



Reg. No. : .....

Name : .....

**First Semester M.Tech. Degree Examination, March 2014**  
**(2013 Scheme)**  
**Civil Engineering**  
**Stream : Structural Engineering**  
**CSC 1003 : ADVANCED METAL STRUCTURES**

Time: 3 Hours

Max. Marks: 60

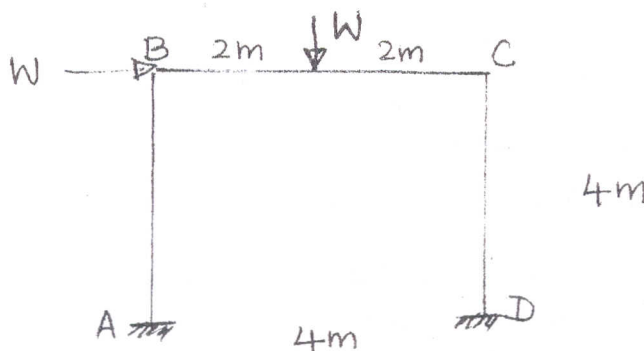
**Instructions :** Answer any two full questions from each Module.

Assume missing data, if any suitably.

Use of IS 800-2007, IS 801-1975, IS 875-1987, IS 8147-1976, IS 5384-1985, IS 11384-1985 and IS 3935-1966 are permitted.

MODULE – I

1. a) Explain the conditions to be satisfied in elastic and plastic analysis. 4
- b) Determine the collapse load for the portal frame shown in figure. The plastic moment of the beam section is  $1.5 M_p$  and for column section is  $M_p$ . Draw the B.M.D. at collapse.

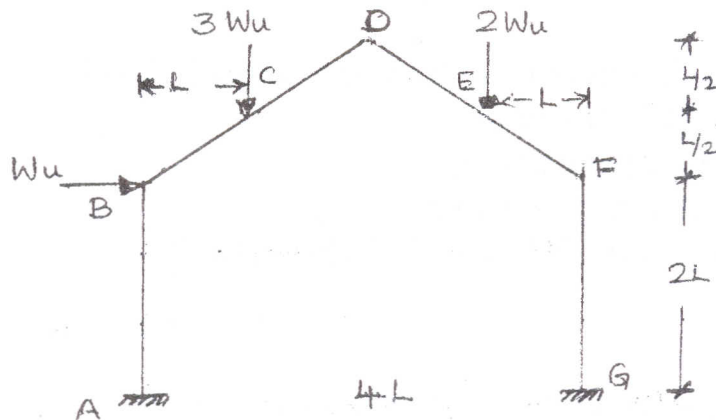


2. a) Explain the effect of axial force on plastic moment capacity of a rolled beam section. 5
- b) Evaluate the plastic moment capacity of an ISMB 400 beam subjected to a shear force of 310 kN. 5

P.T.O.



3. Determine the collapse load for the gable frame shown in figure. Assume uniform plastic moment of resistance.



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#### MODULE – II

4. Briefly explain about :
- Beam and column splices
  - Welds in tabular connections.
5. Design a stiffened seat angle for a reaction of 200 kN from a beam of ISMB 300 connected to the flange of a column ISHB 200. Assume Fe 410 grade steel and shop welding.
6. Give a neat sketch and label the components of a typical structural frame work for a braced industrial building.

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#### MODULE – III

- Explain the advantages and use of light gauge structures.
  - Explain the design procedure of a light gauge column.
8. Determine the allowable u.d.l. for an ISALB 200 × 100, 10.5 mm section used as simply supported beam of span 3m. Assume the beam as laterally unsupported. Assume H20 alloy.
9. Design a simply supported composite beam to support the slab of a building 12 m × 27 m with beams spaced at 4.5 m centre to centre. The thickness of the concrete slab is 125 mm. Floor finish 0.5 kN/m<sup>2</sup>, live load 3 kN/m<sup>2</sup>. Grade of concrete M<sub>20</sub> and yield strength of steel beam is 250 MPa. Use head type stud connectors.

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