Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

A Constituent Institute of Manipal University, Manipal

V SEMESTER B.TECH (MECHANICAL ENGG.) END SEMESTER MAKE-UP EXAMINATIONS, DECEMBER 2017

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 for batch production and also mention its merits and demerits. **04**

1B. List any ten 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 4,00,000 good castings per year. The baking operation takes place 2 minutes for casting and management requires the capacity cushion of 5%. How many ovens will be required, if the total available time in terms of capacity is 800Hrs/year. **03**

2A. What are the four considerations that affect the material 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 flow process chart with neat diagram and example. **04**

3B. Describe load-distance analysis used for location selection. **03**

3C. What is the importance of line balancing? Explain with a neat sketch and example. **03**

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

4B. How does the waiting factor influence the method of storing? Explain in brief. **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. State and explain any six importance of 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.