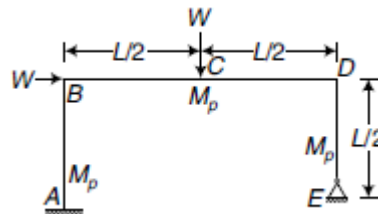


GUJARAT TECHNOLOGICAL UNIVERSITY**BE- SEMESTER- VII EXAMINATION – SUMMER 2026****Subject Code:3170618****Date:29-05-2026****Subject Name: Design of Steel Structures****Time:02:30 PM TO 05:00 PM****Total Marks:70****Instructions:**

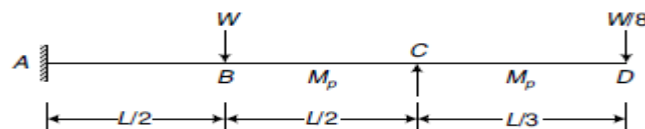
1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.
5. Use of IS 800:2007, IS 1893 and steel table is permitted.

MARKS

- Q.1**
- (a) What are the advantages and disadvantages of steel as a structural material? **03**
- (b) Estimate the design wind pressure for a 100 m high lattice tower located on the outskirts of Allahabad. Estimate also the wind load in terms of the effective frontal area for the tower. **04**
- (c) Derive the Resultant force in Bolted Bracket Connection Type II with neat sketches. **07**
- Q.2**
- (a) Explain simple post critical method to calculate nominal shear strength of girder. **03**
- (b) Explain the Plastic Hinge concept. Obtain the length and profile of plastic hinge for simply supported beam subjected to a uniformly distributed load. **04**
- (c) Find out the collapse load for a portal frame shown in **Fig. 1**. The beams and columns are of same cross section. **07**

**Fig.1****OR**

- (c) A propped cantilever ABCD is loaded as shown in **Fig. 2**. Find the collapse load if the beam is of uniform cross section. **07**

**Fig. 2**

- Q.3**
- (a) Identify the three regions of idealized stress–strain curve of mild steel. Which of these regions is (are) used for limit state design? **03**
- (b) Explain the design procedure of Plate Girder. **04**
- (c) Determine the safe load P that can be carried by the joint **07**

OR

(c) Determine the shape factors for the following sections: 07
 (a) Square of side a with its diagonal parallel to the zz -axis. (b)
 A diamond section with unequal diagonals, the shorter being b
 and longer h ; the shorter diagonal placed parallel to the zz -axis.

OR

(c) Design a cross beam for steel foot bridge for the following data: **07**
Type of truss: warren type, Span: 21 m , Width of walk way: 4
m, Panel length = 3m, Flooring = RCC slab 125 mm thick. Live
Load: 5 kN/m² & Floor Finish: 1.5kN/m². Assume self-weight
of cross beam = 0.8 kN/m. Also carry out required checks.

OR

(b) Determine the maximum bending moment and shear force for the moving loads shown in the **Fig. 4**. **04**

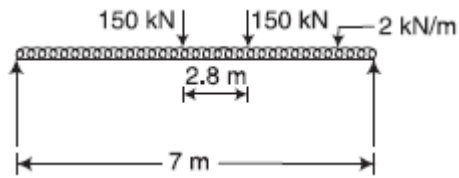


Fig. 4

- (c) Calculate the design wind pressure and design forces on the hoarding 10 m long and 5 m high (as shown in **Fig. 5**), to be fixed at the roof of a 24m high building in densely populated area of Delhi. The base of the hoarding board is 2.0m above the roof level.

07

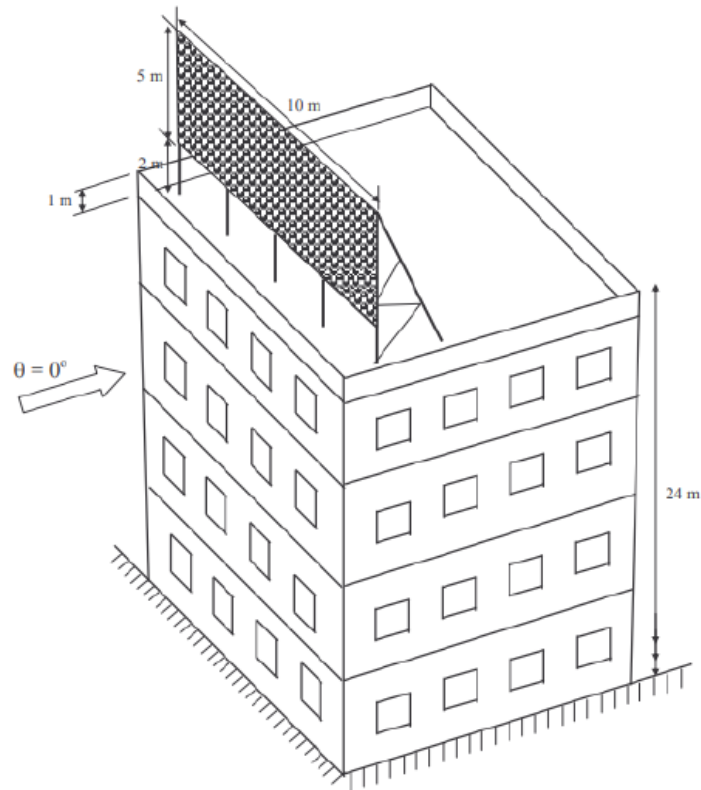


Fig. 5
