



VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE

[Central Technological Institute, Maharashtra State]

Matunga, Mumbai-400 019

SEMESTER EXAMINATION

SEMESTER & PROGRAM

TIME ALLOWED

COURSE (CourseCode) :

CRE-exam

VIth TY-BTech(CIVIL)

3 HRS.

Design of Steel Structures

DATE OF EXAM

TIME

MARKS

22 May 2019

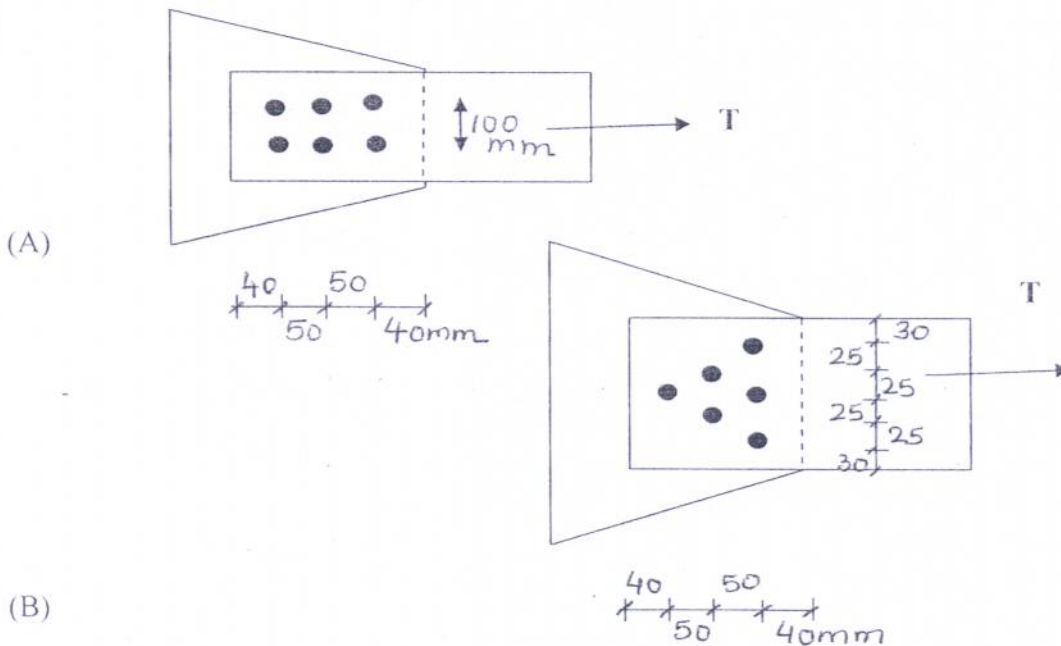
9:30 - 12:30 pm

100

Instructions

1. All questions carry equal marks.
2. Figures to the right indicate full marks.
3. Assume necessary data
4. Use of IS800, IS875 and IS handbook is permitted

- Q-1 A flat of size 160mmx10mm is used as a tension member in a roof truss. It can be connected to the gusset plate by two different arrangements of bolts. Calculate the maximum tension the flat can carry in both cases if the diameter of the bolt is 16mm. Assume yield stress of 250N/mm^2 and ultimate stress of 410N/mm^2 . 10



- Q-2 Design a stiffened seat connection to join ISMB 350@514N/m with a column section ISHB 300@ 576.8N/m. The beam transmits an end reaction of 320kN due to factored loads. Steel is of grade Fe410. Draw neat sketch. 20

OR

- Q-2 A simply supported steel beam 5m span carries uniformly distributed load of 40kN/m. In addition, it carries central point load of 50kN. The beam is laterally supported. Design the section and check the section for shear and deflection. 20

- Q-3 A single storey workshop building situated in a partially developed industrial area 16mx12m is to be provided with a pitch roof. The c/c spacing of the truss is 4m. The sloping roof has a span of 12m and pitch $\frac{1}{4}$. The height of eaves is 5m above ground level. The building will be situated in Mumbai in a plane area and its permeability is normal. Determine wind pressure. 15

- Q-4 Design a splice for joining tension member sections 160x10mm and 250x14mm. 20

The member is subjected to a factored tensile load of 300kN. Assume Fe410 grade of steel. Provide 20mm diameter bolts of grade 4.6 for making the connections. Make staggered connections.

Q-5 An angle carries an ultimate tension of 425kN. Design the connection using lug angle. **15**

OR

Q-5 A column 5m long is to support factored load of 550kN. The ends of the column are effectively held in position and direction at both ends. Design the column using available 20mm plates. **15**

Q-6 Design a built-up column 8m long to carry factored axial load of 1800kN. The column is effectively held in position at both ends and restrained against rotation at one end. Use steel Fe410 with $f_y = 250\text{MPa}$. Design the column with two channels placed back-to-back. **20**