JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATIONS- 2024

B.Tech-VI Semester (CE)

COURSE CODE(CREDITS): 18B11CE612 (3) MAX. MARKS: 35

COURSE NAME: DESIGN OF STEEL STRUCTURES

COURSE INSTRUCTORS: Mr. KAUSHAL KUMAR MAX. TIME: 2 Hours

Note: (a) All questions are compulsory.
(b)Marks are indicated against each question in square brackets.
(c) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems, IS800, IS808 or Steel Table is allowed.

Q1. Short Answer Type [1x7=7]
(a) Write down the different modes of failure of riveted connection.
(b) Explain 'Pitch' and 'Gauge length' with suitable diagrams.
(c) How is effective throat thickness calculated in welded connection?
(d) Explain the terms 'Crushing' and 'Buckling' of column.
(e) What is lacing? What are different types of lacing systems used?
(f) What is maximum limit for the thickness of lacing bar in both single and double lacing system?
(g) What is difference between laterally supported and laterally unsupported beam?

Q2 Design a connection to joint two plates of size 250x12 of grade 410, to mobilize full plate tensile strength using (a) shop fillet weld, if a lap joint is used. Also find its efficiency? [5]

Q3. An ISA 150×150×12 used as a strut has the effective length as 3 m. Calculate the strength when it is connected by two bolts at each end [5]

Q4. A laced column 10.5 m long to carry factored axial load of 1000 kN. The column is restrained in position but not in direction at both the ends. Provide single lacing system. Use 2 ISMC 300 @ 351.2 N/m channel section placed as back to back at a distance of 184 mm. Assume steel of grade Fe 410 and bolts of grade 4.6. Design the lacing system with bolted connections. [8]

Q5. Design a simply supported beam of span 7 m carrying a reinforced concrete floor capable of providing lateral restraint to the top compression flange. The total u.d.l. is made up of 100 KN dead load including self weight plus 150 kN imposed load. In addition, the beam carries a point load at mid span made up of 50 kN dead load and 50 KN imposed load (Assume a stiff bearing length of 75 mm). [10]