

TED (15) – 6013

(REVISION — 2015)

Reg. No. ....

Signature .....

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/  
MANAGEMENT/COMMERCIAL PRACTICE — APRIL, 2019

STRUCTURAL DESIGN - II

[Time : 3 hours

(Maximum marks : 100)

[Note :— Use of IS 800-2007, IS 875, IS 1905 and steel tables are permitted.]

PART — A

(Maximum marks : 10)

Marks

I Answer *all* questions in one or two sentences. Each question carries 2 marks.

1. Define gauge distance of the bolt.
2. Differentiate between column and strut.
3. What is the slenderness ratio in compression member ?
4. Differentiate between simple beam and compound beam.
5. What are the two type of members in a truss based on stress ?

(5 × 2 = 10)

PART — B

(Maximum marks : 30)

II Answer any *five* of the following questions. Each question carries 6 marks.

1. What are the common steel structures ?
2. What are the advantages and disadvantages of bolted connections ?
3. Write the codal provisions for battened system.
4. An ISLB 600 @ 995N/m carrying a live load of 20 kn/m including self weight over an effective span of 5m, the yield stress is 250mpa. Check the safety of beam in deflection.
5. Sketch the crossection of a plate Girder and mark the components.
6. What are the different types of loads acting on a roof truss ?
7. Explain the terms effective length and effective height of masonry wall.

(5 × 6 = 30)

## PART — C

(Maximum marks : 60)

(Answer one full question from each unit. Each full question carries 15 marks.)

## UNIT — I

- III (a) Calculate the design strength of welded joint. If the size of weld is 6mm and its length is 240mm, the ultimate stress in the weld is 410mpa. Assume the condition are made in the workshop. 8
- (b) What are the type of loads and load conditions in the design of steel structure ? 7

OR

- IV (a) A tie member of a truss consisting of an angle section ISA 65 × 65 × 6 of Fe410 Grade is welded to an 8mm gusset plate. Design a weld to transmit a load equal to the full strength of the member. Assume shop welding. 10
- (b) What are the physical and mechanical properties of steel structures ? 5

## UNIT — II

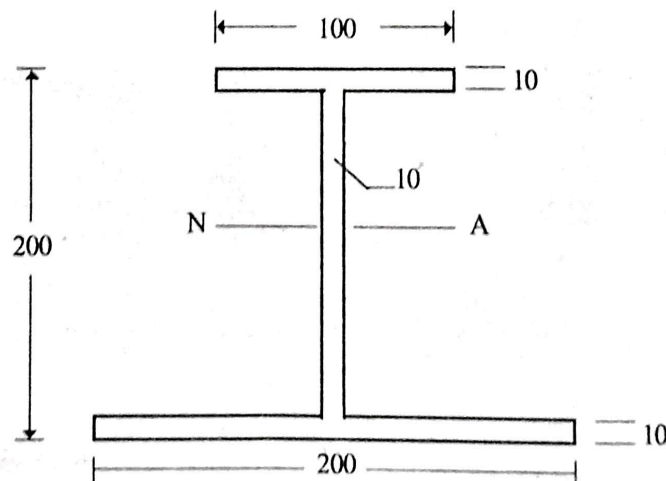
- V (a) A single angle ISA 200 × 100 × 15 mm is connected to a Gusset plate of 12 mm thick by fillet weld 4 mm size. Determine the design strength with  $f_y = 300\text{N/mm}^2$ ,  $f_u = 400\text{N/mm}^2$  and length of weld is 240mm. 9
- (b) What are the different modes of failure of tension member ? 6

OR

- VI (a) Design a single angle strut connected to the gusset plate to carry 180KN factored load. The length of the strut between centre to centre connection is 3m. 8
- (b) Determine the design axial load on the column section ISMB350, given that the height of column is 3.0m and that it is pin - ended. Also assume the following  $f_y = 250\text{mpa}$ ,  $f_u = 410\text{mpa}$ ,  $E = 2 \times 10^5 \text{ mpa}$ . 7

## UNIT — III

- VII (a) Determine the plastic moment capacity and plastic section Modulus of a rectangular beam section of size  $b \times d$  about  $z - z$  axis. 7
- (b) Determine the plastic moment capacity and plastic modulus of section of the Unsymmetric section shown in figure.



OR

- |      |                                                                                                                                                         | Marks |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| VIII | (a) Design a simply supported laterally restrained beam of span 5m carrying an UD load of 20KN/m imposed load and 20KN/m dead load. Assume Fe410 Grade. | 10    |
|      | (b) What is the difference between laterally restrained and unrestrained beam ?                                                                         | 5     |

## UNIT — IV

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|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| IX | (a) Determine the design loads on roof truss for a factory building for a span 20m, pitch = 1/5 and the height of truss at eave's level is 10m, the spacing of truss is 4.5m, the factory building is 36m long is located at Delhi, provide A C sheeting. | 10 |
|    | (b) Differentiate between partition wall and panel wall.                                                                                                                                                                                                  | 5  |

## OR

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|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| X | (a) A masonry wall carry an axial load of 9.8 KN/m is of 3.5m effective length. It is not braced by crosswalls. The effective height of the wall is 2.40m. Design the Masonry wall. | 9 |
|   | (b) Write short notes on :                                                                                                                                                          |   |
|   | (i) Pitch of Trusses                                                                                                                                                                |   |
|   | (ii) Spacing of Trusses                                                                                                                                                             |   |
|   | (iii) Pur lins                                                                                                                                                                      | 6 |
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