

**B.TECH. SEM -V (CIVIL ) 2014 COURSE (CBCS) : SUMMER -  
2018**

**SUBJECT : STRUCTURAL DESIGN – I**

Day : **Monday**  
Date : **21/05/2018**

**S-2018-2329**

Time : **10.00 AM TO 02.00 PM**  
Max. Marks : 60

**N.B.:**

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Use of IS-800, IS-875, steel table, calculator is **ALLOWED**.
- 4) Use of steel Fe-410 ( $f_y = 250$  MPa,  $f_u = 410$  MPa) unless specified otherwise.
- 5) Assume suitable data if necessary.

- Q.1** a) Explain importance of partial safety factors in design. [05]  
b) Explain advantages of LSM over WSM. [05]

**OR**

Determine panel point DL and LL of a six paneled roof truss of span 16 m. [10]  
Height of truss is 4 m and spacing between trusses is 4 m. Assume self-weight 150 N/m<sup>2</sup> of AC sheet.

- Q.2** a) Explain types of bolted connection. [05]  
b) Calculate strength of 6mm fillet weld per mm length. [05]

**OR**

A 2 ISA 60 × 60 × 6 connected back to back on opposite side to 10 mm thick [10]  
gusset plate to carry factored axial force 400 kN. Design bolted connection using M20 bolts.

- Q.3** Determine design tensile strength of an ISA 90 × 90 × 10 connected to 12 mm [10]  
thick gusset plate by 4 numbers of M20 bolts of grade 4.6.

**OR**

Design a tie member using double angle to carry axial tensile load of 300 kN. [10]  
Also design bolted connection by using M20 bolts.

- Q.4** a) Explain modes of failure of compression member. [05]  
b) Explain step by step procedure to design single angle strut. [05]

**OR**

A 2ISA 90 × 90 × 10 connected back to back on opposite side to 12 mm thick [10]  
gusset plate. Determine design compressive strength. The unsupported length is 2.5 m.

- Q.5** a) Differentiate lacing and battening system of column. [05]  
b) State the situations where axial compression is developed in members of [05]  
structures.

**OR**

State and explain column bases with neat sketches. [10]

- Q.6** An ISMB 350 used as a laterally unrestrained simply supported beam of span [10]  
5 m. Determine design strength.

**OR**

An ISMB 400 used as a cantilever laterally supported beam of 3 m span. [10]  
Determine safe UDL carried by the beam.

\* \* \* \*