(Please write your Exam Roll No.)   *Exam Roll No. ..*

END TERM EXAMINATION

FIFTH SEMESTER [B.TECH] NOVEMBER-DECEMBER-2018

	Subject: *Design of Steel Structures*
Paper Code: ETCE-305	
Time : 3 Hours	**Maximum Marks :75**

**Note: Attempt any five questions including Q.no.1 which is compulsory.
Assume any missing data suitably. if not given.**

(5x5=25)

Q1   Attempt **any five** parts
- (a) Compare welded joints with bolted joints with respect to strength, efficiency and workmanship.
- (b) Define slenderness ratio of compression member. State its Limiting value in case of member carrying axial compression due to dead load and live load.
- (c) Differentiate between laterally supported and laterally unsupported beams.
- (d) Differentiate between web buckling and web crippling. With diagram.
- (e) What is lacing, battens and splices? Differentiate it with diagram.
- (f) Draw the diagram of a lap joint and double cover Butt joint.
- (g) Explain Tacking rivets and gusset plate with diagram.
- (h) Explain block shear failure with example.

Q2   Calculate the design bending strength of ISLB 300 @0.369 kN/m considering the beam to be laterally unsupported. Assume the design force is less than the design shear strength and is of low shear. The effective length of beam is 4m. Assume Fe 410 grade of steel.   **(12.5)**

Q3   A column ISMB 300@ 576.8 is to support a factored axial load of 500 KN. Shear force of 120KN and bending moment of 40 kN-m. Design the splice plate. Assuming bolt of dia 20 mm.   **(12.5)**

Q4   Design a laced column 10.5m long to carry factored axial load of 1000KN the column is restrained in position but not in direction at both the ends. Provide single system. Use 2 channel sections placed back to back. Assume steel of grade Fe 410. Design the lacing system with site weld connections.   **(12.5)**

Q5   Explain the following terms.
- (a) Differentiate modes of failure in columns.   **(4)**
- (b) Design of gantry girder.   **(4)**
- (c) Design of frames as per Indian Standard Codal Provisions.   **(4.5)**

Q6   Derive an expression for calculating shape factor for.
- (a) Triangular section   **(6)**
- (b) Symmetric I section   **(6.5)**

Q7   Design a lap joint between two plates each of width 120 mm, if the thickness of one plate is 16 mm and other is 12 mm. The joint has to transfer a design load of 160 kN. The plates are of Fe -410 grade. Use bearing types of bolt.   **(12.5)**

Q8   Design a double angle tension member connected on each side of a 10 mm thick gusset plate, to carry an axial factored load of 375 kN. Use 20 mm black bolts. Assume shop connection.   **(12.5)**