Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

V SEMESTER B.TECH (MECHANICAL ENGG.) END SEMESTER

MAKE-UP EXAMINATIONS, DECEMBER 2018

SUBJECT: PLANT LAYOUT AND MATERIAL HANDLING [MME 4030]

REVISED CREDIT SYSTEM

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.

1A. With a neat sketch explain the type of layout used in airplane assembly and also mention its merits and demerits. **04**

1B. Mention the any six objectives of good plant layout and explain any two of them. **03**

1C. An automobile equipment supplier wishes to install sufficient number of ovens to produce 6,00,000 good castings per year. The baking operation takes place 3minutes for casting and management requires the capacity cushion of 10%. How many ovens will be required, if the total available time in terms of capacity is 700Hrs/year. **03**

2A. What are four considerations that affect the machine factor? Explain them in brief. **04**

2B. What are the types of space can be utilized for movement of materials under the movement factor. **03**

2C. A machine used to produce three varieties of gears in a plant which runs for 25 days with 8 hours in a single shift. If its operations are 90% efficient, determine the number of machines required by considering the below given information. **03**

Gears	Gear-A	Gear-B	Gear-C
Setup time in minutes	240	280	200
Number of setup required per month	20	24	16
Standard time in minutes per Unit	2	3	1.5
Monthly demand in units	4800	10000	14000

3A. Explain the operation process chart with neat diagram and example. **04**

3B. Describe the techniques used for location analysis. **03**

3C. What is line balancing? Explain the line balancing technique with example. **03**

4A. Explain the planning principle involved in material handling. **04**

4B. Mention the features of building factor? Briefly explain any three brief of them. **03**

4C. A company wants to set up a new office at a new location due to the shifting pattern of population density. The coordinates for each location and projected population measured in thousands is shown in the table below. Customers will travel from their respective locations to the new facility whenever the need arises. Use centre of gravity method to find the new location. **03**

Location	Population (in thousands)	X-coordinate	Y-coordinate
M	4	4.5	2.5
N	6	2.5	2.5
O	10	4.5	5.5
P	8	2	5
Q	7	5	8
R	12	2	7
S	6	2.5	9

5A. What are the factors to be considered in the selection of material handling equipment? Explain. **04**

5B. Explain the importance of safety in material handling. **03**

5C. A Company has three plants located throughout a state with production capacity 45, 15 and 40 tonnes. Each day the firm must furnish its four retail shops R_1, R_2, & R_3 with at least 25, 55, and 20 tonnes respectively. The transportation costs (in Rs.) are given below. **03**

Company	Retail outlet		
	R_1	R_2	R_3
Plant-1	10	7	8
Plant-2	15	12	9
Plant-3	7	8	12

Calculate the minimum transportation cost using north west corner method.