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

Question Paper Code: 31161

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2017

Sixth Semester

Civil Engineering

01UCE601 - DESIGN OF STEEL AND TIMBER STRUCTURES

(Regulation 2013)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

(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. Define efficiency of a joint.

3. What is block shear failure?

4. What is filler plate and what is its use?

5. What is meant by slenderness ratio?

6. What is meant by column bases?

7. What is the purpose of providing the bearing stiffener?

8. What do you mean by web buckling?

9. What is flitched beam?

10. Write the assumptions for simple bending of timber beam.

11. (a) Two cover plates, 10 *mm* and 18 *mm* thick are connected by a double cover butt joint using 6 *mm* cover plates as shown in figure. Find the strength of the joint. Given M20 bolts of grade 4.6 and Fe410 plates are used. (16)
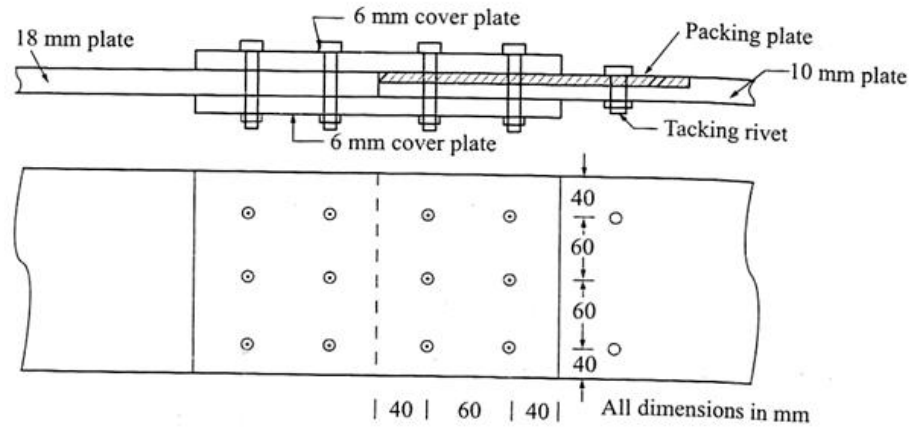
Or

(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 splice to connect a 300 x 20 *mm* plate with a 300 x 10 *mm* plate. The design load is 500 *kN*. Use 20 *mm* black bolts, fabricated in the shop. (16)

13. (a) Design a laced column with two channels back to back of length 10*m* to carry an axial factored load of 1400*kN*. The column may be assumed to have restrained in position but not in direction at both ends. (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)

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14. (a) Design a welded plate girder using Fe 415 steel for a span of 25 *m* to carry a load of 30 *kN/m*. (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) A column has to carry a load of 600 *kN*. Its effective height is 4.0 *m*. Design a built up solid wood column of deodar. (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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