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Total No. of Pages : 02

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M.Tech. (Structural Design) EL-IV (2016 & Onwards) (Sem.-3)

INDUSTRIAL STRUCTURE

Subject Code : MSTD-306

M.Code : 74808

Time : 3 Hrs.

Max. Marks : 100

INSTRUCTIONS TO CANDIDATES :

1. Attempt any FIVE questions in all.
2. Each question carries TWENTY marks.
3. Use of IS800:2007 steel tables are allowed.
4. Any missing data may be assumed.

- Q1. Design a welded connection to connect two plates of width 200 mm and thickness 10 mm for 100 percent efficiency.
- Q2. Select a suitable angle section to carry a factored tensile force of 210 kN assuming a single row of M20 bolts and assuming design strength as $f_y = 250$ N/mm sq.
- Q3. Design a single angle section to carry a compression of 100 kN. The centre to centre distance between the end connections is done by at least two bolts. The grade of steel is E200.
- Q4. Design a simply supported I section to support the slab of a hall 9m×24m with beams spaced at 3 m c/c. The thickness of the slab is 100 mm. Consider a floor finish load of 0.5 kN/sq.m. and a live load of 3 kN/sq.m. The grade of steel is E 250. Assume that an adequate lateral support is provided to the compression flange.
- Q5. Design a vertical side bracing for the industrial building. The horizontal (longitudinal) force along the rails over the gantry girder due to electrically operated overhead crane is 16 kn.

The height of rails is 7.5m above base.

Height from top of rails = 3.5 m

c/c distance b/w columns (span of gantry girder) = 8m

Reaction from gable wind girder = 42 KN

Q6. Design a gantry girder to be used in an industrial building carrying an electric overhead travelling Crane, from the following data :

Crane capacity	= 250 KN
Self wt. of crane girder excluding trolley	= 200 KN
Self wt. of trolley, electric motor, hook, etc	= 60KN
Approx. min. approach of the crane hook to the gantry girder	= 1.1 m
Wheel base	= 3.4 m c/c
c/c distance b/w gantry rails	= 20 m
c/c distance b/w columns	= 7 m
Self wt. of rail sections	= 300 N/m
Yield stress of steel	= 250 MPa & $E = 2 \times 10^5$ MPa

Q7. (a) Discuss merits and demerits of structural steel over reinforced structures.

(b) Discuss various loads which a gantry girder is subjected to its design.

Q8. Write short notes on :

(a) Different roofing and claddings

(b) Types of purlins

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.