Date: 18/05/2017

New

GANPAT UNIVERSITY

B. Tech. Semester: 6th Civil Engineering

Regular Examination April-June 2017 (CBCS NEW)

2CI601 DESIGN OF STEEL STRUCUTRES

Time: 3 Hours   **Total Marks: 60**

Instruction: 1. All questions are compulsory.
2. Figure to the right indicates full marks.
3. Assume suitable data wherever if necessary.
4. Use of IS 800-2007, IS:875 – 1987 (Part I, II & III) and Steel Table / IS 808 is allowed.

Section – I

Que. – 1 Attempt following questions:

(A) Explain steps of Gantry Girder.   04

(B) What do you mean by gantry girder? Write down essential components of crane   03
system.

(C) Show the deflection criteria for gantry girder. Also show what is the difference in   03
maximum deflection at mid span if two wheel loads and four wheel loads is given?

OR

Que. – 1 Design a gantry girder to carry two electrically operated overhead cranes travelling in   10
tendem, having following data :

Crane capacity (each) = 240 kN	Wheel spacing = 3.4 m
Weight of crane girder = 160 kN	Weight of crab = 50 kN
Minimum hook approach = 1.4 m	Span of crane girder = 16 m
Minimum spacing between cranes = 2 m	Span of gantry girder = 8 m
Weight of rail section = 1.0 kN	Height of rail section = 75 mm

Que. – 2 Attempt following questions:

(A) What is plate girder? Write down its application.   03

(B) Enlist merits and demerits of Plate Girder over trusses.   03

(C) How the design of connection between load bearing stiffeners and web is carried out?   04

OR

Que. – 2 Design a welded plate girder for simply supported bridge deck with clear span of   10
20m, subjected to working UDL of 40kN/m. Deck also carries two concentrated load
of 300kN at 5m from both ends. Fe 415 grade of steel. Assume suitable data.

Que. – 3 Attempt following questions.

(A) Design a suitable web cleat connection between main beam ISMB 500 and   07
secondary beam ISMB 300. Secondary beam has to transfer end reaction of 200kN
due to factored loads. Use 8.8 grade bolts of 20mm diameter, steel grade 410MPa.

(B) Justify which connection is more preferred from bolted connection and welded   03
connection?

Que. – 4   Attempt following questions.

    (A) Calculate the moment capacity of ISLB 500 beam having span 5m with the   **05**
          compression flange laterally unrestrained.

    (B) Determine the buckling moment of an ISHB 500 section with f_y= 250MPa when it is   **05**
          simply supported over a span of 5m and laterally restrained?

<div align="center">OR</div>

Que. – 4   In a factory building steel beams are provided at 3.5m c/c. the effective span of beam   **10**
          is 7.5m. The RCC floor slab is 120 mm thick. It has superimposed load of $3.5kN/m^2$.
          Assume weight of RCC as $25kN/m^3$ and weight of floor finish as $24kN/m^3$. Design
          the steel beam. Make necessary checks.

Que. – 5   Attempt following questions.

    (A) Differentiate the G.I Sheets and Asbestos cement Sheet.   **03**

    (B) Determine graphically design load for wind load only. Check load for all the   **07**
          members of a roof truss with following details.

Types of Roof Truss – Simple Fan type	Span of Roof truss – 9.0 m	
Total nos. of full panel points – 8 nos.	Rise of Truss – 5.0 m	
Loads on full panel points are		
(i). D.L. = 5kN	(ii). L.L. = 5kN	(iii). W.L = 10 kN (suction)

<div align="center">OR</div>

Que. – 5   Attempt following questions.

    (A) Explain with neat sketch component of roof truss.   **03**

    (B) Determine graphically design load for gravity load only. Check load for all the   **07**
          members of a roof truss with following details.

Types of Roof Truss – Simple Fan type	Span of Roof truss – 9.0 m	
Total nos. of full panel points – 8 nos.	Rise of Truss – 5.0 m	
Loads on full panel points are		
(i). D.L. = 5kN	(ii). L.L. = 5kN	(iii). W.L = 10 kN (suction)

Que. – 6   Determine Gravity Load and Wind Load per panel point for the roof truss of a   **10**
          workshop shed considered at Jaisalmer City for the following requirements.

Span of truss : 12 m	Spacing of roof truss : L/4 m
Rise of truss : 4 m	Height of truss above G.L : 16 m
Roofing Material : G.I Sheets with $130 N/m^2$	Wt. of Purlin and Fixtures : $125 N/m^2$ on plan area
Total Nos. of Purlins : 10	Opening of wall area : 40%
Topography : Plain Horizontal ground and upwind slope less than 3 degree	Terrain Category and Class : Category III and Class B
Probable life of roof truss : 35 years	

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