Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

DIPLOMA ENGINEERING - SEMESTER–VI (DLM) EXAMINATION – SUMMER 2013

Subject Code: 360601/2360601 **Date: 09/05/2013**

Subject Name: Design of Steel Structure

Time: 10:30 am to 01:00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **English version is considered to be Authentic.**
5. **Non programmable calculator is allowed in exam.**
6. **IS 800-2007, IS 875-1987 Part I To III, SP-6(1) are allowed in examination.**
7. **Nothing should be written in the code which may leads to UFM case.**

Q-1 (A) Calculate D.L. and live load (Imposed load) Per Panel Point of roof truss. (i) Span of roof truss = 15 m fan truss (ii) Spacing of roof truss = 4m (iii) Rise of roof truss = 3 m (iv) A.C. sheets used as roofing material (v) Total No. of Panels = 8.Assume suitable data. **07**

Q-1 (B) Draw sketch of roof truss (With the help of Bird View) and explain various components of it. **07**

Q-2.(A) Calculate wind load for above roof truss in **Q1(a)** with following data (i) Place = Mumbai (ii) Height of truss above G.L = 20 m (iii) medium opening (iv) Slope of ground less than 3^0 (v) life of building = 50 years (vi) terrain category = 1 and class-B structure. **07**

Q-2.(B) Two plates 100 x 12 mm and 100 x 20 mm are connected by lap joint to resist a tensile load of 120 kN. Design a lap joint using M 16 bolts of grade 4.6 and grade 410 plates Draw figure showing detailed connection. **07**

OR

Q-2(B) Determine the compressive strength of a single ISA 90 x 60 x 8 mm with length of member 3.0 m. The ends of the member are fixed and load is applied concentrically to the angle. Take fy = 250 Mpa. **07**

Q-3 (A) An ISA 125 x 75 x 8 mm is subjected to axial tensile force of 150 kN connected by its longer leg to 10 mm thick gusset plate. Design welded joint using 6 mm size fillet weld on sides only. Consider shop welding. **07**

Q-3 (B) State advantages and disadvantages of welded connections. **07**

OR

Q-3 (A) An equal angle section 125 x 75 x 8 mm is connected to gusset plate 8 mm thick using 5-20 diameter bolts to transfer tensile force. Determine tensile strength of the angle. Assume steel grade Fe 410. **07**

Q-3(B) State partial safely factors for loads & materials as per IS. **07**

Q-4(A). Design a simply supported beam having span 5m and carrying total factored load (including self weight) of 40 kN/m on entire span. The compression flange of the beam is laterally restrained throughout.
Check for deflection only. **07**

Q-4(B) Design a single lacing system for a column composed of 2ISMC 350 placed back to back at a clear spacing of 220mm. Effective length of column is 6m. The axial load on column is 1800 kN. Use blots for end connection. Do not check lacing for tensile and compressive strength. **07**

OR

Q-4(A) Design a double angle discontinuous strut to carry factored comp. load of 240 kN. The effective length of strut is 3.6 m.Angles are placed on either Side of G.P. Take fy=250 Mpa. **07**

Q-4(B) .Determine the design axial load on the column section ISMB 300 having 3.25m height and fixed at both ends. **07**

Q-5(A) A steel column is carrying factored axial load of 1800 KN. Design the column using two channels back to back section having length 5.5 m with both ends fixed. Take fy=250 Mpa. **07**

Q-5(B) Design an angle section purlin of roof truss having 26^0 angle. Span of purlin is 3.65m. It carries design load of 3 KN/m. **07**

OR

Q-5(A) Design suitable slab base for a column made of ISHB 300 @ 63 kg/m and carrying axial load of 1200 kN. The safe bearing capacity of soil is 180 kN/m^2 Show all details in two views. (Use M25 & Fe410). **07**

Q-5(B) Draw neat Sketches by assuming suitable data for the flowing.
(At least two views)
(a) Beam to Column connection – Web and Seat angle connection stiffened (Bolted) **04**
(b) Beam to Beam connection -Web cleat angle connection (Welded) **03**