Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

VI SEMESTER B.TECH (CIVIL) END SEMESTER EXAMINATIONS

MAY- 2022

SUBJECT: DESIGN OF STEEL STRUCTURES [CIE 4064]

Date of Exam: 21-05-2022 **Time of Exam: 2-5 PM** **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	Give reasons to provide intermediate stiffeners in case of thin web plate girder.	CO1	02
2	Determine shear resistance (Vcr) corresponding to web buckling of a steel plate girder using post critical method. Assume stiffeners are provided at the support only. Mz = 4275 kN-m and Vz =8777.5 kN. Flange size 450x35 mm and web 12x1200mm.	CO1	03
3	Determine shear and moment carrying capacity of end panel of a plate girder, having stiffeners on either side of the web. Given (web size = 8x1500 mm), flage size (400x387 mm) and spacing of stiffeners 2000mm).Assume Vu=705kN and Vcr =470kN.	CO1	05
4	Draw a neat sketch of end bearing stiffeners provided in the welded plate girder. What are the codal provisions available to arrive at preliminary dimensions of the stiffeners?	CO1	02
5	Check the deflection of gantry girder (self-weight 200kN) of span 6.0mts; assume two wheel loads 180 kN each separated by a distance 3.0mts, moving from left to right. Moment of inertia of the gantry steel section 1207x10^{6}mm^4.	CO2	05
6	In brief explain procedure to check the overall member strength of a column subjected to axial force and Biaxial moment.	CO3	03
7	Draw the typical sketches to show the following beam-column bolted connection. State when do you prefer those connections ; a) Unstiffened seated connection. b) Stiffened seated connection.	CO4	04
8	Draw a neat sketch of cross section of composite bridge having following components : Thickness of the slab = 350mm Road width (including foot path) = 9mts Span of the bridge = 20mts Spacing of welded I steel girders = 1.8mts Shear connectors 20 dia - 3nos at 250 c/c	CO5	03
9	Design the shear connectors used in composite bridge to transfer a vertical shear of 560kN. Given: Spacing of girders 2mc/c Thickness of the slab 300mm and M20 Grade concrete	CO5	05

	Flange thickness(30x500)mm Web size(10x1000)mm CG of the composite section is at a distance 192.5mm from the top of RCC slab. Assume 16mm Diameter steel connectors.		
10	Why light gauge or cold formed steel section are preferred over standard rolled steel section?	CO5	03
11	Draw typical cold formed steel sections currently used for structural frames (six sections).	CO5	03
12	Determine the design capacity in bending and shear of a steel ISMC125 purlin section subjected to factored M_z=6.7 kN-m, M_y =0.67 kN-m, Fz=5.35 kN, Fy=0.539kN.	CO4	05
13	Determine the bending moment and shear force of a Roof truss steel Purlin ISMC125. Given weight of the AC sheets =150N/m^2 Live load =750 N/m^2 Wind load in X direction=1.54kN/m Span of the truss= 40mts Slope theta-6 degree Spacing of the purlin =1.5mts Truss spacing S=5mts.	CO4	03
14	With neat sketches explain (a) Stiffened compression Element. (b) Flat width ratio. In case of light gauge steel structures.	CO5	04