Sixth Semester B.Arch. Degree Examination, Dec.2017/Jan.2018
Structure - VI

Time: 3 hrs. Max. Marks:100

Note: 1. *Answer any FIVE full questions.*
2. *Assume missing data, if any, may be suitably assumed.*
3. *Use of IS – 800-2007 and steel table is permitted.*

1 a. Mention the modes of failure of bolts under tensile force. **(06 Marks)**
   b. Find the efficiency of lap joint shown in Fig. Q1(b) for M_{20} bolts of grade 4.6 and Fe410 pates of 20mm thickness. **(14 Marks)**
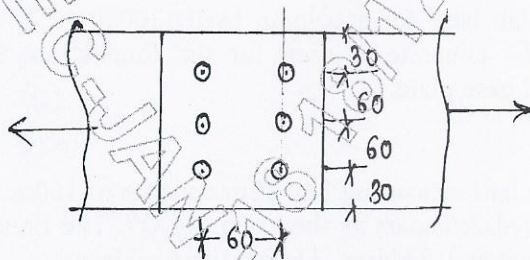

Fig. Q1(b)

2 a. Explain types of loads and their combination. **(05 Marks)**
   b. A bracket plate bolted to a vertical column is loaded as shown in Fig. Q2(b). If M_{20} bolts of grade 4.6 are used, determine the maximum value of factored load P which can be carried safety. **(15 Marks)**
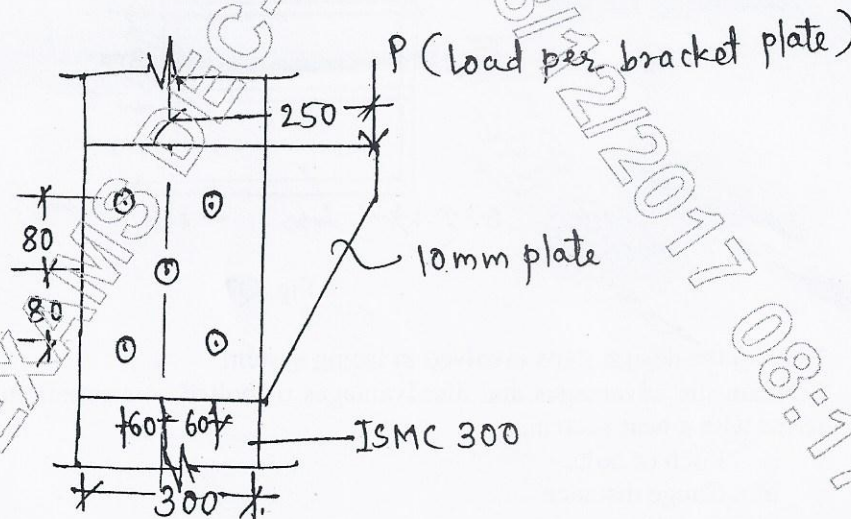

Fig. Q2(b)

3 a. Explain advantages and disadvantages of welded connection. **(08 Marks)**
   b. Design a welded connection for an angle ISA 100×75×8mm subjected to a working pull of 150kN. Assume connections are made in workshop. **(12 Marks)**

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

5   In a truss a strut 3m long consist of two angles ISA 100×100×6mm. Find the factored strength of the member if the angles are connected on both sides of 12mm gusset by
       i)   One bolt
       ii)   Two bolts
       iii) Welding, which makes the joint rigid? **(20 Marks)**

6   Design a slab base for a column ISHB 300@ 577N/m carrying an axial factored load of 1000kN M_{20} concrete is used for the foundation. Provide welded connection between column and base plate. **(20 Marks)**

7   A roof of a hall measuring 8m×12m consists of 100mm thick R.C slab supported on steel I-beams spaced 3m apart as shown in Fig Q7. The finishing load may be taken as $1.5kN/m^2$ and Live load as $1.5 \ kN/m^2$. Design the steel beam. **(20 Marks)**
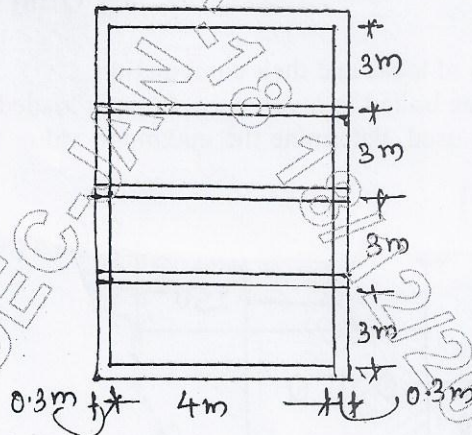

Fig. Q7

8   a. Explain the design steps involved in lacing system. **(10 Marks)**
      b. Mention the advantages and disadvantages of bolted connection and explain the following terms with a neat sketch.
         i)   Pitch of bolts
         ii)   Gauge distance
         iii) End distance
         iv) Edge distance
         v)   Staggered distance. **(10 Marks)**

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