

**B.TECH SEM – V (2007 COURSE) (CIVIL ENGG.) : WINTER -
2017**

SUBJECT: STRUCTURAL DESIGN-I

Day: Tuesday
Date: 16/01/2018

W-2017-2451

Time: 02.30 PM TO 06.30 PM
Max. Marks: 80

N.B:

- 1) **Q.No.1 and Q. No.5** are **COMPULSORY**. Out of remaining attempt **ANY TWO** questions from each section.
 - 2) Figures to the right indicate **FULL** marks.
 - 3) Use of IS875, IS800-2007, Steel Table, and **CALCULATOR** is allowed.
 - 4) Assume suitable data if necessary.
 - 5) Answer to both the section should be written in **SEPARATE** answer book.
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SECTION-I

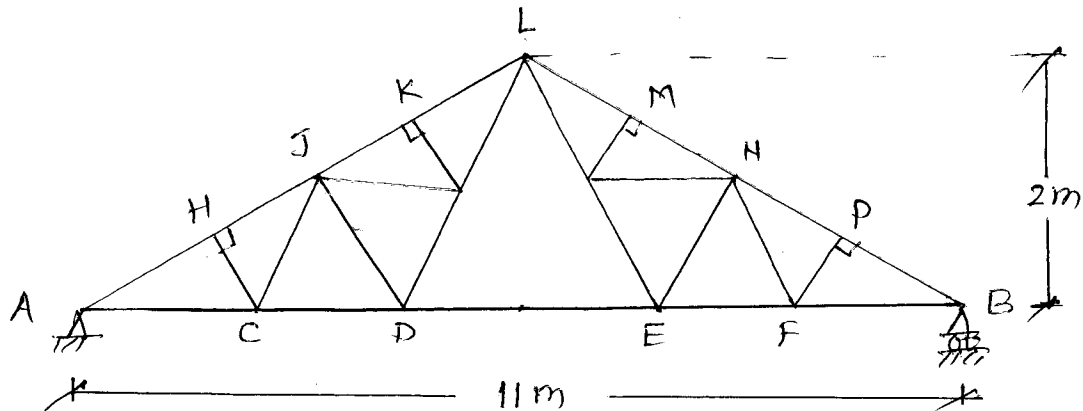
- Q.1**
- a) Explain limit state of strength and limit state of serviceability. **(04)**
 - b) Calculate strength of 10 mm size fillet weld per mm length of weld. **(04)**
 - c) Explain four different types of cross section with reference to moment rotation capacity. **(04)**
- Q.2**
- a) Explain importance of partial safety factors in structural design. **(07)**
 - b) Two plates of thickness 12 mm are connected by 2 bolts of class 4.6 and size M20. Calculate strength of each bolt. **(07)**
- Q.3**
- a) Explain effect of following on compressive strength of member. **(07)**
 - i) Buckling class
 - ii) Imperfection factor
 - iii) Support condition
 - b) A truss member of length 3m is subjected to design tensile load of 250 kN. Design suitable angle section for this member assuming bolted connection. **(07)**
- Q.4** A laterally supported beam of simply supported span 4m is subjected to design load of 150 kN/m over whole span. Design suitable section for this beam with all necessary checks. Draw neat sketch. **(14)**

SECTION-II

- Q.5**
- a) Explain the steps in design of purlin for roof truss. **(05)**
 - b) Write a short note on curtailment of flange plate. **(05)**
 - c) Design a slab base for a column. ISHB 300 carrying an axial load of 700 kN. It is supported on concrete pedestal having bearing capacity of 4 MPa. **(04)**
- Q.6** A roof truss is shown in fig. The design loads calculated at panel points are as under. **(13)**

P.T.O.

Load	Intermediate panel point	End panel point
DL	1.6 kN	0.8kN
LL	2.1 kN	1.05 kN
WL	6.0 kN (Suction)	3 kN (Suction)



Design Bottom chord, Top chord member and connection at H. Assume welded connection.

Q.7 A welded plate girder of 20m span is subjected to uniformly distributed load of 50 kN/m over entire span. Assume compression flange to be laterally retained for entire length and ends are restrained against rotation. Design the girder section and intermediate vertical stiffener. Also design the connection of this stiffener with the web plate. **(13)**

Q.8 Design a built up column of effective length of 5m to carry an axial load of 900kN using two channel section back to back. Also design suitable lacing systems. **(13)**

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