Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

V SEMESTER B.TECH (MECHANICAL ENGG.) END SEMESTER EXAMINATIONS, NOV/DEC 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. Sketch and explain the combination layout with a suitable example. Also mention its merits and demerits. **04**

1B. Mention the six factors influencing the plant location and explain any three of them with examples. **03**

1C. The monthly data of a product is given: Profit of 1700Rs, administration costs, infrastructure and machinery costs are Rs.1200 and revenue is Rs.5600. The product is to be modified with additional purchase of machine costs Rs.600/month is expected to increase the Profit -Volume ratio by 6%. Determine the volume of modified product to be sold out annually to make an additional profit of Rs. 900/month. Show the above data on Profit-Volume chart. **03**

2A. What are the considerations of man factor in plant layout? Explain. **04**

2B. List the services relating to material and explain. **03**

2C. A production shop has four identical machines which are capable of producing two products A and B respectively with production time of Product-A is 22minutes/unit and Product-B is 28minutes/unit. The shop is operating on 5days a week from 9am to 5pm. In a week the production shop manufactures 200 quantities of product-A and 180 quantities of Product-B. During another week when the demand is higher, the production shop completes 240 units of product-A and 220 units of Product-B. Determine the following: **03**

i. The capacity of production shop.
ii. The capacity Utilization in regular and peak season.
iii. Overtime hours.

3A. The task timings and precedence relationships for an assembly line are given below. **04**

Task	A	B	C	D	E	F	G	H	I	J	K	L
Task Time (minutes)	23	24	17	49	12	14	27	9	20	23	36	25
Preceding task	----	---	A	A	C	C	B	E	F,G	D,H,I	I	J,K

Use the 'Longest task time Rule' to assign the tasks to various stations and also calculate the line efficiency.

3B. State and explain the methods of layout evaluation. **03**

3C. Describe the travel chart with a neat sketch and suitable industry example. **03**

4A. A bearing manufacturing company has currently opened its temporary storage yard at location F. Company needs to deliver the goods from storage yard to different retailer locations whose X-Y co-ordinates and quantity shipped are as shown in the table below. The Management wants to shift the storage yard to some other location to reduce the transportation costs. **04**

Retailer Location	A	B	C	D	E	F	G	H
Quantity shipped (units)	4500	6000	6500	2500	8000	6700	15000	32000
X-Y Co-ordinates	(08,12)	(07,13)	(10,11)	(13,07)	(13,04)	(11,9)	(12,11)	(17,05)

i. Determine the center of gravity as a possible location for the new facility.
ii. Compare the load distance scores for the centre of gravity location and the current location (F) using rectilinear distance.

4B. List the six safeguards needs to be considered under waiting factor. Explain any three of them. **03**

4C. Explain with neat sketches Cart-On-Track Conveyor and In-Floor Tow-Line Conveyor. **03**

5A. A company owns four food processing facilities at different locations with production capacities 60, 40, 50, and 40 tonnes respectively. These facilities have to deliver the food items to their retail outlets with at least 50, 30, 60, and 50 tonnes respectively on daily basis. Table below shows the transportation costs (in Rs.) **04**

Company	Retail outlets			
	Retailer-1	Retailer-2	Retailer-3	Retailer-4
Facility-1	4	6	8	7
Facility -2	3	7	9	3
Facility -3	2	5.5	5	4
Facility -4	2.5	4	6	6.5

Determine the following:
i. Transportation cost using least cost method.
ii. Transportation cost using North West corner rule.

5B. What are the factors to be considered in the selection of material handling equipment? Explain any three of them. **03**

5C. What is the function of packaging? Explain. And list the principles of packaging. **03**