Form A: Paper Setting Blank Ref. No EX/CE/T/423/2017(Old)

B. E. CIVIL ENGINEERING 4TH YEAR SECOND SEMESTER EXAM, 2017(OLD)

SUBJECT – Design of Metal Structures – II

(Name in full)

Time: Three hours Full Marks 100

ANSWER ANY FOUR QUESTIONS

Each question carries 25 marks

(IS 875,800,1161 SP 6(1) , SP 16 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 450 KN and has two wheels on each gantry girder with a wheel base distance of 4.0 m on which a 300 KN crab moves carrying a lifting load of 500 KN .Check the section for bending compression and shear .

2. Design and detail the girders including shear connectors of a concrete deck-steel girder composite foot bridge of span 10 m and overall width including kerbs as 4.5 m suggesting the general arrangement .Take live load = 4 kN/sq.m . Assume M25 concrete . Assume unpropped construction.

3. Design a column with the base connection to support a compressive load of 550 kN and the moment of 80 kN-m. The column is fixed at the base (two ISMB 450 sections placed @1000 mm c/c), propped at the top and has an unsupported length of 5.0 m.

4. 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 50 KN and 800 KN vertical loads at roof and crane levels respectively and a udl due to wind load of 4 KN/m throughout the column height .

5. A factory shed is 14 m wide , 36 m long , 4 m high upto eaves level and has 7 m overall height .The trusses along the shed are 4 m center to center .Assuming the shed to be constructed in Kolkata suggest a tie – bracing general arrangement and design the members of the bracing system using hollow tubes .Use IS 800 – 2007 .