

Total number of printed pages – 7

B. Tech
HSSM 4302

Fifth Semester Examination – 2007

**PRODUCTION AND OPERATIONS
MANAGEMENT**

Full Marks – 70

Time : 3 Hours

IWL

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

*The figures in the right-hand margin
indicate marks.*

1. Answer the following questions : 2 × 10
- (a) Which type of manufacturing layout is to be followed for construction of an Hanging Bridge ?

P.T.O.

- (b) What do you understand by plant-within-a-plant (PWP) concept ?
- (c) What do you understand by Decoupling Inventory ?
- (d) What do you understand by Diseconomies of scale ?
- (e) What do you understand by system based operating capabilities ?
- (f) What do you understand by Time-cost model in Project management ?
- (g) What do you understand by Fixed time-period model of Inventory system ?
- (h) What do you understand by the concept of Virtual Factory ?
- (i) Write down any *three* advantages of Group Technology layout.
- (j) Write down any *three* Qualitative techniques applied in forecasting.

2. In a factory, eight jobs are performed on two machines (A and B). The time required for each job on each machine is given below. On the basis of the information, identify the optimal sequence and calculate the in and out time for each job on each machine and the total elapsed time. 10

Job	Work Station - 1	Work Station - 2
A	3	3
B	6	4
C	5	7
D	8	5
E	2	6
F	1	8

3. A company involved in the manufacture of two wheelers installs a new assembly line with the objective of producing 100 units per 10 hour shift. The work elements and the relationships are as per the below mentioned table. Draw network diagram, work station cycle time, Number of work stations and distribution of work elements in a work station and the efficiency. 10

Work Element	Time (Minutes)	Tasks that must precede
A	4	—
B	3	A
C	6	A
D	1	B
E	2	D, C
F	5	E

4. A firm is selling two products, Chairs and Study tables, each at Rs. 500 per unit. Chairs have a variable cost of Rs. 250 and Study tables of Rs. 200. Fixed cost of the firm is Rs. 2,00,000.

(a) If the sales mix is 1 : 1 (One Chair sold for every Study Table sold), what is the break-even point in rupees of sales and in units of Chairs and Study Tables ? 5

(b) If the sales mix changes to 1 : 4 (One Chair sold for every four Study Table sold), what is the break-even point in rupees of sales and in units of Chairs and Study Tables ? 5

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5. A manufacturer identifies six potential market locations in a country it plans to enter. Suggest the best possible location to the manufacturer so that it can minimize its overall transportation cost. The coordinates and volume to be moved between these locations are given in the table.

10

Potential Markets	X	Y	Volume
L1	200	250	130
L2	350	200	120
L3	450	600	115
L4	700	900	100
L5	230	760	100
L6	890	450	105

6. The Just-in-Time (JIT) purchasing system has gained significant importance in the business world in the last few years. It helps companies to reduce order size and try to time them close to their uses in production as possible. Explain how

the JIT purchasing system is different from the traditional purchasing system ? 10

7. A project has the following list of activities along with their time of completion, precedence relationship, normal and crash activity times and normal and crash costs associated with it :

Activity	Preceding Activity	Required Time (Weeks)		Cost (Rs.)	
		Normal	Crash	Normal	Crash
A	-	4	2	10000	11000
B	A	3	2	6000	9000
C	A	2	1	4000	6000
D	B	5	3	14000	18000
E	B, C	1	1	9000	9000
F	C	3	2	7000	8000
G	E, F	4	2	13000	25000
H	D, E	4	1	11000	18000
I	H, G	6	5	20000	29000

- (a) Draw the critical path and estimated completion time. 5
- (b) To shorten the project by three weeks, which task would be shortened and what would be the total project cost ? 5

8. Every product passes through various stages in the product life cycle. They are the Introduction, Growth, Maturity and Decline. The operations strategy of an organization is dependent on the stage in which the product is. Describe the major focus of operations strategy of an organization in various stages of product life cycle. 10