Seventh Semester B.E. Degree Examination, Dec.2018/Jan.2019

Design of Steel Structures

Time: 3 hrs.   Max. Marks:100

Note: 1. Answer any FIVE full questions, selecting
at least TWO questions from each part.
2. Use of IS-800-2007 and steel tables permitted.

PART – A

1   a.   Describe briefly advantages and disadvantages of steel structures.   **(06 Marks)**
    b.   Explain the load combinations adopted in the design of steel structures.   **(06 Marks)**
    c.   Explain the four classes of section as per IS-800-2007.   **(08 Marks)**

2   a.   Explain the various modes of failure of bolted connections with neat sketches.   **(06 Marks)**
    b.   Determine the strength and efficiency of lap joint consists of 10 mm and 8 mm thick plates.
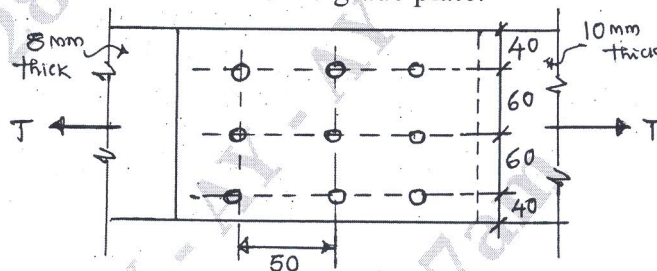   Use M18 grade 5.6 black bolts and Fe440 grade plate.

Fig.Q2(b)   **(14 Marks)**

3   a.   Describe briefly advantages and disadvantages of welded connections.   **(06 Marks)**
    b.   Determine the bracket load "P" the column can carry. Take size of weld as 8 mm.

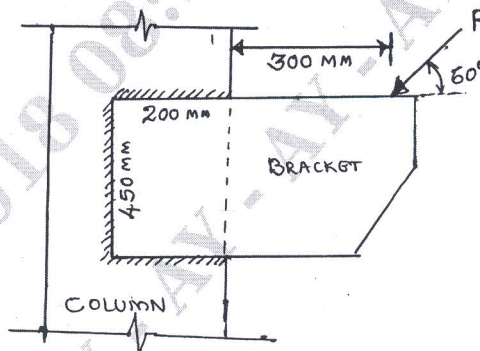Fig.Q3(b)   **(14 Marks)**

4   a.   Determine the shape factor of a 'T' section having a flange width 200 mm and 20 mm thick
         with a web of 10 mm thick and 180 mm depth.   **(06 Marks)**
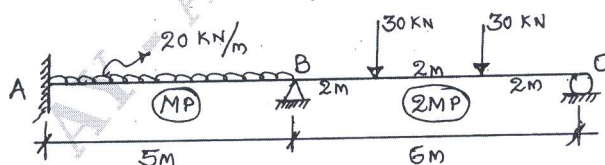   b.   Calculate "plastic moment" for the beam as shown in Fig.Q4(b). Use load factor = 2.

Fig.Q4(b)   **(14 Marks)**

PART – B

5   Design a tie or tension member using double angle (equall legs) section connected on either side of gusset plate subjected to a force of 300 kN use suitable welded connection. If the length of member is 3m. Check for reversal of stresses. **(20 Marks)**

6   Design a compression member using double channel section "face to face" to carry a factored load of 1600 kN. The length of the column is 5m with one end is fixed and other end is hinged. Also design single lacing system. **(20 Marks)**

7   Design a column base (slab base) and concrete base for a column ISHB400 subjected to an axial load of 1000 kN. Use M20 grade concrete and safe bearing capacity of soil is 200 kN/m². Draw neat sketch. Use welded connection. **(20 Marks)**

8   The RCC floor of a classroom 6m × 12m is supported on beam kept at 3m c/c. The beams are simply supported at ends over a span of 6m and rest on 300 mm thick masonry wall. Assuming the thickness of slab is 125 mm, live load on slab is 4 kN/m². Design an interior beam using IS specifications. Apply all the necessary checks. **(20 Marks)**

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