Sem-VII / mech / 14-12-10 / manufacturing Planning & control

Con. No-56

Con. 6530–10. **(REVISED COURSE)** **GT–8757**

(3 Hours) **[Total Marks : 100**

1) Question No. 1 is compulsory.
2) Answer any **four** questions out of the remaining **six** questions.
3) Figures to the right indicate full marks.
4) Illustrate answers with neat sketches where ever required.
5) Answers to the questions should be grouped and written together.
6) Assume suitable data if required.
7) To calculate probability use of table is permitted.

Attempt any **four** : Marks

1. A) Explain general MPC system that a firm can use for planning and controlling its manufacturing operations. 5

B) Explain Bill of Material. 5

C) Explain various costs associated with inventory control. 5

D) There are seven jobs each of which has to be processed on Machine 1 and Machine 2 in the order M_1, M_2. Determine the sequence of processing the jobs. 5

Job	1	2	3	4	5	6	7
Machine 1	3	12	15	6	10	11	9
Machine 2	8	10	10	6	12	1	3

E) A manufacturer produces two types of models M_1 and M_2. Each M_1 model requires 4 hours of grinding and 2 hours of polishing; whereas each M_2 model requires 2 hours of grinding and 5 hours of polishing. The manufacturer has two grinders and 3 polishers. Each grinder work for 40 hours a week and each polisher work for 60 hours a week. Profit on M_1 model is Rs. 3 and on M_2 is Rs. 4. Whatever is produced in a week is sold in the market. How should the manufacturer allocate his production capacity to the two types of models so that he can make the maximum profit in a week? 5

F) Discuss the advantages and limitations of simulation. 5

2. A) What are the functions of MPC system? 10

B) The sales of cell phones manufactured by a company are given. Forecast the demand for the next three years using least square method. 10

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sales ('000)	30	33	37	39	42	46	48	50	55	58

3. A) What is the role of Capacity Planning in MPC? 5

B) What are the various strategies for Aggregate Planning? Explain 5

C) Explain the functions of MPS. 5

D) Explain Production Activity Control in MPC. 5

Question

4. A) With reference to MRP explain the following terms 5
   i) Gross Requirement
   ii) Time Bucket
   iii) Lead Time Offset

B) What is MRP II? 5

C) Discuss JIT. 5

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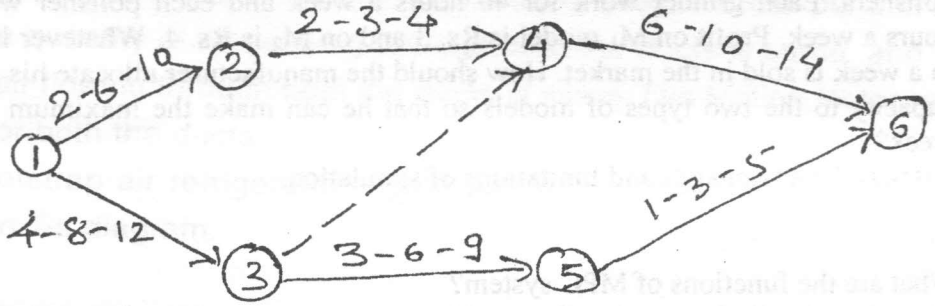
D) Complete the material requirement plan for an item shown below. The item has an independent demand and a safety stock of 40 is maintained. 5

Order Quantity=70 Lead Time= 4 Weeks Safety Stock 40	WEEK											
	1	2	3	4	5	6	7	8	9	10	11	12
Project Requirement	20	20	25	20	20	25	20	20	30	25	25	25
Receipts		70										
On hand at the hand of project (65)												
Planned order Release												

5. A) For the network shown below calculate the probability of completion in 22 days. 8



B) Following table shows the various activities of a network. The normal cost, time and crash cost, time are also given: 12

Activity	Normal		Crash	
	Time (Days)	Cost (Rs.)	Time (Days)	Cost (Rs.)
1-2	3	360	1	400
2-3	6	1440	2	1620
2-4	9	2160	4	2380
2-5	7	1120	2	1600
3-4	8	400	4	800
4-5	5	1600	2	1770
5-6	3	480	1	760

A boat company makes three different kinds of boats. All boats can be made profitably but the company's monthly production is constrained by limited amount of labour, wood and screws available each month. The director will choose the combination of the boats that maximizes his revenue in view of the information given in the following table: 20

Input	Row Boat	Canoe	Keyak	Monthly Availability
Labour (Hrs)	12	7	9	1,260 Hrs.
Wood (Board Feet)	22	18	16	19,008 Board Feet
Screws (KG)	2	4	3	396 KG
Selling Price	4, 000	2, 000	5,000	

A) Formulate the problem as LPP and solve by Simplex method. 4 + 8

From the optimal table of the solved LPP , answer the following questions

B) How many boats of each type are produced and what will be the resulting revenue? 2

C) Which, if any, of the resources are not fully utilized? If so, how much of spare capacity is left? 3

D) How much wood will be used to make all the boats given in the optimal solution? 3

7. A) Four buildings (B1, B2, B3 and B4) are to be constructed by four different contractors (C1, C2, C3 and C4). Each contractor has submitted the bid for the four buildings. The bid amount has been shown below. The problem is to determine which building is to be awarded to each contractor; so as to keep the costs of construction of four building optimum. 10

	Contractor			
Building	C1	C2	C3	C4
B1	48	48	50	44
B2	56	60	60	68
B3	96	94	90	85
B4	42	44	54	46

B) A company has three factories X, Y, Z. It supplies goods to four warehouses W1, W2, W3 and W4. The production capacities of the factories and demand of the warehouses are as shown in the table. Determine the optimal solution of the problem. 10

		Warehouse				
		W1	W2	W3	W4	Production Capacity
Factory	X	19	30	50	12	7
	Y	70	30	40	60	10
	Z	40	10	60	20	18
Demand		5	8	7	15	