

1720**Code : 15CE61T***Register
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VI Semester Diploma Examination, April/May-2018**DESIGN OF STEEL AND MASONRY STRUCTURES****Time : 3 Hours]****[Max. Marks : 100**

- Note :** (i) Use of IS 800-2007 and steel table are permitted, in the exam hall.
(ii) Missing data may be assumed suitably.

PART - A

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

1. What are the advantages and disadvantages of Steel Structures ? 5
2. What are the different types of loads acting on Steel Structures ? 5
3. Define Pitch, Gauge, Edge distance, Nominal dia and lap. 5
4. What are the advantages of welded joints ? 5
5. Mention different types of failures in beams. 5
6. Name different modes of failure of tension members and explain briefly any one. 5
7. Mention the end conditions of columns with their effective lengths as per I.S. Standards. 5
8. Name various conditions for stability of gravity dams. 5

PART – B

Answer any **five** questions of the following. Each question carry **fifteen** marks.

9. Design a lap joint connecting two plates $100 \text{ mm} \times 8 \text{ mm}$ to transmit a factored load of 150 kN . Use 16 mm diameter black bolts of grade 4.6, Steel having $f_u = 410 \text{ N/mm}^2$. 15
10. An I.S.A. $150 \times 115 \times 10 \text{ mm}$ angle section is to be connected to a 10 mm thick gussette plate. Design a fillet weld to carry a load equal to the strength of the member. Fillet weld is provided on all the three sides. 15
11. A simply supported steel beam of 4 m effective span is laterally supported throughout. It carries total u.d.l. of 12 kN/m inclusive of self weight. Design the section using steel of grade 410. 15
12. Design a tension member using two angles back to back on either side of a gussette plate 10 mm thick for an axial factored load of 375 kN . Use 20 mm diameter black bolts. Take $f_u = 410 \text{ N/mm}^2$ & $f_y = 250 \text{ N/mm}^2$. 15
13. Design a column 3.8 m long in a building subjected to a factored load of 600 kN . Both the ends of column are effectively restrained in direction and position. Use steel of grade 410. 15
14. A 3.6 m long ISHB 250 @ 536.6 N/m carries factored axial load of 2500 kN . Design a slab base for the column which is resting on a concrete pedestal of M25 concrete. Also design the pedestal for SBC of soil 280 kN/m^2 . Use 20 mm dia bolts. 15
15. A masonry retaining wall of trapezoidal section is 5 m height and 1 m wide at the top. It retains soil upto the top of wall. Face of the wall in contact with soil is vertical. Soil and masonry weigh 16 kN/m^3 and 23 kN/m^3 respectively. Calculate minimum bottom width of the wall so that no tension is induced at the base. Take angle of repose as 30° . 15