R18 Regulation *Subject code:2P6AC*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech VI Semester Regular/Supplementary Examinations, June 2022

DESIGN OF STEEL STRUCTURES

(CIVIL ENGINEERING)

Maximum Marks: 70 Date:20.06.2022 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 which carries 10M.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Note: IS 800 2007, STEEL TABLE BOOK, IS 875 (PART-3) these books are allowed.

Part-A

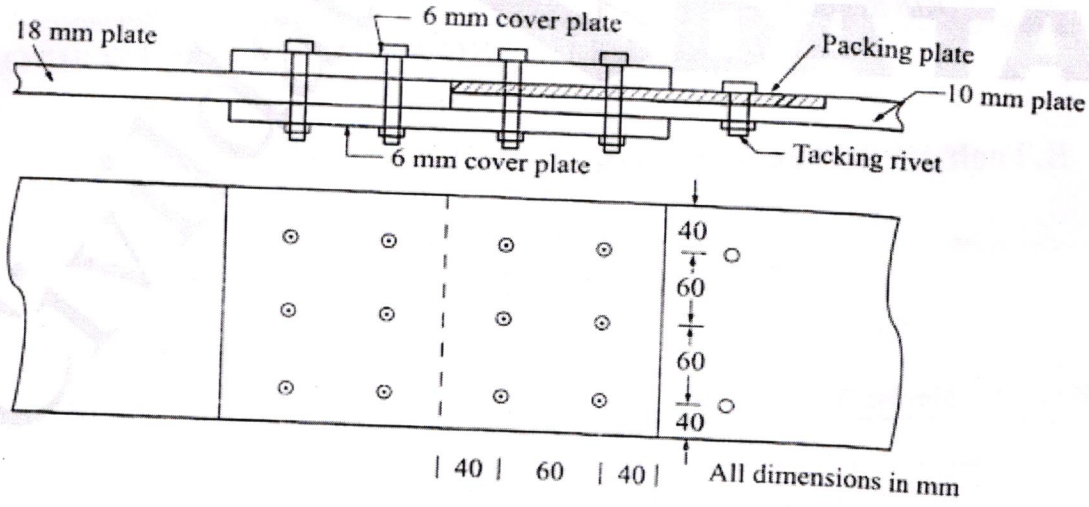
All the following questions carry equal marks (10x2M=20 Marks)

1 How joint efficiency affect the quality of bolted connection?
2 Is it suitable to connect flat plate with angle section using bolted connection? explain
3 Sketch any two forms of tension member
4 What happens when a single angle with one leg is connected to a gusset plate, which is subjected to an eccentric load?
5 How to control the buckling of web in Steel beam I section?
6 Give few suggestions about cover plates in built up beams.
7 Classify the shape of the purlins as per steel table.
8 List the structural elements in roof trusses.
9 How economical depths affect the cost of material to design plate girder?
10 State the difference between plate girder and Rolled I-Section.

Part-B

Answer All the following questions. (5X10M=50Marks)

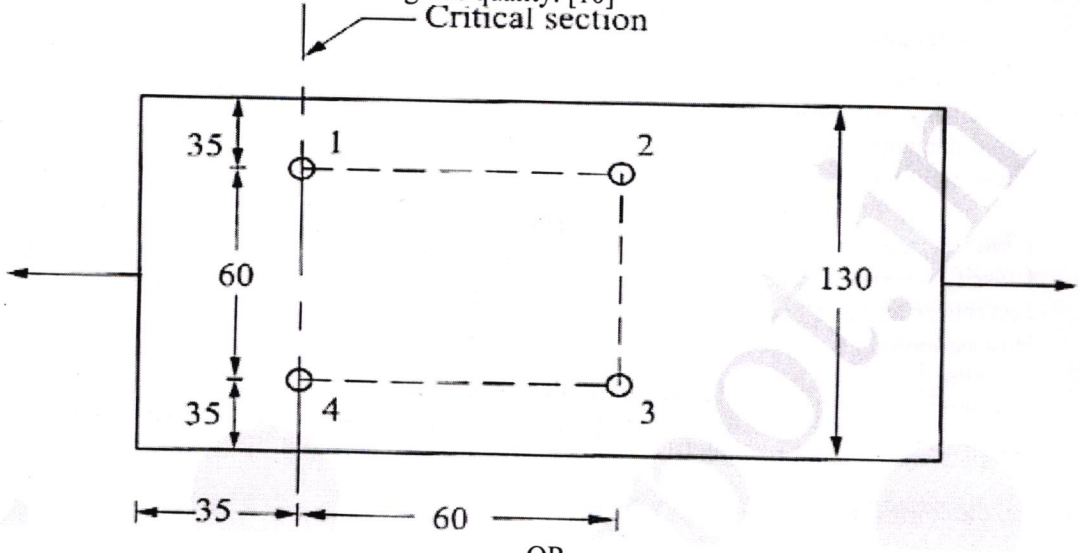
11 Find the efficiency of the lap joint shown in fig. with the following data: M20 bolts of grade 4.6 and Fe410 plates are used. [10]



OR

12 Design a single bolted double cover butt joint to connect boiler plates of thickness 12mm for maximum efficiency. Use M16 bolts of grade 4.6.boiler plates are of Fe 410 grade. Find the efficiency of the joint. [10]

13 Determine the design tensile strength of the plate 200mmx12mm with the holes for 16mm diameter bolts as shown in fig. Steel used is of Fe415 grade quality. [10]



OR

14 Design a column with single lacing system to carry a factored axial load of 1000kN. The effective length of column is 4m. Use two channels placed back-to-back. [10]

15 Design a simply supported beam of effective span 1.5m carrying a factored concentrated load of 360kN at mid span. [10]

OR

16 Design a simply supported beam of 10m effective span carrying a total load of 60kN/m. the depth of beam should not exceed 500mm.the compression flange of the beam is laterally supported by floor construction. Assume stiff end bearing is 75mm. [10]

17 Design angle purlin for the following data by simplified method: Spacing of trusses=4mSpacing of purlins=1.6mWeight of A.C sheets including laps and fixtures=0.205kN/m^2 Live load=0.6 kN/m^2 Wind load=1 kN/m^2 Inclination of main rafter of truss=21° [10]

OR

18 A roof truss shed is to be built in Lucknow for an industry. The size of shed is 24mx40m.the height of building is 12m at the eves. Determine the basic wind pressure. [10]

19 A plate girder of span 15m is made-up of web plates of 1600mm x 8mm flange angles 150mmx 115mm x 10mm and two flange plates 480mm x 10mm it carries a uniformly distributed load of 100kN/m including its own weight. Design and sketch the web splices at 5m from one end. [10]

OR

20 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. [10]