Reg. No.



MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL (A constituent unit of MAHE, Manipal)

## VI SEMESTER B.TECH (CIVIL) END SEMESTER EXAMINATIONS JUNE 2019

SUBJECT: ADVANCE DESIGN OF STEEL STRUCTURES [CIE 4013]

Date of Exam:

Time of Exam:

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<sup>2</sup>) unless specifically mentioned

1.	A simply supported plate girder <b>22m</b> in span and laterally restrained throughout. It has to support a uniform service load <b>40kN/m</b> throughout the span. Design the plate girder with intermediate stiffeners. Design also the intermediate stiffeners and welded connections.	10	CO1
2A.	Estimate bending capacity for a section ISWB 600 @ 133.7 kg/m and ISMC 300@35.8 kg/m of gantry girder.	06	CO2
2.B	Check the fatigue strength for cantilever beam of span 2.2m carrying 120kN concentrated load at the free end, for the following data: The crane operates for 180 days per year, the working hours 9 am to 3 pm, maximum number of trips per hour 2, design life 60 years (Intermittent weld is used for I and Channel section).Use section ISWB 500 @ 95.2kg/m and ISMC 300@35.6 kg/m.	04	CO2
3.	Design an industrial column of unsupported length <b>4m</b> height subjected to following loads and moments. Factored axial load <b>550kN</b> , Factored moment Mz @ top <b>15 kN-m</b> , Factored moment Mz @bottom <b>45 kN-m</b> . Assume effective length of column as <b>0.8L</b> .	10	CO3
4A.	Write design steps for unsymmetrical bending of beams, give examples of standard sections which are subjected for unsymmetrical bending. Explain briefly advantages of pre engineering building (steel) structures.	7	CO4
4B.	Explain briefly about post buckling strength of Light gauge steel members.	3	CO5
5A.	Explain briefly about effective width calculations for un-stiffened, stiffened and multi stiffened elements of Light gauge steel members.	4	CO5
5B.	Two channels <b>200mm</b> × <b>80mm</b> with bent lips are connected with webs to act as column. The thickness of the plate is <b>2.5mm</b> and depth of the lips is <b>25mm</b> . Determine the safe load carrying capacity, if effective length of the column is <b>4m</b> . Consider $Fy = 235$ N/mm <sup>2</sup> and $E= 2 \times 10^5$ N/mm <sup>2</sup> .	6	CO5