Roll No. ☐☐☐☐☐☐☐☐☐☐☐   **Total No. of Pages : 02**

Total No. of Questions : 08

M.Tech. Structural Design EL-IV (2016 & Onwards)   (Sem.–3)
INDUSTRIAL STRUCTURE
Subject Code : MSTD-306
Paper ID : [74808]

Time : 3 Hrs.   **Max. Marks : 100**

INSTRUCTIONS TO CANDIDATES :
1. **Attempt any FIVE questions in all.**
2. **Each question carry TWENTY marks.**
3. **Use of IS:800 and IS 875 Part I, II and III are allowed.**

Q.1 a) Enumerate the special consideration required in the design of steel structure.   (10)

   b) Draw idealized stress-strain curve for mild steel.   (5)

   c) Discuss the effects of residual stresses.   (5)

Q.2 An industrial building is made of 15 portal frames spaced 6m apart. The frame has a span of 15m and 3 m rise with a column height of 5m above the ground level. Assuming the column bases is hinged. Design the frame for the dead and live load only.   (20)

Q.3 A column ISHB350@ 661.2 N/m carries an axial compressive factored load of 1700kN. Design a suitable welded gusset base. The base rests on M15 grade of concrete.   (20)

Q.4 Design a laterally restrained simply supported beam to carry a udl of 44kN/m. The effective span of beam is 8m. A bearing length of 75mm is provided at the supports.   (20)

Q.5 a) Discuss various modes of failure of bolted connection with neat sketches.   (10)

   b) How are the building connections classified based on their moment-rotation characteristics?   (5)

   c) Discuss the effect of residual stresses.   (5)

Q.6 Design a tension member using two angle section to carry 180 kN when both angles are connected

   a) On both sides of the gusset plate.   (10)

   b) On the same side of the gusset plate.   (10)

Q.7   a)   A roof truss shed is to be built in Lucknow for an industry. The size of shed is 24m × 40m. The height of building is 12m at the eves. Determine the base wind pressure.   (10)

      b)   Describe various elements of roof truss with neat diagram.   (10)

Q.8   Write short notes on :-

      a)   Portal bracing and roller bracing.   (10)

      b)   Different types of beam-column connections.   (10)