*Regulation: R18* *Subject code: 2P6AC*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

**B.Tech VI Semester Supplementary Examinations, June/July 2023**

## Design of Steel Structures
## *(Civil Engineering)*

*Maximum Marks: 70* Date:27.06.2023 **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.

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 types of roof truss with neat sketch.
9 Name the components of plate girder.
10 Give the expression for economical depth of a plate girder.

Part-B

Answer All the following questions. (5x10M = 50 Marks)

11 a) Write the Advantages and Disadvantages of welded connections (5M)
b) Briefly explain the various stability checks considered by the IS code. (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 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 = 300
Spacing of Purlin = 2m c/c
Wind pressure = 1.5 kN/$m^2$,
Roof coverage= A.C Sheeting weighing 200 N/$m^2$,
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 welded plate girder for an effective span of 35m carrying a UDL 25kN/m and two concentrated loads of 100kN each acting at 10m from both the ends. The girder is simply supported and fully restrained against lateral buckling throughout the span. (10M)

OR

20 Discuss about
A. Economical depth of welded plate girder. (5M)
B. Stiffeners (5M)