Roll No. | | | | | | | | | | | | Total No. of Pages : 03

Total No. of Questions : 09

B.Tech. (CE) (Sem.–6)

DESIGN OF STEEL STRUCTURES

Subject Code : PECE-603B-18

M.Code : 79401

Date of Examination : 07-07-22

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. Write briefly :

a) What is Bracket Connection? Describe in brief.

b) What is Gantry Girder? Draw neat Sketch.

c) What is meant by Transverse bends?

d) What is role of cross girder in steel structures?

e) What is difference between lateral and longitudinal bracing?

f) What is un-stiffened seat connection?

g) What is stringer?

h) Define Permissible stresses and working stresses?

i) Write a short note on grillage footing.

j) Define collapse load.

SECTION-B

2. Write a detailed note on *'plastic hinge mechanism'*.

3. Draw neat sketch of Grillage foundation. Also write down the steps to design it.

4. What are the different beam-column connections? Explain with help of diagram

5. Describe the design procedure for Gantry Girder.

6. Design a suitable bearing for a plate girder railway bridge of span 3.2m centre to centre of bearings. The bridge is designed for meter gauge single track main line.
What are the different types of bracings used in a braced building?

SECTION-C

7. Design a gantry girder to carry an electric overhead travelling crane to suit following data:

   Crane capacity: 200 kN

   Wt. of crab alone: 70 kN

   Wt. of crane: 150 kN

   Minimum approach of crane hook: 1.2 m

   Distance between centres of crane wheels: 3.5 m

   Distance between cranes of gantry girders: 18.0 m

   Span of gantry girder: 7 m

   Wt. of rail section: 0.300 kN per metre

   Height of rail section: 80 mm.

8. Design a column section for the industrial building in which the pitch of the roof truss is 1 in 4. The spacing of roof truss is 4m. The span of roof truss is 16m. Adopt the following values of various load coming over the column from other component of industrial building. Reaction from roof truss including weight of purlins, roof covering material etc. = 18kN

Reactions from side rail and sheeting = 9.5 kN

Reactions from crane gantry girder and rails = 5.6lkN

It acts at a distance of 250mm from the face of the column.

Reaction due to live load =9.20 kN

Basic wind pressure = 1.50 kN/m^2

Height of column upto eaves level = 8m

The crane is 5m above the base. Crane capacity = 300 kN, weight of crane excluding trolley = 190kN, Weight of trolley = 100kN.

Minimum approach of the crane hook is 1.2m.

Distance between centre of crane wheels = 3.5m

Distance between centre of gantry girder = 17 m

9. Explain the following :

a) Portal Sway bracing

b) Mill bent

c) Roller bearing

d) Cross girder.