Bachelor of Engineering(Civil Engineering) Fifth Year, First Semester, Supplementary 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 20 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 4.0 m on which a 350 KN crab moves carrying a lifting load of 480 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 1200 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 400 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 9 m and 3 m respectively .The column carries 50 KN and 800 KN vertical loads at roof and crane levels respectively and audl due to wind load of 4 KN/m throughout the column height.   25

4. A factory shed is 16 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 tie – bracing general arrangement and design the members of the bracing system using hollow tubes .   25

5. A factory shed is 16 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 truss geometry and design purlins using hollow tubes . Also draw a rough sketch of purlin-rafter connection.   25