

B.Tech Sem – V (2007 Course) (Civil Engg.) : SUMMER - 2019

SUBJECT: STRUCTURAL DESIGN – I

Day: Monday
Date: 13/05/2019

S-2019-3059

Time: 10.00 AM TO 02.00 PM
Max Marks: 80

N.B.:

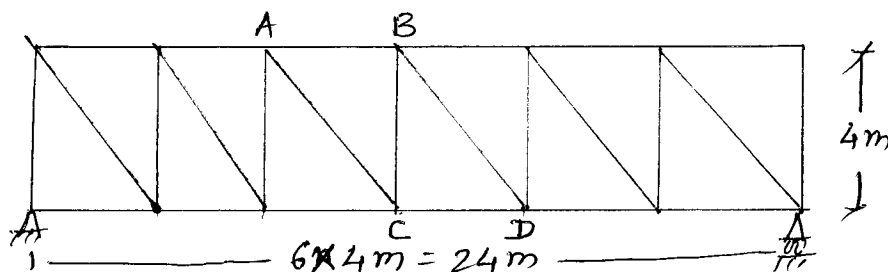
- 1) **Q. No.1 and Q.No.5 are COMPULSORY.** Out of the remaining questions attempt **ANY TWO** questions from each section.
- 2) Answers to both the sections should be written in **SAME** answer books.
- 3) Use of IS 800-2007, IS 875, steel tables, electronic **CALCULATOR** is allowed.
- 4) Figures to the right indicate **FULL** marks.
- 5) Assume suitable data if necessary.

SECTION – I

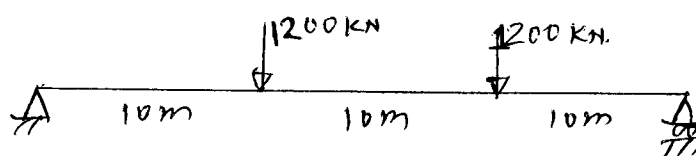
- Q.1** a) Write advantages of a steel over R.C.C. material. [04]
b) Explain partial safety factors used in LSM. [04]
c) Differentiate Bolted and Welded connections. [04]
- Q.2** A 2ISA 90 × 90 × 10 connected back to back to the 10 mm thick gusset plate. [14]
Design bolted connection using M20 black bolt of grade 4.6. Member is subjected to design force of 500 kN.
- Q.3** Determine design compressive strength of an ISLB 400 used as a column for a [14]
length of 5m. One end of column is fixed and other end is pinned.
- Q.4** Design a laterally supported beam for maximum shear force 210 kN and [14]
maximum bending moment 150 kN-m select I section.

SECTION – II

- Q.5** a) What are load combinations considered for design of roof truss? [04]
b) Draw neat sketch of gusseted base footing. [04]
c) Explain design steps for intermediate vertical stiffeners. [04]
- Q.6** A foot over bridge shown in figure is subjected to dead load 50 kN/m and live [14]
load 150 kN/m. Calculate design forces in members AB, AC and CD.



- Q.7** A column made up of ISMB 600 is subjected to design load of 1800 kN. [14]
Design suitable base for this column. Take $f_{ck} = 20\text{N/mm}^2$ and SBC of soil = 250 kN/m^2 .
- Q.8** A plate girder is loaded as shown in figure. Design end bearing stiffeners. [14]
Assume depth of girder = 2.5 m and flange thickness = 30 mm. Take all checks.



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