B.E. Civil Engineering (Part Time) Fifth Year ,First Semester Examination , 2018(Old)

SUBJECT – Design of Metal Structures –II

Time: Three hours   Full Marks 100

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

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1.   Suggest a 24 m gantry girder section supporting a crane of 20 m span .The electrically operated crane has a weight of 550 KN and has two wheels on each gantry girder with a wheel base distance of 4.2 m on which a 350 KN crab moves carrying a lifting load of 500 KN .Check the section for bending.   25

2.   Take a gantry girder section with the top flange 500 mm X 40 mm ,bottom flange 300 mm X 40 mm and web 1000 mm X 8 mm .The electrically operated crane has a weight of 450 KN and has two wheels on each gantry girder with a wheel base distance of 3.0 m on which a 450 KN crab moves carrying a lifting load of 450 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 8 m and 3 m respectively .The column carries 50 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 16 m wide , 28 m long , 4 m high upto eaves level and has 6.0 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.   Consider the data of problem 3. Assuming 2 - ISMB 450 @ 1000 mm c/c as the crane leg design and detail the base connection.   25