

Reg.No.

--	--	--	--	--	--	--	--	--	--

**D.K.M.COLLEGE FOR WOMEN (AUTONOMOUS),
VELLORE-1**

SEMESTER EXAMINATIONS

APRIL - 2017

15CPCO2D

QUANTITATIVE TECHNIQUES FOR BUSINESS

DECISIONS

Time : 3 Hrs

Max. Marks : 75

SECTION-A (5x 6 =30)

Answer ALL the questions.

1. (a) What is Linear Programming? Bring out its advantages.

(Or)

- (b) What is network analysis? Explain the objectives of network

Analysis under Linear programming.

2. (a) A company has a demand of 12,000 units/year for an item and it can produce 2000 such items

per month. The cost of one setup is Rs.400 and the holding cost per unit/month is Rs.0.15. Find

the optimum lot size, max inventory, manufacturing time, and total time.

(Or)

(b) The annual demand for an item is 3200 units. The unit cost is Rs.6/- and inventory carrying charges 25% per annum. If the cost of one procurement is Rs.150/- determine

- (i) Economic order quantity
- (ii) Time between two consecutive orders
- (iii) Number of orders per year
- (iv) The optimal total cost.

3. (a) Determine basic feasible solution to the following transportation problem using North West Corner Rule:

Corner Rule:

		A	B	C	D	E	Supply
Origin	P	2	11	10	3	7	4
	Q	1	4	7	2	1	8
	R	3	9	4	8	12	9
Demand		3	3	4	5	6	

(Or)

(b) Solve the following transportation problem to maximise profit.

		A	B	C	D	Supply
Source	1	40	25	22	33	100
	2	44	35	30	30	30
	3	38	38	28	30	70
Demand		40	20	60	30	

4. (a) The processing time in hours for the jobs when allocated to the different machines are indicated

below. Assign the machines for the jobs so that the total processing time is minimum.

		Machines				
		M1	M2	M3	M4	M5
	J1	9	22	58	11	19
	J2	43	78	72	50	63
Jobs	J3	41	28	91	37	45
	J4	74	42	27	49	39
	J5	36	11	57	22	25

(Or)

- (b) The assignment cost of assigning any one operator to any one machine is given in the following table.

		Operators			
		I	II	III	IV
Machine	A	10	5	13	15
	B	3	9	18	3
	C	10	7	3	2
	D	5	11	9	7

Prepare optimum assignment schedule.

5. (a) In a super market, the average arrival rate of customer is 10 in every 30 minutes following

Poisson process. The average time taken by the cashier to list and calculate the customer's

purchases is 2.5 minutes, following exponential distribution.

What is the probability that the

Queue length exceeds 6? What is the expected time spent by a customer in the system?

(Or)

(b) In a railway Marshalling yard, goods train arrive at a rate of 30 Trains per day, Assuming that inter arrival time follows an exponential distribution and the service time distribution is also exponential, with a average of 36 minutes. Calculate the following.

- (i) The mean Queue size (line length)
- (ii) The probability that Queue size exceeds 10
- (iii) If the input of the train increases to an average 33 per day, what will be changes in (i) , (ii) ?

SECTION-B (3x15 =45)

Answer any THREE of the following questions.

6. Find all the basic solutions to the following problem:

$$\text{Maximize } Z = x_1 + 3x_2 + 3x_3$$

$$\text{Solution to } x_1 + 2x_2 + 3x_3 = 4$$

$$2x_1 + 3x_2 + 5x_3 = 7$$

Also find which of the solutions are

- (i) Basic feasible
 - (ii) Non – degenerate basic feasible
 - (iii) Optimal basic feasible.
7. The demand for an item in a company is 18,000 units per year and the company can produce the item at a rate of 3000 per month. The cost of one set up is Rs. 500 and the holding cost of one unit per month is 15 paise. The shortage cost of one unit is Rs. 20 per

month. Determine the optimum manufacturing quantity and the number of shortages. Also determine the manufacturing time and time between set – ups.

8. Find the starting solution of the following transportation model:

1	2	6	7
0	4	2	12
3	1	5	11
10	10	10	

Using

- (i) North West Corner Rule.
 - (ii) Least Cost Method.
 - (iii) Vogel's Approximation Method.
9. Four Different jobs can be done on four different machines. The setup and take down time costs are assumed to be prohibitively high for change overs. The matrix below gives the cost in rupees of processing job i on machine j.

		Machines			
		M1	M2	M3	M4
Jobs	J1	5	7	11	6
	J2	8	5	9	6
	J3	4	7	10	7
	J4	10	4	8	3

How should the jobs be assigned to the various machines so that the total cost is minimize?

10. Write short notes on the following:

(i) PERT

(ii) Queuing System.

* * * * *