Total number of printed pages – 8 **B.Tech**

HSSM 4302

Sixth Semester Examination – 2008

PRODUCTION AND OPERATIONS MANAGEMENT

Full Marks – 70

Time : 3 Hours

Answer Question No. 1 which is compulsory and any ***five*** *from the rest.*

The figures in the right-hand margin indicate marks.

1. Answer briefly the followings : 2×10

   (a) Which type of processing structure is used for highly standardized products manufacturing ?

   (b) What do you understand by value-added services ?

   (c) What do you understand by capacity utilization rate ?

   (d) Write any two approaches to achieve capacity flexibility.

   (e) Write down any three good reasons for carrying inventory.

   (f) What is the basic purpose of MRP system ?

   (g) What do you understand by withdrawal KANBAN ?

   (h) What is the difference between Free float and Independent float ?

   (i) Which type of layout is being followed for construction of highway ?

   (j) What do you understand by External Failure Cost ?

2. A firm works 40 hours a week and has a capacity of overtime work to the extent of 20

hours in a week. It has received seven orders to be processed on three machines A, B and C in the order of A, B, C and to be delivered in a week time from now. The process time in hours are recorded in the below mentioned table :

Job	Machine		
	1	2	3
1	7	2	6
2	8	2	5
3	6	1	4
4	7	3	2
5	8	2	1
6	5	4	5
7	7	2	5

The manager, who, in fairness, insists on performing the jobs in the sequence in which they are received, is refusing to accept an eighth order, which requires 7,2 and 5 hours respectively on A, B and C machines, because, according to him, the eighth job

would require a total of 61 hours for processing, which exceeds the firm capacity. Advise him, whether to take the job or not. 10

3. Explain the relationship between quality and productivity under JIT philosophy. 10

4. The following tasks are to be performed on an assembly line. The workday is seven hours long and the demand for completed product is 750 per day.

Task	Seconds	Task that must precede
A	20	–
B	7	A
C	20	B
D	22	B
E	15	C
F	10	D
G	16	E, F
H	8	G

(a) Find the cycle time. 1

(b) What is the theoretical no. of Workstations ? 1

(c) Draw the Precedence Diagram. 3

(d) Balance the line using sequential restrictions and longest operating time rule and calculate the efficiency. 5

5. M/s Videocone Ind cost of goods sold last year was Rs. 65,30,000/- and the firm operates 49 weeks per year. It carries ten (10) items in inventory constituting 4 raw materials, 3 work-in-process items and 3 finished goods. The following table shows the last year's average inventory level for each item along with its value.

Category	Part Number	Aggregate Level	Unit Value (Rs.)
I	1	15000	3
	2	2500	5
	3	3000	1
	4	2550	7
II	5	5000	14
	6	4000	18
	7	1500	22
III	8	2000	48
	9	1000	62
	10	500	85

(a) What is the average aggregate inventory value ? 2

(b) What weeks of supply does the firm maintain ? 4

(c) What was the inventory turnover last year? 4

6. DRDO is planning to bid on a large project for the development of a new communication system for fighter planes. The following table gives the activities and other relevant cost information.

Activity	Immediate Predecessor	Time (Days)		Direct Cost (Rs.)	
		Normal	Crash	Normal	Crash
A	—	7	5	7000	8000
B	A	3	2	5000	7000
C	A	4	3	9000	10200
D	B, C	5	4	3000	4500
E	D	2	1	2000	3000
F	D	4	2	4000	7000
G	E, F	5	4	5000	8000

(a) Draw the network diagram and determine the minimum and maximum duration of the project. 4

(b) If the project is to be shortened by four days, show which activities, in order of reduction, would be shortened and the resulting cost. 6

7. The purchasing manager of a refinery company is considering three sources of supply for crude barrels. The first supplier offers any quantity of barrels at Rs. 150 each. The second supplier offers barrels in lot of 150 or more at Rs. 125 per barrel. The third supplier offers barrels in lot of 250 or more at Rs. 100 each. The refinery uses 1500 barrels a year at constant rate. Carrying cost are 40 percent and it costs the purchasing agent Rs. 400 to place an order. Calculate the total annual cost for the orders placed to the probable suppliers and find out the supplier to whom the orders be placed. 10

8. A control Panel consists of 3 nos. Electronics circuit and 6 nos. Electric circuit. Each Electronic circuit consists of 4 Transistors and 5 Rectifiers and each Electric Circuit consists of 3 same Rectifiers and 1 control fuse. The lead time of each component and the demand are as mentioned below. Draw the Product Structure Tree and the Materials requirements plan that defines the number of units of each component when they are required and when to be ordered. 4+6

Lead Times	
Control Panel	1 day
Electronics Circuit	3 days
Electric Circuit	2 days
Rectifier	3 days
Transistor	4 days
Control Fuse	1 day

Total Unit Demand	
Day 10	50 A
Day 8	20 B (Spares)
Day 6	15 D (Spares)