

# PC-10050/NJ

F-40/2110

OPTIMIZATION TECHNIQUES-I-304

Semester-III

(Syllabus Dec.-19)

Time : Three Hours]

[Maximum Marks : 70

**Note :** Attempt *two* questions each from Section A and B, carrying 10 marks each and the entire Section C consisting of 10 short answer type questions carrying 3 marks each.

## SECTION – A

- I. Derive the EOQ formula  $q_0 = \sqrt{\frac{2C_3R}{C_1}}$ , where the symbols have usual meanings.
- II. A Company uses 1200 Units per month of an electronic component each costing Rs. 2. Placing each order costs Rs. 50 and the carrying cost is 6% per year of the average inventory.
- Find EOQ.
  - If the Company gets 5% discount on single order, should it accept the discount offer.

- III. Discuss a deterministic inventory system with multiple items and limited floor area.
- IV. Consider a shop which produces three items. The items are produced in lots. The demand rate for each item is constant and can be assumed to be deterministic. No back orders are to be allowed. The pertinent data for the items are given below :

Item	1	2	3
Holding Cost (Rs.)	20	20	20
Set-up Cost (Rs.)	50	40	60
Unit Cost (Rs.)	6	7	5
Demand rate per year	10,000	12,000	7,500

Determine approximately the economic order quantities when the total value of average inventory levels of these items is Rs. 1,000.

### **SECTION – B**

- V. Give Johnson's procedure for determining an optimal sequence for processing in Jobs on two machines. Give the Justification of the rule used in procedure.
- VI. There are five jobs, each of which is to be processed through three machines A, B and C in the order ABC. Processing times in hours are

Machines → Job ↓	A	B	C
1	3	4	7
2	8	5	9
3	7	1	5
4	5	2	6
5	4	3	10

Determine the optimum sequence for the five jobs and the minimum elapsed time. Also find the idle time for the three machines and waiting time for the jobs.

- VII. State the circumstances where CPM is a better technique of project management than PERT.
- VIII. Explain Monte Carlo method and give the situations where these methods are useful.

### SECTION – C

- IX. (a) What are the advantages and disadvantages of having inventories?
- (b) Explain the following terms in inventory management :
- (i) Carrying Cost.
  - (ii) Shortage Cost.
  - (iii) Ordering Cost.

- (c) What happens when total carrying cost per year is not equal to total ordering cost per year?
  - (d) Explain the following terms in inventory theory :
    - (i) Lead time.
    - (ii) Re-order Level.
    - (iii) Safety stock.
  - (e) Explain sequencing problem in detail.
  - (f) State the assumptions made in sequencing.
  - (g) What is the need of simulation?
  - (h) State the applications of Monte Carlo simulation in Inventory Control.
  - (i) Explain the rules of network Construction.
  - (j) Discuss all the four types of float.
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