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D: 20/05/2014.

Student Exam No._____

GANPAT UNIVERSITY

B. Tech. Semester: 6th Civil Engineering

Regular Examination March – June 2014

2CI601 Design of Steel Structure

Time: 3 Hours **Total Marks: 70**

Note: 1. All Questions are Compulsory
2. Figure to the Right indicates full marks.
3. Assume Suitable Data if necessary.
4. Use of code IS800-2007, Steel Table and IS 875 (part 3) 1987 is allowed.

Section - I

Que. – 1 Design gantry girder to carry single electric overhead travelling crane for following detail: **12**

Span of girder : 5 m
Crane capacity : 500 kN
Self weight of trolley : 90 kN
Distance between wheels : 3.2 m
Span of crane girder : 12 m
Self weight of the rail : 0.6 kN/m
Minimum hook approach : 1.2 m
Self weight crane girder excluding trolley : 450 kN

Que. – 2 Determine the gravity load at each panel and wind load for the Pratt roof truss, which is located at closely spaced area of Delhi city. **11**

Given Data:

Span of the Truss (L) = 12m
Spacing of the Truss = 4m
Rise of the Truss = span / 4
Height of Eaves = 6m
Roof Covering = A.C Sheet
Permeability = Normal
Soil Type = Hard

OR

Que. – 2 Design a welded plate girder for a simply supported bridge deck beam with clear span 24m, subjected to dead load 20kN/m (excluding self weight), live load 10kN/m and two concentrated loads of 200kN each at 6m from each end. Use Fe415 grade steel. Check shear capacity of web, moment capacity of flange and shear buckling of web. **11**

Que. – 3 (A) What is difference between surge load and drag load of cranes? **04**
(B) What are the advantages of plate girder over truss? **04**
(C) Explain pre-buckling and post-buckling behavior of web plate. **04**

OR

Que. – 3 (A) Explain edge & pitch distance, give the criteria for it. **04**
(B) Explain Shear Capacity and Bearing Capacity of Bolt. **04**
(C) Explain Stiffeners and it's types. What is the importance of it? **04**

Section – II

Que. – 4 A Column section ISHB350 Carries an axial load of 1100kN.Design Suitable Gusset Base plate Using HSFG Bolts. Allowing Bearing pressure on Concrete is 4000kN/m^2.Assume 16 mm thick gusset plates. **12**

OR

Que. – 4 Design Slab base plate for a built-up column composed of 2ISMC 300 placed back to back at clear spacing 300mm.Axial factored load on column is 1200kN. **12**

Que. – 5 Design a bolted bracket connection to support an end reaction of 300kN because of the factored load supported by the beam ISHB150@300.19 N/m. The eccentricity of the end reaction is 200 mm. The steel used is of grade Fe410. Use M20 bolts of grade 4.6. The thickness of bracket plate may be taken as 10mm. **11**

OR

Que. – 5 Design a bolted beam Splice for ISMB 450 section to transfer a factored bending moment of 150kN-m and a factored Shear of 100kN.Assume that the flange splice carry all of the moment and that the web splice carries only shear. Use M20 HSFG, 8.8 Grade bolts. **11**

Que. – 6 Design a Simply Supported beam of span 8m carrying working loads of DL=20kN/m and LL=15kN/m. Assume that the compression flange of beam is laterally restrained throughout. Perform the Checks for Shear buckling of web and Web crippling only. **12**

END OF PAPER