

Ref. No EX/CE/T/422/2018

B. E. CIVIL ENGINEERING 4TH YEAR SECOND SEMESTER EXAM, 2018
SUBJECT – Design of Structures – IV
(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)

1a. 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 .

OR

1b. 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 .Design the bearing and intermediate stiffener .Connection design is not required.

2a. 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 propped construction.

OR

2b. Design and detail the girders 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. Shear connector design is not required.

3a. Design a column with the base connection to support a compressive load of 800 kN and the moment of 80 kN-m. The column is fixed at the base propped at the top and has an unsupported length of 5.0 m.

OR

3b. 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 750 KN vertical loads at roof and crane levels respectively and a udl due to wind load of 4 KN/m throughout the column height .

4a. A factory shed is 14 m wide , 36 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

4b. A factory shed is 14 m wide , 36 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 .