Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

VI SEMESTER B.TECH (CIVIL) END SEMESTER EXAMINATIONS
MAY- 2023
SUBJECT: DESIGN OF STEEL STRUCTURES [CIE 4064]

Date of Exam: **Time of Exam:** **Max. Marks: 50**

Instructions to Candidates:

- Answer ALL the questions & missing data may be suitably assumed
- IS 800 and SP-6 is Permitted to Use. Use Fe410 gade steel with fy=250N/mm^2

1	Explain the codal provisions available to determine size of intermediate stiffeners in case of thin web plate girder.	CO1	02	2
2	Determine shear resistance corresponding to web buckling (V_{tf}) using tension field method. Stiffeners are provided at 1800 mm c/c and Vcr=550 kN. Mz = 4300 kN-m and Vz =900 kN. Flange size 450 mmx40 mm and web 12 mmx1300mm.	CO1	05	3
3	Determine the bearing capacity of end stiffeners(8mmx180mm), having stiffeners on either side of the web. Given (web size = 8 mmx1600 mm), flage size (400 mmx40 mm) .Assume Vu=900kN and end bearing 150 mm.	CO1	03	3
4	Discuss the procedure to check the member strength of a column subjected to axial force and Biaxial moment.	CO3	03	2
5	Determine maximum factored bending moment and shear force in gantry girder of span 7.0 m; carrying crane with lifting capacity is 160 kN, weight of the crane bridge is 200kN(span of the crane bridge is 17.5m),weight of crab and motor 60kN, wheels are separated by a distance 3.0mts, moving from left to right. Assume weight of the rail as 0.4kN/m. Minimum hook approach is 1m. Assume weight of the gantry girder including top channel 2kN/m.	CO2	05	3
6	Determine overall stability of the column ISHB250@51.0 kg/m,of effective height 4.25 m subjected to maximum factored axial force 600 kN and factored moment 60 kN-m at top and 30 kN-m at the bottom.Given Mdz=121kN-m and Pdz=1400kN.,	CO3	05	3
7	Determine size of slab base plate to carry axial load of 550 kN and bending moment 50 kN-m resting on RCC footing with M_{30} grade concrete .Assume ISHB300@58.8kg/m Column.	CO4	05	3

8	Draw the cross section of composite bridge having following components : Thickness of the slab = 300 mm Road width (including foot path) = 10 m Span of the bridge = 20 m Spacing of welded I steel girders = 2 m Shear connectors 16 dia - 3nos at 240 mm c/c	CO5	03	2
9	Determine the number of shear connectors required in composite bridge to transfer a vertical factored shear of 700 kN. Given: Spacing of girders 1.8 m c/c Thickness of the slab 350 mm and M_{25} Grade concrete Flange thickness(40 mm x 500 mm) Web size(10 mm x1200 mm). C.G of the composite section is at a distance 210.5 mm from the top of RCC slab. Assume 16 mm diameter steel connectors.	CO5	05	3
10	Discuss the factors considered while manufacturing different forms of light gauge steel sections?	CO5	03	2
11	Draw typical cold formed steel sections currently used for structural frames (two sections). list advantage of each section	CO5	02	2
12	Determine the design capacity in bending and shear(dead load and live load combination) of a steel ISMC150@16.4 kg/m purlin section subjected to factored M_Z=7.5 kN-m, M_y =1.34 kN-m , Fz=6.35 kN Fy=0.8kN. Also Do the check for biaxial bending.	CO4	05	3
13	Discuss pre-engineered buildings? List Advantages of the pre-engineered buildings.	CO5	04	2