

(4)

- (c) A Stenographer has 5 persons from whom he performs the works. Arrival rate is poisson and service time is exponential. Average arrival rate is 4/Hr. Average service time is 10 minutes. Cost of waiting is Rs. 8/Hr. Servicing cost is Rs. 2.50 each. Find average waiting time of an arrival and length of waiting time.

- (d) Draw a network diagram based on the following information :

Activity	A	B	C	D	E	F	G	H
Predecessors	-	-	A	B	CD	CD	E	F

**6. Answer any one question :**

**8 X 1**

- a) A project having the following activities and time estimates as under

Activity	Estimated duration in weeks		
	Optimistic	Most likely	Pessimistic
1-2	3	6	15
1-3	2	5	14
1-4	6	12	30
2-5	2	5	8
2-6	5	11	17
3-6	3	6	15
4-7	3	9	27
5-7	1	4	7
6-7	4	19	28

You are required – draw the project network, expected duration and variance of each activities, determine the critical path and what is the probability that the project will be completed in 38 weeks.

- b) Define inventory. State the reasons for carrying inventories.

2+6

*(Internal Assessment :10 marks)*

Total Pages - 04 (Four)

18/PG/PKC/IS/COM-103

**2018**

**M. Com.**

**1<sup>st</sup> Semester Examination**

**QUANTITATIVE TECHNIQUES FOR MANAGERIAL DECISION**

**PAPER – COM – 103**

**Full Marks : 50**

**Time : 2 Hours**

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

*Candidates are required to give their answers in their own words as far as practicable.*

**UNIT – I**

**1. Answer any two questions:**

**2 X 2**

- (a) Write the Dual of the following L.P.P.-

$$\begin{aligned} \text{Min } Z &= 40x_1 + 120x_2 \\ \text{Subject to, } &-x_1 + 2x_2 \geq -8 \\ &3x_1 + 5x_2 = 90 \\ &15x_1 + 44x_2 \leq 660 \\ \text{Provided that } &x_1, x_2 \geq 0 \end{aligned}$$

- (b) A retired person wants to invest up to an amount of Rs. 30,000/- in the fixed income securities. His broker recommends investing in two bonds – bond A yielding 7% p.a. and bond B yielding 10% p.a. After some consideration he decides to invest at the most Rs. 12,000/- in bond B and at least Rs. 6,000/- in bond A.
- (c) What is 'Degeneracy' condition of a Transportation problem?
- (d) What do you mean by 'Matrix Reduction' of an Assignment Problem?

*(Turn Over)*

(2)

**2. Answer any two questions:**

**2 X 4**

(a) Solve the following assignment problem of minimizing total time for doing all the jobs :

Jobs	1	2	3	4	5
Operators					
1	6	2	5	3	6
2	2	5	8	7	7
3	7	8	6	9	8
4	6	2	3	4	5
5	9	3	8	9	7
6	4	7	4	6	8

(b) In a sales emporium, 4 salesmen A, B, C & D are available from four counters W, X, Y & Z. Each salesman can handle any counter. The services of salesman given in the following table

Salesman	A	B	C	D
Counter				
W	41	72	39	52
X	22	29	49	65
Y	27	39	60	51
Z	45	50	48	52

How should the salesmen be allocated to appropriate counters to minimize the service time.

(c) The cost of producing two units A & B is Rs. 60 & 80 respectively. As per agreement at least 200 units of B has to supply to the customer. A requires one machine hour and product B has abundant machine hours. Total machine hour available for product A are 400 hours. Product A and B requires one labor hour each and total 500 labor hour are available.

The company wants to minimize the cost of production. Show the problem as a L.P.P.

*Continued*

(3)

(d) What do you mean lay unbalanced Transportation Problem? Give the advantages of Duality in L.P.P.

**3. Answer any one question:**

**8 X 1**

a) Solve the following L.P.P using Simplex Method

$$\begin{aligned} \text{Min } Z &= 4x_1 + 8x_2 + 2x_3 \\ \text{Subject to, } &1/2x_1 + 2x_2 + 4x_3 \geq 4 \\ &x_1 + x_2 - 2x_3 \geq 6 \\ \text{Provided that } &x_1, x_2, x_3 \geq 0 \end{aligned}$$

b) A company is spending Rs. 1000/- on transportation of its units from three plants to four distribution centres. The supply and demand of units with unit cost of transportation are given as :

Centres	D-1	D-2	D-3	D-4	Availability
Plant					
P1	19	30	50	12	7
P2	70	30	40	60	10
P3	40	10	60	20	18
Requirements	5	8	7	15	

What can be the minimum saving by optimal scheduling? (Use MODI Method to solve the problem)

**UNIT - II**

**4. Answer any two questions:**

**2 X 2**

- (a) Explain the meaning of Predecessor and Successor Activities;
- (b) Briefly explain the objectives of Inventory Management.
- (c) State the assumption of Single Channel Queuing Model.
- (d) Briefly indicate what do you mean by 'Slack'?

**5. Answer any two questions:**

**4 X 2**

- (a) Distinguish between PERT and CPM .
- (b) Excel Ltd. has to supply the customer 600 units of a product p.a. Shortages are not allowed and the inventory carrying cost amounted to Re. 0.60 p/unit p.a. the setup cost per run is Rs. 80/-. Find EOQ and minimum average yearly cost.

**(Turn Over)**