



Regulation: R18

Subject code: 2P6AC

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A' Grade)

B.Tech VI Semester Supplementary Examinations, January 2023

Design of Steel Structures

Civil Engineering

Maximum Marks: 70

Duration: 3 hours

- Note:
1. This question paper contains two parts A and B.
 2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
 3. Part B consists of 5 Units. Answer any one full question from each unit.
 4. Each question carries 10 marks and may have a, b, c, d as sub questions.

NOTE: CODE BOOK IS 800-2007 IS ALLOWED

Part-A

All the following questions carry equal marks

(10x2M = 20 Marks)

- 1 What are the various types of rolled structural steel sections?
- 2 List the various types of welded joints.
- 3 Classify the modes of failure in Tension members.
- 4 Distinguish between lacing and battening
- 5 What do you mean by web buckling?
- 6 What do you understand laterally restrained beams? Explain with diagram?
- 7 What is roof truss? What are the different parts of roof truss?
- 8 Write the uses of Sag rod in a roof truss?
- 9 What is the maximum spacing of vertical stiffener in plate girder?
- 10 Differentiate between intermediate stiffeners and bearing stiffeners?

Part-B

Answer All the following questions.

(5x10M = 50 Marks)

- 11 a) What are the various types of structural steel? Discuss their mechanical properties. (5M)
b) Sketch the various types of Bolted connections and Welded connections. (5M)

OR

- 12 Design a lap joint between the two plates each of width 120mm, if the thickness of one plate is 16mm and the other is 12mm. The joint has to transfer a design load of 160 kN. The plates are of Fe410 grade. Use bearing type bolts. (10M)
- 13 Design a bridge truss diagonal subjected to a factored tensile load of 300 kN. The length of the diagonal is 3.0m. The tension member is connected to a gusset plate of 16mm thick with one line of 20mm diameter bolts of grade 8.8. (10M)

OR

- 14 Design a Stanchion (compression member) 3.5m long, in a building, subjected to a factored load of 550 kN. Both the ends of the stanchion are effectively restrained in direction and position. Use steel of grade Fe410. (10M)

- 15 A simply supported steel joist of 4.0m effective span is laterally supported throughout. It carries a total uniformly distributed load of 40 kN (inclusive of self-weight). Design an appropriate section using steel of grade Fe410. (10M)

OR

- 16 An ISLB 350 @495 N/m transmits an end reaction of 350KN to the web of an ISMB500 @869N/m. Design a framed connection. (10M)

- 17 Design a purlin for a roof truss having the following data: (10M)

Span of the truss = 9.0m,

Spacing of truss = 3m c/c,

Inclination of roof = 30°

Spacing of Purlin = 2m c/c

Wind pressure = 1.5 kN/m²,

Roof coverage= A.C Sheetting weighing 200 N/m²,

Provide a channel section for Purlin.

OR

- 18 Explain in detail the steps involved in the design of a roof truss. (10M)

- 19 Design a simply supported welded plate girder of 25m span subjected to a uniformly distributed load of 30 kN/m, exclusive of self-weight. Design the connection. Use Fe410 steel. (10M)

OR

- 20 Design intermediate transverse stiffeners and connections without using tension field action for the welded plate girder section as follows; Web plate = 3000 mm × 8 mm; Flange plates = 500 mm × 20 mm; Factored bending moment and shear force are 4500 kN-m and 900 kN respectively. (10M)