Bachelor of Engineering (Civil Engineering) Fifth Year, First Semester **Examinations 2019**
SUBJECT – Design of Metal Structures – II **(Old)**

(Name in full)

Time: Three hours   Full Marks 100

Answer any four questions

(IS 875,800,1161 SP 6(1) and 806 are allowed in the hall)

1. Suggest a 20 m gantry girder section supporting a crane of 20 m span .The electrically operated crane has a weight of 400 KN and has two wheels on each gantry girder with a wheel base distance of 3.5 m on which a 300 KN crab moves carrying a lifting load of 450 KN .Check the section for bending.   25

2. Take a gantry girder section with the top flange 500 mm X 32 mm , bottom flange 300 mm X 32 mm and web 1000 mm X 8 mm . The electrically operated crane has a weight of 400 KN and has two wheels on each gantry girder with a wheel base distance of 3.0 m on which a 400 KN crab moves carrying a lifting load of 400 KN. Design the bearing and intermediate stiffeners .Connection design is not required .   25

3. Design and detail a stepped column fixed at base and hinged at top .The crane and roof legs are 9 m and 3 m respectively .The column carries 60 KN and 700 KN vertical loads at roof and crane levels respectively and a udl due to wind load of 4 KN/m throughout the column height.   25

4. A factory shed is 18 m wide , 32 m long , 4 m high upto eaves level and has 7.2 m overall height .The trusses along the shed are 4 m center to center .Assuming the shed to be constructed in Kolkata suggest a rafter – bracing general arrangement and design the members of the bracing system using hollow tubes .   25

5. Design a column with the base connection to support a compressive load of 550 kN and the moment of 75 kN-m. The column is fixed at the base (two ISMB 450 sections placed @800 mm c/c), propped at the top and has an unsupported length of 5.0 m.   25