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

Total No. of Questions : 08

M.Tech. (Civil Engineering)   (Sem.–2)
INDUSTRIAL STRUCTURE
Subject Code : MTCE-211
M.Code : 74304

Time : 3 Hrs.   Max. Marks : 100

INSTRUCTION TO CANDIDATES :
1.   **Attempt any FIVE questions out of EIGHT questions.**
2.   **Each question carries TWENTY marks.**
3.   **Missing data if any can be suitably assumed, clearly stating the same.**
4.   **Wherever possible support the answer with suitable sketches.**
5.   **Use of relevant codes (IS 800, IS 801, IS 3908 & steel tables etc) is allowed.**

1.   a)   Explain the concept of minimum weight design as applicable to plastic design with a
          suitable example.   (10)

     b)   Write short answer for the following :

          i.   On what basis Industrial structures are classified?

          ii.   Define Ventilation.

          iii. What are the causes for fire in Industrial Buildings?

          iv.   Mention the sources of noise in Industries.

          v.   Explain plastic section modulus.   (2 × 5)

2.   a)   Explain in brief the planning, types and elements of an industrial building.   (10)

     b)   Write short answer for the following :

          i.   What is "Resonance"?

          ii.   How protection against noise can be done in industrial buildings?

          iii. Mention the major components of an industrial building.

          iv.   What is the minimum front open space to be provided for factory building as per
                NBC?

          v.   List the factors that govern the site selection for an industrial building.   (2 × 5)

3.   a.   Discuss Types of sections used in light gauge steel structure. (8)

      b.   Find the allowable axial load for a column section shown in figure. Effective length of the column is 3.6 m. Take fy =235 N/mm^2. (12)
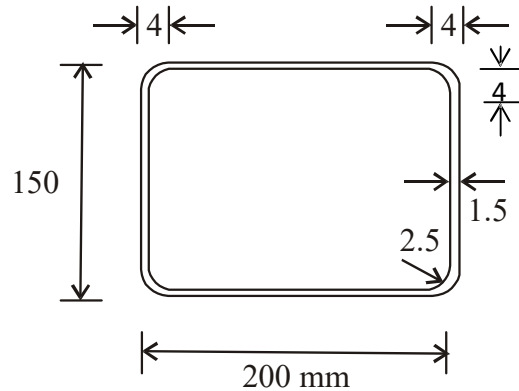
Fig.1

All dimensions are in mm.

4.   a.   List out the various uses of steel towers. (5)

      b.   What are the various loads that may act on Transmission line towers? (5)

      c.   Write about the design aspects of transmission line towers. (10)

5.   Write short answer for the following :

      a.   What are the stresses during erection?

      b.   What are the structural components for prefabrication?

      c.   What is the difference between floor and a slab?

      d.   What is a shear wall?

      e.   Define stiffened, unstiffened element of light gauge element.

      f.   What are materials used for prefabrication techniques?

      g.   What are the safety factors to be considered?

      h.   What are the types of shear wall?

      i.   What are the various stages involved in prefabrication of structures?

      j.   Define multiple stiffened element of light gauge element. (2×10)

6. a. Enlist the advantages and disadvantages of aluminium structures. (3)

   b. Explain the design procedure of Aluminium compression members. (5)

   c. Design an Indian Standard Aluminium Equal Leg Angles (ISALE) strut to carry an axial load of 160 kN. The effective length of strut is 1.25 m. Provide a single section. Adopt a factor of safety of 2.5. (12)

7. A cylindrical silo has an internal diameter of 10 m with the height of cylindrical portion is 40 m. The density of material is 15.2 kN/m ^{3}. The coefficient of friction between material and concrete is 0.70. The angle of repose of the material is 17.5 degrees. Design the thickness and reinforcements required at the bottom of the cylindrical portion of the silo. Adopt M 25 grade of concrete and Fe 415 steel. (20)

8. a. Design a 'I' section purlin, for an industrial building situated in the outskirts of Allahabad, to support a galvanized corrugated iron sheet roof for the following data :

   Spacing of the truss c/c = 6m,

   Span of truss = 12m,

   Spacing of purlins c/c =1.5m,

   Intensity of wind pressure = 2kN/m^2,

   Weight of galvanized sheets = 130 N/m^2,

   Grade of steel = Fe 410 (14)

   b. Compare the hollow circular & hollow square section as thin tubular sections, for its strength with respect to use as compression member. (6)

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.