Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
(A constituent institution of MAHE, Manipal)

M.TECH. (INDUSTRIAL AUTOMATION AND ROBOTICS)

END SEMESTER EXAMINATIONS, DEC 2018

SUBJECT: DIGITAL MANUFACTURING [MTE 5135]

REVISED CREDIT SYSTEM

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL Five** questions.

1A.	Explain generative process planning methodologies.	**3**
1B.	Describe the Deep reactive ion etching (DRIE) process. How can DRIE achieve perfect vertical etching?	**3**
1C.	List out the various activities of a manufacturing plant which can be carried out through computer control. Discuss the main elements of CIM systems.	**4**
2A.	Describe any four actuation techniques for micro devices. Provide any one major advantages of each of these techniques.	**3**
2B.	Discuss Computer aided Quality control. List objectives and benefits.	**3**
2C.	Explain the relevance and benefits of Networking in manufacturing, how does it help in design activity where a large number of engineers are involved.	**4**
3A.	A vehicle suspension producing company is about to rent a robot for miscellaneous operations. The products in its assembly line arrive at the rate of 4 per hour. Non-processing of products i.e. idle time in system incur a loss of Rs: 16/hr. Two alternatives for robots is given and you as chief engineer have been tasked for choosing one for the company. Details of robots are as follows: ROBOT 1 — Charges: Rs: 6/hr — Service rate: 4/hr ROBOT 2 — Charges: Rs: 10/hr — Service rate: 6/hr Which robot would you hire? Assume an 8-hr working day and incoming of product rate following Poisson's distribution.	**3**

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3B.	Discuss on the use of Polymers in MEMS.	
3C.	"Concurrent Engineering is essentially an innovation system, but one must be clear about the process of framing it". Describe the system and process.	**4**
4a.	List out the drawbacks of sequential engineering in handling design change requests.	**3**
4b.	Discuss the requirements for the next generation manufacturing systems with Distributed Intelligence as a point of reference.	**3**
4c.	Briefly explain the Low Pressure Chemical Vapor Deposition process.	**4**
5A.	"Information Technology plays a crucial role in Implementing Concurrent Engineering". Validate the statement and state the different variety of tools it can offer	**3**
5B.	Explain the Micro actuation. Describe various methods employed for actuation.	**3**
5C.	Discuss the following: 1. Design for Manufacturability with cost reduction as point of reference, 2. Agent Based Manufacturing	**4**