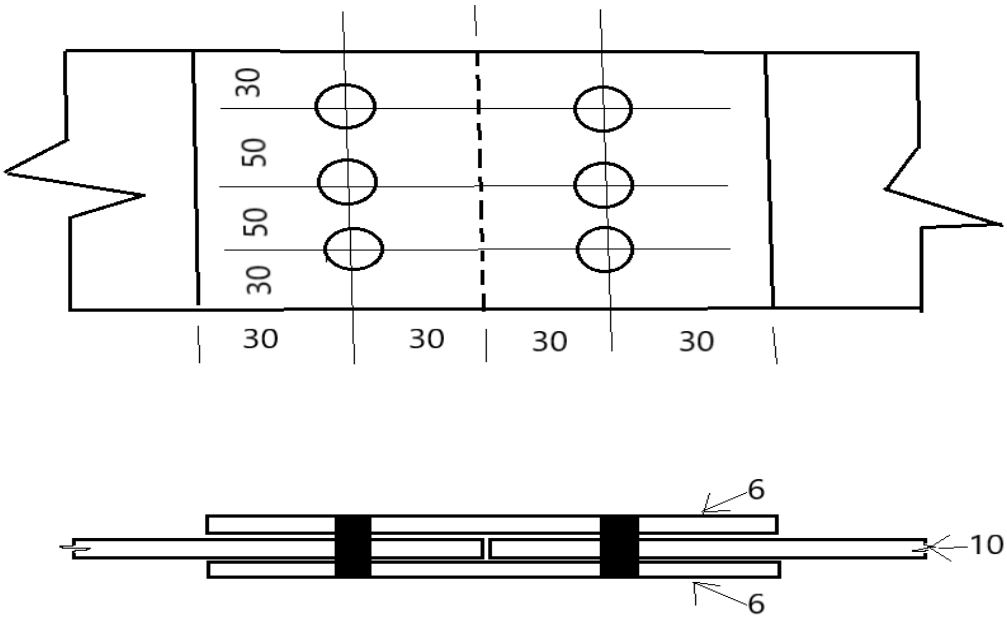
Roll No. _____

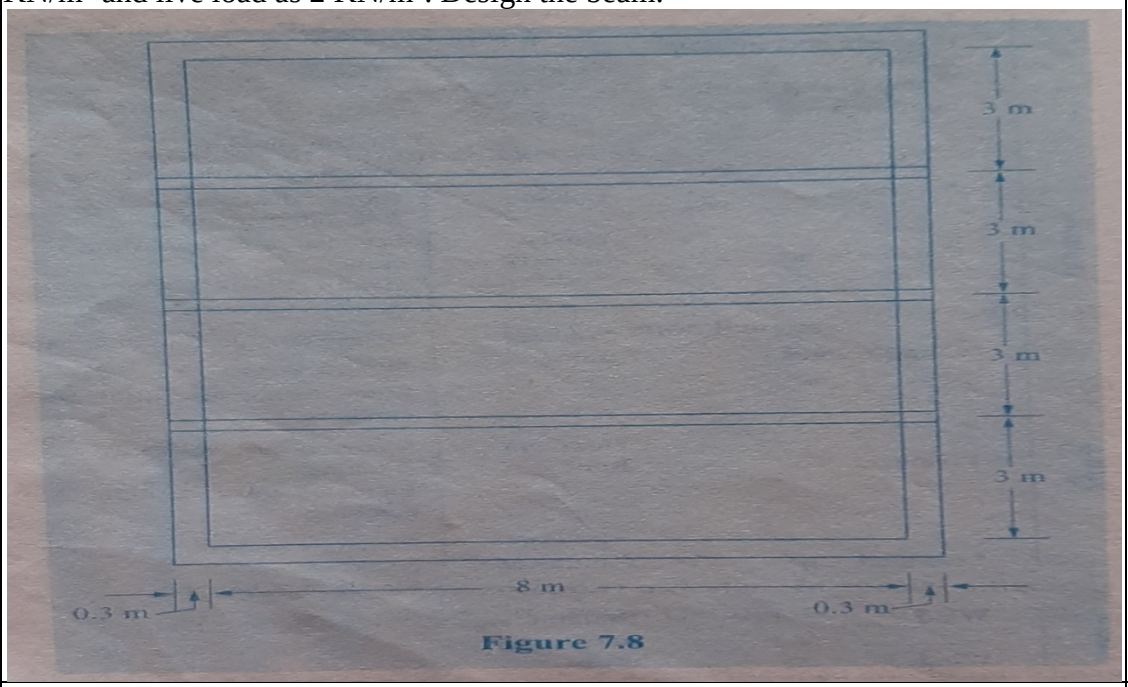
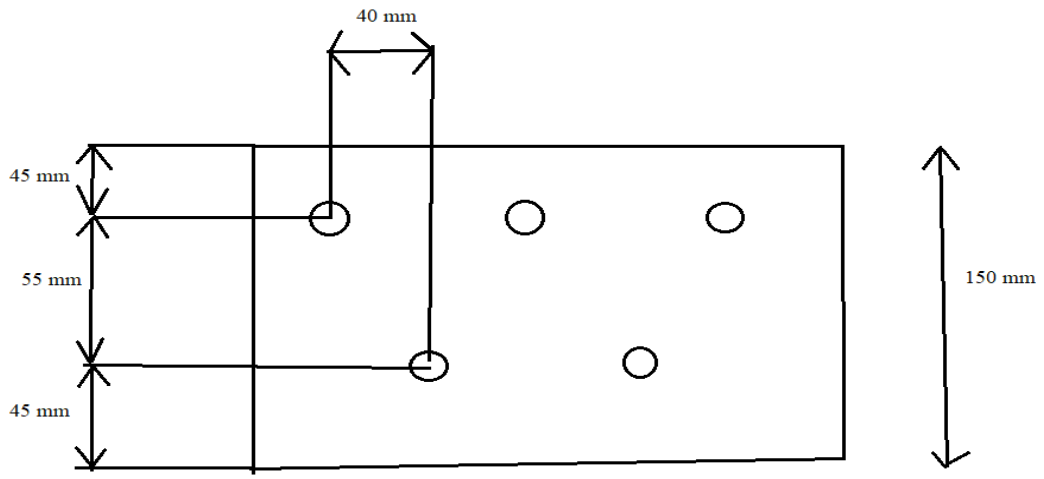
END SEMESTER EXAMINATION
SEMESTER- VI (backlog)

COURSE CODE : CE 509 | **DURATION : 3 (THREE)HRS**
COURSE TITLE : DESIGN AND DETAILING OF STRUCTURE II | **MAXIMUM MARKS : 75**
PASS MARKS : 35 %
SESSION : JULY-DEC.' 2021

NOTE: *1. Attempt any 5 (five) questions .*
2. Mark for each question is shown against it.
3. Assume suitable logical data wherever necessary.

1.	**(a)**	Explain the following terms: a) Pitch distance. b) Gauge distance. c) Edge distance. d) End distance. e) Staggered distance.	**(10)**
	(b)	Sketch the following: a) Single cover double butt joint. b) Shear tear out of plate	**(5)**
2.	**(a)**	Two plates 160mm x 10mm each are connected by a double cover butt joint with 16mm diameter bolts as shown in fig. below. The cover plates are 6mm thick. Determine the design strength of the joint and also the efficiency of the joint. Use plates of Fe 410 (E 250) grade and 4.6 grade of bolt. All dimensions are in mm.	**(10)**
	(b)	Design a single angle strut connected to the gusset plate to carry 200 KN factored load. The length of the strut between centre to centre connection is 3m.	**(5)**



3.	**(a)**	A roof of a hall measuring 8 m x 12 m consists of 100 mm thick RC slab supported on steel I beams spaced 3 m apart as shown. The finishing load may be taken as 105 KN/m^2 and live load as 2 KN/m^2. Design the beam.  Figure 7.8	**(15)**
4.	**(a)**	Longer leg of an ISA 150 X 75 mm is connected to a gusset plate by 20 mm diameter rivets in two rows as shown below. The gauge space is 55 mm and the staggered pitch is 40 mm. determine the thickness of the angle which would be sufficient to transmit a pull of 250 KN. Allowable tensile stress is 150 N/mm^2. 	**(10)**
	(b)	Calculate the tensile strength of a tension member ISA 100 x 90 x 8mm, when it isconnected to: a) Longer leg. b) Shorter leg.	**(5)**
5.	**(a)**	find the efficiency of the following riveted joints: a) Single riveted lap joint for 8 mm thick plates with 16 mm dia rivets at a pitch of 50 mm centres. b) Double riveted lap joint for 8 mm thick plates with 16 mm dia rivets at a pitch of 75 mm centres.	**(8)**
	(b)	Design a lap joint connecting two plates 120 mm X 8 mm to transmit a factored load of 120 KN. Use 12 mm bolts of grade 4.6 and plates of grade 410.	**(6)**

6.	**(a)**	An I-beam ISLB 450 @925 N/m carrying a total uniformly distributed load of 250 KN is to be supported on ISHB 300 @588 N/m columns at the ends. If at each end the beam is bolted to the flange of the supporting column with 20 mm dia bolts, design the connection.	**(8)**
	(b)	Design a lap joint connecting two plates 120 mm X 8 mm to transmit a factored load of 120 KN. Use 12 mm bolts of grade 4.6 and plates pf grade 410.	**(6)**
7.	**(a)**	Explain with diagrams the types of staircase.	**(10)**
	(b)	What are the requirements of good staircase.	**(5)**
8.	**(a)**	Explain with diagrams the types of footing.	**(8)**
	(b)	Distinguish between bolting, riveting and welding.	**(6)**

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