MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL

Paper Code : CE(PC)604/CE602 Design of Steel Structures

UPID : 006651

Time Allotted : 3 Hours *Full Marks :70*

The Figures in the margin indicate full marks.
Candidate are required to give their answers in their own words as far as practicable

Group-A (Very Short Answer Type Question)

1. Answer *any ten* of the following : [1 x 10 = 10]

(I) Horizontal stiffeners are provided in plate girder to resist ----------.

(II) In case of gantry girder lateral force will cause B.M. in the ---------- plane.

(III) Limit state method include ----------.

(IV) What is the minimum size of weld for the thickness of thicker member up to 10mm?

(V) For a single unequal angle tie member, the leg preferred for making connection is the ----------.

(VI) ---------- will be preferred for a column section.

(VII) The angle of dispersion of a concentrated load on the flange to the web plate of a steel beam is ----------.

(VIII) Bearing stiffeners are provided at ---------- and ----------.

(IX) The most common built-up section used in gantry girder is ----------.

(X) For checking the deflection of beams ,what are the partial safety factors for dead and live loads?

(XI) Two plates 18 mm and 16 mm are jointed by fillet ,the maximum size of fillet weld may be -------.

(XII) The net sectional area of a tension member is the gross sectional area of the member minus ---------.

Group-B (Short Answer Type Question)

Answer *any three* of the following : [5 x 3 = 15]

2. Discuss in short about different types of rolled steel sections used in design of steel structures. [5]
3. What are the failure modes of bolted joints? Explain your answer with neat diagram. [5]
4. What do you mean by Lug Angles? Illustrate your answer with neat sketch. [5]
5. What are the basic differences between slab base and gusseted base? Illustrate your answer with neat sketches. [5]
6. What do you mean by the optimum depth of the plate girder? Derive the expression for the same. [5]

Group-C (Long Answer Type Question)

Answer *any three* of the following : [15 x 3 = 45]

7. A simply supported steel joist of 4.0 m effec tive span is laterally supported throughout. It carries a total uniformly distributed load of 40KN (inclusive of self weight). Design an appropriate section using Fe410. [15]
8. The section of a welded plate girder consists of flange plates 575mmx35mm and a web plate 1780 mm x 10 mm. Determine the moment capacity of the sec tion and also the shear resistance corresponding to web buckling intermediate stiffeners are not provided Use Fe410. [15]
9. Design a suitable section for simply supported gantry girder for: [15]
   Spacing of columns = 4 m, Crane capacity = 160 kN
   Weight of the crane excluding the crab = 250 kN
   Weight of the crab = 60 kN, Minimum clearance of cross travel = 0.8 m
   Wheel base = 5.3 m, C/C distance between gantry girders = 20 m
   Height of the rail = 105 mm, Expected numbers of stress cycles = $2x10^6$
   Use Fe410.
10. Give a detailed account about different types of limit states used in steel design. [15]
11. Discuss about the different types of load, load combina tions and I.S. Codes used in design of steel structures. [15]

*** END OF PAPER ***