MANIPAL INSTITUTE OF TECHNOLOGY

A Constituent Institute of Manipal University, Manipal

VII SEMESTER B.TECH (MECHANICAL ENGG.) END SEMESTER
MAKEUP EXAMINATIONS, DECEMBER 2017

SUBJECT: PRODUCTION PLANNING & CONTROL [MME 4103]
REVISED CREDIT SYSTEM

Time: 3 Hours   MAX. MARKS: 50

Instructions to Candidates:

❖ Answer **ALL the** questions.
❖ Missing data if any may be suitably assumed.

1A. Draw the production consumption cycle and do the nomenclature by indicating the sequence of activities. **05**

1B. The demand forecast for a company for the first six months of the next year and the working days available as shown in the table below:

	Jan.	Feb.	March	April	May	June
Demand (units)	1520	2304	1920	240	1024	1536
Work days	25	20	24	25	20	24

The company has a constant workforce of 80 workers and each unit requires 10 worker hours to produce at a labor cost of $ 6 per hour as regular rate and $9 per hour as overtime. Working hours are 8 hours per day. If the company plans to resort to the strategy of giving overtime and allowing idle time to the workers to meet the demand in time, determine the total cost of the plan if the manufacturing cost excluding the labour cost is $120 per unit? **05**

2A. Explain in detail the four qualitative methods of Forecasting? **05**

2B. A farmer strongly believes that his farm yield in a year is dependent on the rainfall in that year and has maintained the following record:

Year	Rainfall in meters	Yield (tons)
1	3	1.3
2	3.4	1.7
3	2.8	1.2
4	3.6	1.9
5	3.5	1.7
6	3.3	1.4

If the likely rainfall next year is 3.7 meters, what yield should he expect? **05**

3A. Two jobs are to be processed on 6 machines A, B, C, D, E and F. The processing time required and the technological order for the jobs is as shown below:

Time Required

Job	Machines					
	A	B	C	D	E	F
1	20	30	15	20	25	30
2	15	30	40	30	20	20

Technological Order

Job 1: A-B-C-D-E-F

Job 2: D-E-A-C-F-B

Determine the order in which the 2 jobs are to be processed on each of the machines to minimize the make span? What is the make span?   **05**

3B. The annual requirement of an item is 12,000 units. It is manufactured at the rate of 2000 units /month. The set up cost per production run is Rs. 3,000/- The inventory carrying costs are Rs. 20/unit / year. The shortage costs are estimated to be Rs. 3 / unit / month

Calculate i)Economic lot Size ii) Maximum shortage in a cycle iii) Maximum level of inventory in a cycle iv) The production time / cycle v) Cycle time   **05**

4A. Write a short note on

i) 'A' and 'C' class items.

ii) Rough estimate methods of determining safety stock and reorder point.   **(02+03)**

4B. Product 601 is made from three 740 sub-assemblies, two 810 sub-assemblies and one 900 subassembly. A 740 sub- assembly consists of one unit of component 309 and two units of component 207. The 900 sub-assembly is made from two units of component 400 and one unit of component 782. An 810 sub-assembly consists of one unit of component 309, one unit of component 721 and two 682 sub- assemblies. A 682 sub-assembly is made from one unit of component 400 and one unit of component 207. Draw the product structure tree and determine the gross requirements for components 207, 400 and 309 that are required to produce 150 units of product 601.   **05**

5A. Using the data given below:
- Draw a precedence diagram.
- Assuming that 55 minutes per hour are productive, compute the cycle time needed to obtain 50 units per hour.
- Assign the tasks to various stations using the longest work element rule.   **05**

Task	Immediate predecessor	Task time(minutes)
A	None	0.9
B	A	0.4
C	B	0.6
D	C	0.2
E	C	0.3
F	D,E	0.4
G	F	0.7
H	G	1.l

5B. Potential locations X, Y, & Z have the cost structures as shown below. Determine the volume ranges over which each location is suitable? If the likely demand is 1, 30,000 units which location is to be selected? Plot the data on the graph. **05**

Location	X	Y	Z
Fixed Cost /year(Rs.)	1,50,000	3,50,000	9,50,000
Variable Cost/ unit (Rs.)	10	8	6