distance and end distance with sketch. **[5]**

**Q3) a)** Design a column section to carry axial compression of 750kN. The column has an effective length of 7.0 m with respect to x-x axis and 5m with respect to y-y axis. **[8]**

b) A column 9 m long consisting 2ISMC 300 @35.8 kg/m spaced 220mm back-to-back to carry a factored load of 1200kN. The Column is restrained in translation but not in rotation at both ends. Design a suitable lacing system. **[7]**

**P.T.O.**

OR

- Q4)** a) Design a double angle discontinuous strut to carry a factored load of 140kN. The Centre to Centre (C/C) length of strut is 2.6 m. The angle is placed back-to-back on opposite side of gusset plate. [8]
- b) Design a single angle discontinuous strut which is carrying factored load of unsupported 160kN. Length of member is 2.5 m. Assume  $f_y = 250$  MPa. Minimum two bolt are to be used for end connections. Use 20 mm dia. bolts of 4.6 grades. [7]

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