Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

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(A constituent unit of MAHE, Manipal)

VI SEMESTER B.TECH (CIVIL) END SEMESTER EXAMINATIONS

APRIL/MAY 2019

SUBJECT: ADVANCE DESIGN OF STEEL STRUCTURES [CIE 4013]

Date of Exam: **03/05/2019** Time of Exam: **2:00 PM to 5:00 PM** Max. Marks: **50**

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitably assumed.
- Usage of **IS:800-2007, IS:801-1975** and **SP-6** (part I)is permitted
- Use **Fe410** (**Fy=250N/mm^2**) unless specifically mentioned

1.	Design a simply supported welded plate girder using intermediate stiffener of span **20m** and laterally restrained throughout. It has to support a uniform service load **45kN/m** throughout the span exclusive of self-weight. Design the end stiffener and design of connection need not to done.	**10**	**CO1**
2.	Design a gantry girder to be used in an industrial building carrying a manually operated overhead travelling crane, for the following data: Crane capacity **150 kN**, self-weight of the crane girder excluding trolley **120kN**, self-weight of trolley **30 kN**, Approximate minimum approach of the crane hook to the gantry girder **1.0m**, wheel base **3.0m**, c/c distance between gantry rails **12m**, c/c distance between columns **8m**, self-weight of rail section **300N/m**, diameter of the crane wheels **100mm**,self-weight of girder **2kN/m**. Check for lateral torsional buckling moment of the gantry girder.	**10**	**CO2**
3.	Design an industrial column of unsupported length **4.5m** height subjected to following loads and moments: Factored axial load **750kN**, Factored moment Mz @ top **25 kN-m**, Factored moment Mz @bottom **40 kN-m**, Factored moment My @ top **8 kN-m**, Factored moment My @ bottom **14 kN-m**. Assume effective length of column as **0.8L**.	**10**	**CO3**
4A.	Design a laterally unsupported beam for an Effective length **4m** simply supported**,** Live load **2.0kN/m** and Dead load **1.5kN/m,** sketch the cross sectional details.	**7**	**CO4**
4B.	Write short note on pre engineering building (steel) structures.	**3**	**CO5**
5A.	Explain with neat sketch Laterally supported beams in light gauge steel members	**4**	**CO5**
5B.	Find the allowable load for the rectangular tubular column section of dimensions **200×120 mm**, thickness **2mm**. The effective length of the column is **3.6m** and **Fy = 235 N/mm^2**.	**6**	**CO5**