Ref. No.: Ex/Arch/CE/T/315/2023(S)

# BACHELOR OF ARCHITECTURE THIRD YEAR FIRST SEMESTER SUPPLEMENTARY EXAM 2023

## Design of Structure I

Time: Three Hours | Full Marks 100

Use a separate Answer-Script for each part

**[Relevant IS code (IS 456, IS 800) and section hand books are allowed in the exam hall. For all questions assume $f_y$=250 N/mm$^2$ and $f_u$=410 N/mm$^2$ for steel structure (Question no-1-3) and M25 grade of concrete and Fe 500 grade of steel for concrete structure (Question no-4-6)]**

| No. of questions | Part I (Answer Any four of the following questions.) | Marks (4X25=100) |
|---|---|---|
| 1(a) | Design a compression member whose both ends are hinged and length is 4 m. The axial factored load is 500 kN. | 17 |
| (b) | Discuss about limit state method of design, working stress method d of design. | 8 |
| 2 (a) | Design a lap joint to transmit 600 kN using M16 bolts of grade 4.6 and grades of plate is fy=250,fu=410. | 12.5 |
| (b) | Design weld connection of a truss member for factored load 300 kN for 75X75X8 truss member. | 12.5 |
| 3 (a) | Single equal angle 100X100X6 connected to a 8mm thick gusset plate at the ends with five 16 mm diameter bolts to transfer tension. Design tensile strength of angle. | 17 |
| (b) | Write a note on type of bolt connection. | 8 |
| 4 | Design and detail a reinforced concrete one way slab of length 5m and breadth 2m having live load 5kN/m$^2$. The four edges are simply supported. | 25 |
| 5 | Design and detail a reinforced concrete beam subjected to a super imposed moment 400kNm. | 25 |
| 6 | Design and detail a reinforced concrete column of dimension 300X300mm having axially load of 8000kN. | 25 |