25 (2) POMN 202

2014

PRODUCTION & OPERATION MANAGEMENT

Paper : 202

Full Marks : 70

Pass Marks : 28

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1. *(a)* Explain with the help of diagram the stages at which product failure occures for a product. What are the main reasons for product failure ? 5

   (b) Make a comparison of the characteristics of different types of process technologies. 9

2. *(a)* Explain the role of Fixed costs and Variable costs on profitability while selecting a facility location. Explain with the help of diagrams. 8

(b) Given the following two machine problems

Jobs	Machine 1 (Time in Mins)	Machine 2 (Time in Mins)
A	22	19
B	18	17
C	24	19
D	15	15
E	10	12
F	15	17

find the sequence for processing the jobs using Jhonsons algorithm and also calculate the idle time for Machine 2. 6

3. Given below is the data on task, Predecessor, and time taken : 14

Task	Predecessor	Time (secs)
A	–	90
B	–	45
C	A	70
D	A	55
E	B	40
F	C	30
G	C	50
H	D, E	30
I	G, H	45

All the tasks need to be completed to produce one unit of a product. The company is planning to produce 288 units of the products daily by working for 8 hours daily.

Find out the following :

(a) Is the maximum daily output that can be produced by the production line sufficient to meet the company's daily production plan ?

(b) Calculate the maximum allowable cycle time.

(c) Balance the time with the maximum allowable cycle time.

(d) Calculate the efficiency of the line

(e) Also draw the sequence diagram for the tasks.

4. A company is planning to produce product 'A' as per the following schedule. 14

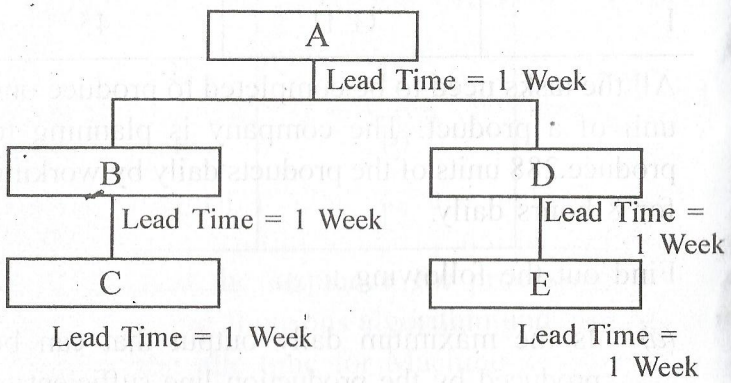
Week 4 → 500 units

Week 5 → 600 units

Week 7 → 650 units

Week 8 → 550 units.

The product tree is as follows :



2 units of components 'B' and 1 unit of component 'D' respectively are required to produce one unit of product 'A'.

3 units of component 'C' is required to produce 1 unit of component 'B'.

2 units of component 'E' is required to produce 1 unit of component D.

Available quantity in hand :

Product 'A' → 100 units

Component B → 500 units

Component C → 700 units

Component D → 650 units

Component E → 440 units.

Scheduled receipt of finished product 'A'

Week 4 → 200 units

Week 5 → 100 units

Week 6 → 100 units

Week 7 → 200 units

Week 8 → 300 units.

Construct the MRP records for 'A', 'B', 'C', 'D' & 'E'.

5. (a) The daily demand for a product is normally distributed with a mean of 35 units and standard deviation of 8. Carrying cost is 80% of cost of inventory of ₹ 60. Lead time is 8 days. Ordering cost is ₹ 2300. The product is produced all throughout the year. A 98% service level is desired. Determine the operating doctrine. 10

(b) How is a Q/R system of inventory different from a periodic inventory system ? 4

6. (a) A production line draws 4 samples in a day. Each sample has 5 nos. of observation. The readings are as follows : 12

SAMPLE No.1(*cms*)	SAMPLE No.2(*cms*)	SAMPLE No.3(*cms*)	SAMPLE No.4(*cms*)
20	21	30	33
25	22	21	21
23	27	22	19
21	29	23	17
26	32	19	18

From the above data compute the control limits for Mean chart and Range chart. Also plot the points by constructing the control charts and comment.

Given :

For $n = 4$, $A_2 = 0 \cdot 729$, $D_3 = 0$, $D_4 = 2 \cdot 282$

For $n = 5$, $A_2 = 0 \cdot 577$, $D_3 = 0$, $D_4 = 2 \cdot 115$.

(b) What are the merits and demerits of a 100% inspection plan ? 2

7. Write short notes on ***any two*** topics : 7+7=14

(a) Modular Vs Standardized products.

(b) CAD / CAM

(c) Objectives of Material Requirement Planning.