

STRUCTURAL DESIGN - II

Important Question
Lect. Name - Subhashree
Behera
Mob No - 9348665219

2 marks

1. Write advantages of welding over bolting?
2. What do you mean by grading of timber?
3. What is slenderness ratio of a masonry wall?
4. Distinguish between slab base & gusset base?
5. For what type of structures, the tubular steel sections are suitable?
6. Define Web buckling?
7. Define Web crippling?
8. Design consideration for masonry footings?
9. What do you mean by Partial safety factor in the limit state method of design?
10. What do you mean by action in the limit state method of design?
11. Determine the buckling class of ISMB 225 @ 459 N/m?
12. What is the angle between fusion faces for fillet weld?
13. What do you mean by efficiency of a bolted joint?
14. Why base plate is required below the column?
15. What is the recommended throat thickness for incomplete penetration butt welds from one side only?
16. Why tubular steel section is preferred as compression member in place of rolled steel section?

17. Mention types of buckling in a compression member?

18. Two plates of (Thickness given) thickness are to be jointed using longitudinal fillet weld suggest a suitable size of weld?

19. Define the net section area of a tension member?

20. What are the advantages of butt joint over lap joint?

21. Define staggered pitch?

22. Define radius of gyration?

23. Define bolt value?

24. How are the connections classified?

25. Define pitch?

26. Define gauge distance?

~~27.~~

5 Mark!

1. List the assumptions made in the design of bearing bolts along with their limitations.

2. A tubular column consisting of IS: 1161 grade of St. 35 steel is hinged at both ends. The outside diameter of the tube is 219.1 mm & the weight per unit length is 310 N/m. If the length of the column is 4.5 m, Determine its safe load carrying capacity?

3. Explain the principle of high strength friction grip bolts?
4. Write design consideration for masonry footings?
5. Write down concept of shear lag?
6. Write down the properties of structural steel?
7. Explain block shear failure with sketches for the case of bolted connections?
8. Explain block shear failure with sketches for the case of welded connection?
9. Explain the special considerations that are to be taken care of in steel design?
10. Give a neat sketch of the following welded connection. Butt weld - single V, Double V & fillet weld?
11. Find the safe axial load on a circular Sal wood column of diameter 160mm & length of 4.0m?
12. Explain different types of butt welds with sketch?
13. Design a RCC footing for a masonry wall 300mm thick subjected to a load of 60 kN/m including self weight. The SBC of soil is 10 kN/m^2 .

14. State & sketch double lap joint,
15. Calculate the maximum tensile load that can be taken by an ISA 125mm x 75mm connected through longer leg by Fillet welding?
16. Explain buckling class of cross sections in compression member,
17. Write down advantages of steel structure?

10 MARKS :-

1. Determine the safe axial load on a circular column of 180mm diameter made up of deodar (HP) wood for the following case.
 - (i) Unsupported length of the column is 3.0m (Outside location)
 - (ii) Unsupported length of the column is 4.5m (Inside location)
2. Design a welded lap joint for two plates of size 120mm x 8mm & 120mm x 12mm for maximum efficiency. Assume shop welding & Fe 410 grade of steel?
3. Design a steel column section using channel section only to carry a factored axial load of 400kN. The column is 4m long & is effectively held in position at both ends but restrained against rotation at one end only.

Consider $F_y = 250 \text{ MPa}$ & assume wind earthquake action?

Q. A sal wood (m.p) column is $150 \text{ mm} \times 200 \text{ mm}$. Determine the safe axial load on the column if the unsupported length of the column is (i) 1.6 m & (ii) 2.8 m assuming creosote location & timber of standard grade (Grade-I)?

Q. Find the maximum force that can be transmitted through a double bolted chain lap joint considering of 6 bolts in 2 rows connecting two plates of thickness 12 mm & 10 mm . Given that M-16 bolts of grade 4.6 & plates of Fe 410 are to be used?

Q. (i) What is the angle between fusion faces for fillet weld?

(ii) An $150 \times 115 \times 12 \text{ mm}$ angle section is to be connected to a 12 mm thick gusset plate at site. Design the silver weld to carry a load equal to the strength of the member.

Q. (i) Design a lap joint to connect two plates 300 mm wide & 16 mm thick using 20 mm diameter bolts of grade 4.6. The applied service load is 375 kN .

(ii) Write down the principles of limit state design?

8) A tension member 0.8m long to resist a service load of 20kN & a service like load of 50kN. Design a rectangular bar of standard structural steel of grade Fe-410. Assume that the member is connected by one line of 16mm diameter bolts of grade 4.6.

9) Design a simply supported beam of effective span 2.5m carrying a factored concentrated load of 300kN at mid span point. Assume it to be lateral supported.

10) A tie member of a roof truss consists of 2 ISA 90x60x8 mm. The angles are connected on the either side of 10mm gusset plates & the member is subject to a factored pull of 360kN. Design the welded connection. Assume welding is to be made in the field.