

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
SECOND SEMESTER M.TECH DEGREE EXAMINATION, MAY 2016

Civil Engineering
(Structural Engineering)

01 CE 6102 ADVANCED METAL STRUCTURES

Max. Marks : 60

Duration: 3hrs

Answer any two questions from each part

PART A

- 1 Design a stiffened seat angle connection to transfer a reaction of 200 kN from an ISMB 300 beam to ISHB 200 column. Assume Fe 410 grade steel. Design it for bolted connections. 9 Marks
- 2 a) Design a bolted cover plate splice for a ISHB 225 column connected to an ISHB 225, to transfer a factored axial load of 450kN, both columns are of grade Fe415 steel. The ends are not machined for full contact in bearing . 6 Marks
b) Explain weld defects 3 Marks
- 3 Design members AB, AC and joint A of the roof truss for the following data. 9 Marks
Use the tubes of grade Y_{st} 210. Provide welded connection at joint A. AB, of length 2.5m has to carry a compressive force of 90 kN and AC of length 3 m has to carry a tensile force of 100 kN. AB is inclined to AC(horizontal) at an angle of 23°

PART B

- 4 The span of knee braced roof trusses over an industrial building 36 m long is 16m. The spacing of roof truss is 3m. The pitch of roof is 1 in 4. Asbestos cement corrugated sheets are used for roof covering. Basic wind pressure is 1.6 KN/m^2 . The height of eaves above ground level is 8.6m. Propose a suitable type of roof truss. Determine the load at various panel points due to 9 Marks

dead load, live load and wind load.

- 5 a) Explain partial and full shear connections 4 Marks
- b) Explain moment resisting base plates with neat sketches 5 Marks
- 6 A column ISHB 350 @ 661.2 N/m carries an axial compressive factored load of 1700kN. Design a suitable bolted gusset base. The base rests on M15 grade concrete pedestal. Use 24mm bolts of grade 4.6 for making the connections. 9 Marks

PART C

- 7 a) Differentiate between local and overall buckling of light gauge compression members. 3 Marks
- (b) Two lipped channels each of size $300 \times 100 \times 30 \times 2.5$ mm are placed back to back, touching each other, to act as a column of length 3.5 m. Compute the safe load on the columns. Take $f_y = 240 \text{ N/mm}^2$. 9 Marks
- 8 a) An ISALC 200×100 @ 153.3 N/m channel is used as a simply supported beam over an effective span of 1.75 m. Calculate the safe uniformly distributed load it can carry. 9Marks
- b) Differentiate Elastic and Plastic Analysis 3 Marks
- 9 Analyse the following portal frame for plastic moment capacity, M_p , required. 12 Marks

