

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 140860

Roll No.

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B.Tech.

(SEM. VIII) THEORY EXAMINATION 2013-14

PRODUCTION AND OPERATIONS MANAGEMENT

Time : 3 Hours

Total Marks : 100

Note :- (i) Use of scientific calculator is permitted.

(ii) Assume any data if missing, justify the same.

1. Attempt any **two** of the following : **(10×2=20)**

(A) (i) What are the primary functions that must be performed in all organizations ? Define each one and explain how they are interrelated.

(ii) Explain the system of manufacturing (with the help of suitable figure), clearly indicating the flow of information and material, additionally .

(iii) Differentiate between Science, Technology, Industrial Management and Industrial Engineering.

(B) (i) What are the major priorities associated with operations strategy ? For each of the different priorities describe the unique characteristic of the market niche with which it is most compatible.

- (ii) What are the typical performance measures for quality, speed of delivery and flexibility? Discuss with suitable example and figures.
- (C) (i) Differentiate, clearly, services from products, as an output of an organization on various issues.
- (ii) Explain "Hausthorne Effect".
- (iii) Explain the contribution of HL Gantt and E Mayo.

2. Attempt any two of the following : (10×2=20)

- (A) (i) What are three major categories of factors that influence operations locations? Discuss them in detail.
- (ii) A company is considering expansion in the western ghat region. It is heavily dependent on water transportation, so preliminary research has narrowed the location to three sites near port in Mumbai, Goa, 'A' and Goa 'B'. On the basis of following data, which site is preferable. Show your computations.

Relevant factors	Mumbai	Goa 'A'	Goa 'B'
Variable cost/unit	\$1.80	\$2.00	\$1.95
Fixed cost/year	\$1,50,000	\$3,00,000	\$4,00,000
Price/unit	\$3.00	\$2.97	\$3.15
Volume (units/year)	3,00,000	2,50,000	3,25,000

- (B) (i) Discuss some of the objectives of a good layout.
- (ii) What are the advantages and disadvantages of layout by product?
- (iii) Briefly describe how a U-Line call operates.
- (C) (i) What are some major capacity considerations in a hospital? How do they differ from those of a factory?

- (ii) Discuss the product design philosophy behind industrial design and design for manufacture and assembly. Which one do you think is more important in a customer focused product development.

3. Attempt any two the following : (10×2=20)

- (A) (i) Suppose you want to set a time standard for the baker making her specialty square donuts. A work sampling study of her on "donut day" yielded the following results :

Time spent (working and idle)	32 min
Number of do-nuts produced	5000
Working time	280 min
Performance Rating	125%
Allowances	10%

What is the standard time per donut?

- (ii) What is job design? Discuss the content of a job.
- (B) (i) What are the objectives of motion study?
- (ii) Discuss the man-machine chart highlighting its salient features. Explain it with the help of an example and suitable figure.
- (iii) What are the predetermined motion times. Explain ratio delay analysis.
- (C) (i) Here are the precedence requirements, normal and crash times and normal and crash costs of a construction project.
 - (a) What is critical path and the estimated time?

- (b) To shorten the project by three weeks. Which tasks would be shortened and what would be final project cost ?

Activity	Preceding Activity	Time		Cost	
		Normal	Crash	Normal	Crash
A	-	4	2	\$10,000	\$11,000
B	A	3	2	6,000	9,000
C	A	2	1	4,000	6,000
D	B	5	3	14,000	18,000
E	B,C	1	1	9,000	9,000
F	C	3	2	7,000	8,000
G	E,F	4	2	13,000	25,000
H	D,E	4	1	11,000	18,000
I	H,G	6	5	20,000	29,000

(ii) What are the differences between PERT and CPM ?

(iii) Explain all types of float.

4. Attempt any **two** of the following : (10×2=20)

(A) (i) DAT Inc. needs to develop an aggregate plan for its product line.

Relevant data are :

Production time- 1 Hour/Unit; Beginning Inventory- 500 units

Average Labour Cost- \$10/hr.; safety stock- ½ month

Work week- 5 days; 8 hour each day;

Shortage cost-\$ 20/month; Days/month- 20 working days

Carry Cost - \$ 5/unit/month.

The forecast for 1998 is

Jan	Feb.	Mar.	Apr.	May	Jun	Jul	Aug.	Sep.	Oct.	Nov.	Dec.
2500	3000	4000	3500	3500	3000	3000	4000	4000	4000	3000	3000

Management prefer to keep a constant work force and production level, absorbing variations in demand thorough inventory excesses and shortages. Demand not met is carried over to the next month. Develop an aggregate plan that will meet demand and other conditions of the problem. Don't optimize. Make necessary assumption, justifying the same.

(ii) Distinguish between pure and mixed strategies in production planning with the help of suitable example.

(B) (i) Describe the relationship between business plan and the production plan.

(ii) What is aggregate planning ?

(iii) Five jobs are to be run on two processes, all in the sequence of first-process 1, then- process 2. The duration (in hours) of the operations are shown in the following table :

Job	Time	
	Process 1	Process 2
A	3.0	1.2
B	2.0	2.5
C	1.0	1.6
D	3.0	3.0
E	3.5	1.5

- (a) Sequence the jobs according to the Johnson's rule.
- (b) Use Gantt Chart to show how long after the start of the first job on process 1, each job will be completed on process 2.
- (C) (i) What is a backlog report ?
- (ii) What is dispatching ? Describe a few Heuristics that may be used in dispatching.
- (iii) Discuss the objective of input/output control.
- (iv) Briefly describe the steps in estimating the cost and delivery dates for job shop work.
- (v) What do you mean by learning curves ? Explain.

5. Attempt any **two** parts of the following : (10×2=20)

- (A) (i) Differentiate dependent-demand-item inventory from independent demand-item inventory clearly state how these types of inventories are handled.
- (ii) What are the inventory control systems ? Explain any one in detail.

- (iii) Derive the expression of EOQ. Clearly state all the assumptions used in the derivation.
- (B) (i) What is master production schedule ? How does it differ from forecast ? What is lead time offsetting ?
- (ii) Explain MRD II and its working (with simple example) through a flow diagram. Clearly show the outputs and inputs to MRD II in flow diagram.
- (C) (i) Distinguish between "Push" and "Pull" system.
- (ii) What is the role of FMS in today's manufacturing scenario, toward world class manufacturing.
- (iii) State the pillars of TQM. Define term "Quality".
- (iv) Explain process capability index.
- (v) State the central limit theorem.