

Each question carries 25 marks

(IS 875,800,1161 SP 6(1), SP 16 and 806 are allowed in the hall )

1a. Suggest a 18 m gantry girder section supporting a crane of 18 m span .The electrically operated crane has a weight of 500 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 400 KN .Check the section for bending compression and shear .

OR

1b. Suggest a 18 m gantry girder section supporting a crane of 18 m span .The electrically operated crane has a weight of 500 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 400 KN .Design the bearing and intermediate stiffener .Connection design is not required.

2a. Design a column with the base connection to support a compressive load of 800 kN and the moment of 50kN-m. The column is fixed at the base propped at the top and has an unsupported length of 4.0 m.

OR

2b. 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 600 KN vertical loads at roof and crane levels respectively and a udl due to wind load of 4 KN/m throughout the column height .

3a. A factory shed is 16 m wide , 30 m long , 4 m high upto eaves level and has 6 m overall height .The trusses along the shed are 3 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 .

OR

3b. A factory shed is 16 m wide , 30 m long , 4 m high upto eaves level and has 6 m overall height .The trusses along the shed are 3 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 .Use IS 800 – 2007 .

4a. A factory shed is 16 m wide , 32 m long , 4 m high upto eaves level and has 6 m overall height .The trusses along the shed are 4 m center to center .Assuming the shed to be constructed in Kolkata design the purlins using hollow tubes .Use IS 800 -- 2007 .

OR

4b. A factory shed is 16 m wide , 32 m long , 4 m high upto eaves level and has 6 m overall height .The trusses along the shed are 4 m center to center .Assuming the shed to be constructed in Kolkata design the side rails using hollow tubes .Use IS 800 – 2007 .