**Reg. No. :** | | | | | | | | | | |

**Question Paper Code: 31161**

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2016

Sixth Semester

Civil Engineering

01UCE601 - DESIGN OF STEEL AND TIMBER STRUCTURES

(Regulation 2013)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

(IS800-2007 code book, Steel table are permitted)

PART A - (10 x 2 = 20 Marks)

1. What are the types of failures occur in riveted joint?
2. List the common types of connections used.
3. What is block shear failure?
4. Mention any one advantage of using Lug angles.
5. What is meant by slenderness ratio?
6. Define Slenderness ratio.
7. What is the purpose of providing the bearing stiffener?
8. What is meant by plastic hinge?
9. What is flitched beam?
10. What is meant by decay of timber?

PART - B (5 x 16 = 80 Marks)

11. (a) Find the efficiency of the lap joint shown in figure.1 with the following data: M20 bolts of grade 4.6 and Fe410 plates are used. (16)

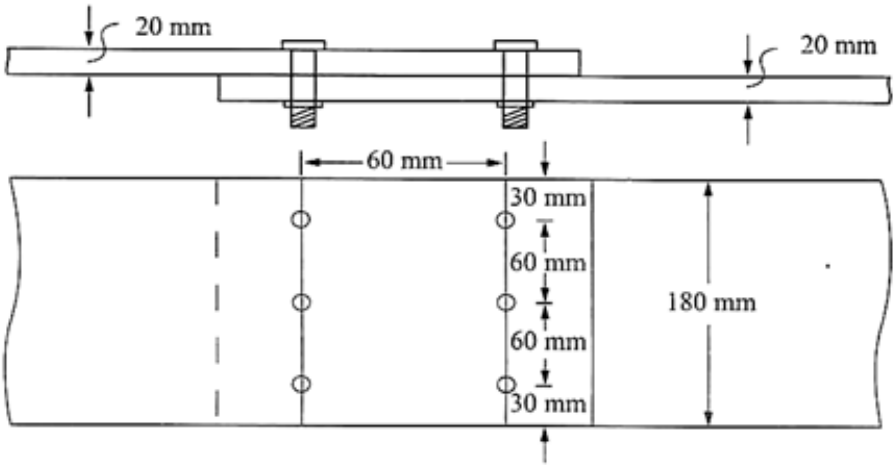


Figure - 1

Or

(b) Design a lap joint between the two plates each of width 120*mm*, if the thickness of one plate is 16*mm* and the other is 12*mm*. The joint has to transfer a design load of 160*kN*. The plates are of Fe410 grade. Use bearing type bolts. (16)

12. (a) Determine the tensile strength of a roof truss member 2ISA 9060, 6*mm* connected to the gusset plate of 8*mm* plate by 4*mm* weld. The effective length of weld is 200*mm*. (16)

Or

(b) Design a single angle section for tension member of a roof truss to carry a factored tensile force of 225*kN*. The member is subjected to possible reversal of stresses due to the action of wind. The length of the member is 3*m*. Use 20*mm* shop bolts of grade 4.6 for the connection. (16)

13. (a) Design a single angle strut connected to the gusset plate to carry 180 *kN* factored load. The length of the strut between centre to centre intersections is 3 m. (16)

Or

(b) Design a gusseted base for a column ISHB 350 @ 710 *N/m* with two plates 450 *mm* x 20 *mm* carrying a factored load of 3600 *kN*. The column is to be supported on concrete pedestal to be built with M20 concrete. (16)

14. (a) Design a simply supported beam of effective span 1.5*m* carrying a factored concentrated load of 360 *kN* at mid span. (16)

Or

(b) Design simply supported beam of 10m effective span carrying a total factored load of 60*kNm*. The depth of the beam should not exceed 500*mm*. The compression flange of the beam is laterally supported by the floor construction. Assume stiff end bearing as 75*mm*. (16)

15. (a) Design a Teak wood floor beam having spacings of 3 *m* centers. The Span of the beam is 5 *m*. The dead load of span is 3 $kN/m^2$ and live load is 2 $kN/m^2$ and the beam is simply supported at both ends. (16)

Or

(b) A compression member is made of 150*mm* x 60*mm* deodar wood and it is 2*m* long. The member is subjected to a compressive load of 16.5*kN* and a bending moment of 800*Nm*. Investigate the safety of the design. Safe compressive stress due to axial load: as per code. Safe bearing stress: 10$N/mm^2$. (16)

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