

1318**Code : 15CE61T***Register
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VI Semester Diploma Examination, Oct./Nov.-2019**DESIGN OF STEEL AND MASONRY STRUCTURES****Time : 3 Hours]****[Max. Marks : 100**

- Instructions :** (i) Use of IS 800-2007 and steel table are permitted in the examination Hall.
(ii) Missing data may be assumed suitably.

PART - A

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

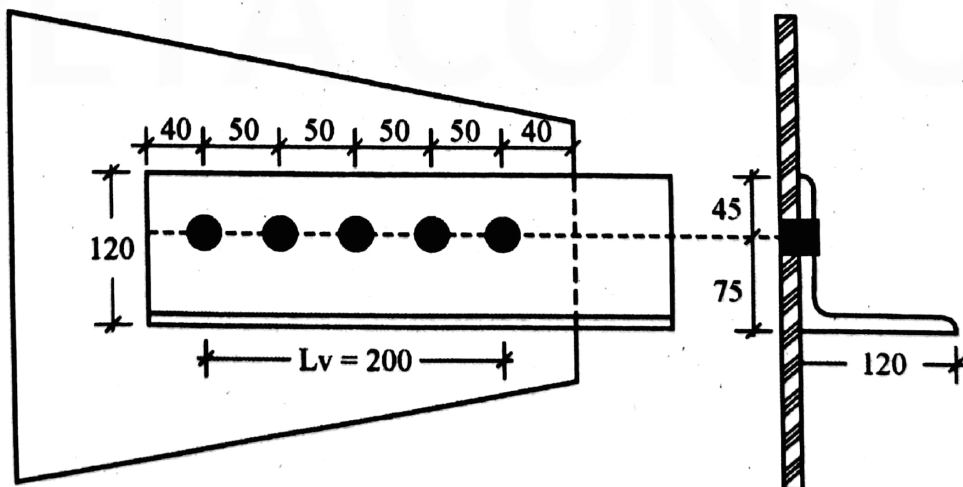
1. Explain the different types of loads acting on the steel structures.
2. State the advantages of using wide flanged beams over narrow ISMB beams.
3. Define the terms :
 - (a) Gauge
 - (b) Efficiency of joint
 - (c) Staggered pitch
 - (d) Effective length of weld
 - (e) Throat thickness of weld
4. What are the types of failures occurring in bolted joints ? Explain any two types of failures.
5. Explain the failure criteria :
 - (a) Web buckling
 - (b) Web crippling
6. Explain any five factors which affect the strength of tension members.

7. Define :
- Strut
 - Effective length of column
 - Slenderness ratio
 - Slab base
 - Gusseted base
8. Mention the various conditions for the stability of dam. Describe any two of them.

PART - B

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

9. Design a lap joint between two plates of size of 60×10 mm thick and 60×8 mm thick so as to transmit a factored load of 80 kN using a single row of M16 bolts of grade 5.6 and 410 grade plates.
10. A tie member of a truss consisting of an angle section ISA $75 \times 50 \times 6$ mm of Fe 410 grade is welded to an 8 mm gusset plate. Design a weld to transmit a load equal to the full strength of the member. Assume shop welding. Fillet weld is provided on top and bottom of the tie member.
11. Design a Simply supported beam of span 5 m carrying a reinforced concrete floor capable of providing lateral restraint to the top compression flange. The beam is subjected total udl of 45 kN/m inclusive of self weight. Assume Fe410 grade steel.
12. A single angle $120 \times 120 \times 8$ mm connected to a gusset plate at the ends with 20 mm diameter bolts with the connection length of 200 mm to transfer tension. Determine the tensile capacity of the joint show in figure. Take $f_u = 410 \text{ N/mm}^2$ and $f_y = 250 \text{ N/mm}^2$.



Determine the design compressive strength of the member 2 ISA $110 \times 110 \times 8$ mm of length 3 m connected on both sides of 12 mm gusset plate by

- (a) Two bolts
- (b) Welding which makes the joint rigid

14. Design a slab base for the column ISHB 250 @ 536.6 N/m carrying an axial load of 520 kN at working conditions. Adopt Fe410 grade steel and M20 concrete. Also design the welded connection to the base plate.
15. A masonry dam, trapezoidal in section is 3.50 m wide at top and 18.0 m high with vertical water face, it impounds water to a depth of 17.0 m. Calculate the minimum bottom width necessary so that, no tension is induced at the base. The density of masonry is 24 kN/m^3 and that of water 10 kN/m^3 . Also, examine the stability of the dam if the co-efficient of friction between dam section and foundation masonry is 0.62.
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