25(2) POMN 202

2010

PRODUCTION AND OPERATIONS MANAGEMENT

Paper : 202

Full Marks - 70

Time - Three hours

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

Answer any *five* questions.

1. (a) What are the major operation objectives in production decision problem ? Explain the strategic significance of the relationship between cost Vs. quality and delivery Vs. flexibility. 3+4=7

   (b) Explain the concept of the product life cycle and examine the manufacturing issues involved. 4

(c) Explain the process of new product development. 3

2. (a) Give a general framework for facility location planning. In order to attract IT companies to the North-East, what measures would you suggest to the government? Explain. 2+5=7

(b) For the four given locations and their respective demand, find the best supply centre by using the simple median model. 4

Location	Coordinates (x, y)	Demand (in 000 kg)
AA	(20, 0)	200
BB	(0, 400)	300
CC	(140, 20)	800
DD	(360, 80)	200

(c) List the important factors to be taken into consideration for deciding the type of production process to be used for production. 3

3. (a) What are the basic principles of plant layout? Describe the three kind of basic layouts stating their advantages and disadvantages. 1+6=7

(b) Task, task times and precedence relationship of a production line are given below :

Task	Time (in sec)	Predecessors
A	40	none
B	20	A
C	15	B
D	60	none
E	20	D
F	10	C
G	10	C
H	10	E
I	10	E
J	5	F,G,H,I
K	10	J

(i) Construct a sequence diagram.

(ii) To balance the line with a 60 second cycle time, what is the theoretical minimum number of work stations required? A 7 hr day is worked.

(iii) Balance the line with LOT algorithm, taking 60 seconds cycle time.

(iv) What is the efficiency of the line?

$$1+2+3+1=7$$

4. (a) Explain the relationship between quality and productivity. Discuss the theory that states that quality and productivity improvement move in the same direction. **5**

(b) Explain the relationship between method study and time study in work design. **4**

(c) What is the need for capacity planning? Explain the relationship between capacity planning and location planning. **5**

5. (a) What is the use of ABC, VED to functional departments other than inventory control? Determine inventory stocking policies using ABC in conjunction with VED. **4+3=7**

(b) A contractor has to supply 10,000 bearings per day to an automobile manufacturer. He finds that, when he starts production run, he can produce 25,000 bearings per day. The cost of holding a bearing in stock for a year is Rs. 2 and the set up cost of a production run is Rs.180. How frequently should production run be made? **5**

(c) Write note on value analysis and its benefits. **2**

6. (a) Describe codification and standardization. Explain how these are used for inventory reduction. **4+2=6**

(b) Given the following product tree, explode, offset and determine the gross and net requirements. All lead times are one week and the quantities required are shown in parantheses. The MPS calls for 100 A to be available in week 5. There are 20 Bs available in stock. **8**

A
├── B(2)
│   ├── D(1)
│   └── E(1)
└── C(1)
      ├── D(2)
      └── F(1)
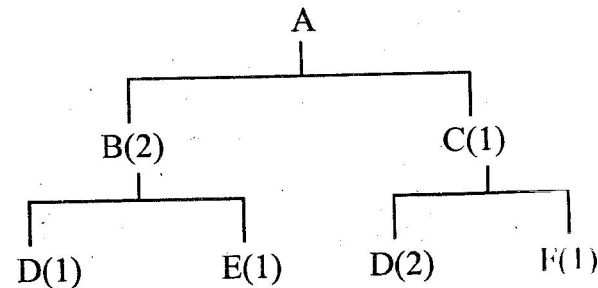
7. (a) In SQC how does variable measurement differ from attribute measurement? 4

(b) What is meant by cost of quality? Describe its components. 4

(c) In a control chart application, it was found that the grand average over all past samples of size 7 is $\overline{\overline{X}} = 30$ and $\overline{R} = 5$.

(i) Set up a control chart for this application.

(ii) The following measurements are taken—
38, 35, 27, 30, 33, 28 and 32. Is the process still under control?

[Given table value of $A_2 = 0.419$, $D_3 = 0.076$ and $D_4 = 1.924$] 3

(d) Write a brief note on TQM. 3