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6015-119

B.E/ B.Tech/ B. Arch (Full-Time) END SEMESTER EXAMINATIONS, APRIL/MAY 2019  
CIVIL ENGINEERING BRANCH  
SIXTH SEMESTER

CE 8601 – DESIGN OF STEEL AND TIMBER STRUCTURES  
(REGULATIONS 2012)

Time : 3 hours

Max Marks : 100

- Instructions:
1. Use of IS 800-2007, IS 883-1994 and steel tables is permitted.
  2. Relevant data may be suitably assumed if found necessary.

Answer ALL Questions

PART A – (10 x 2 = 20 marks)

1. With a neat sketch show a single bolted double cover butt joint
2. What do you understand by staggered pitch?
3. What are lug angles?
4. Write short notes on block shear failure.
5. What is effective column area?
6. What are the advantages of battened columns?
7. Classify the section ISMB250.
8. List any two factors that influence web crippling.
9. List any four commonly used timber connections
10. Find the form factor for a rectangular cross-section of size 200mm x 300mm



PART B – (5 x 16 = 80 marks)

(Q. No. 11 is Compulsory)

(Use structural steel of Fe410 grade unless specified otherwise)

11. A tension member consists of two angles ISA60 x 60 x 8mm placed back to back on either side of the gusset plate. One leg of each angle is connected to a 10mm thick gusset plate. Find the safe tension for the member. 3 nos. of 16 mm in diameter bolts of grade 4.6 are used for the connection.
- 12 (a) Design a single cover butt joint to connect two plates each 12mm thick and 280mm wide. The connection has to transfer a factored load of 300kN. Use 16mm diameter bolts of grade 4.6 and cover plate of thickness 10mm.  
Or  
(b) A tie member consisting of an ISA 80x80x10mm is welded to a 12mm thick gusset plate. Design the weld to transmit load equal to the design strength of the member. Use site welding.

13 (a) Design a column to support a factored axial load of 1000kN. The effective length of the column is 8m along the Z- axis and 6m along the Y-axis.

Or

(b) Design a built-up column of effective length 9m to carry a factored axial load of 1000kN. Provide single lacing system with welded connection. Use two channels placed back to back.

14(a) Design a laterally supported beam of effective span 5m to carry a factored bending moment of 150kNm and a factored shear force of 210kN.

Or

(b) Determine the design bending strength of ISMB300 considering the beam to be laterally unsupported. The unsupported length of the beam is 3m.

15 (a) Design a timber column to carry a safe load of 400kN. The unsupported length of the column is 3m. Use Group C timber of

- (i) grade II for outside location
- (ii) select grade for wet location

Or

(b) Design a simply supported timber beam of span 6m for outside location to carry a uniformly distributed load of intensity 4kN/m. The beam is to be made of Group A select grade timber. Bearing distance on either end = 90mm.

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