2017

COMMERCE

Paper : 203

QUANTITATIVE TECHNIQUE FOR BUSINESS DECISION

Full Marks: 80

Time: 3 hours

The figures in the margin indicate full marks for the questions

1. Answer the following questions: 2 X 4 = 8
   a) What is faceable region of linear programming problem?
   b) What do you mean by total slack and free slack of a Network?
   c) Why assignment method is also known as Hungarian method?
   d) Mention the objectives of queuing theory.
2. Answer the following questions: 5 X 4 = 20
   a) What are the main characteristics of linear programming problem?
   b) What are the different types of assignment problem? State briefly with example.
   c) State the following terms used in queuing theory-
      i) Queue length ii) Reneging iii) Jockeying iv) Balking v) Priorities
   d) Write a short note on Transportation Model of linear programming problem.

P.T.O.

3. Answer any two of the following questions: 10 X 2 = 20

a.) What are the steps to be followed for formulating a LP problem? A company owns two flour mills, A and B, which have different production capacities for high, medium and low grade flour. This company has entered a contract to supply flour to a firm every week with 12, 8 and 24 quintals of high, medium and low grade flours respectively. It cost the company Rs. 1000 and Rs. 800 per day to run mill A and B respectively. On a day, mill A produces 6, 2 and 4 quintals of high, medium and low grade flour respectively and mill B produces 2, 2 and 12 quintals of high, medium and low grade flour respectively. Using graphic method of solving linear programming problem find out how many days per week should each mill be operated in order to meet the contract order most economically?

[The points of interaction are (6,0), (3,1), (1,3), (0,6)]

3+7=10

b) Explain the Vogel's Approximation Method (VAM) and Least Cost Method of finding initial basic solution of transportation problem. 5+5+6

Find out the initial feasible solution of the following transportation problem using least cost method.

Sources / Destinations	Q	R	S	T	Demand
A	4	6	22	14	6
B	2	0	12	2	1
C	10	16	30	18	10
Supply	7	5	3	2	

c.) State the procedures of Hungarian method of assignment problem. 10

d.) State the different formulae useful in queuing theory. 10

4. Answer the following questions :

a) Write a short note on PERT.

From the following information draw a network of arrow diagram.

Activity:	0-1	1-2	1-3	2-4	2-5	3-4	3-6	4-7	5-6	6-7
Duration:	1.0	4.0	5.0	3.0	1.5	1.5	3.5	2.5	1.0	4.0

Find out

a. Early and latest time for each activity

b. Total slack and free slack for each activity

c. Critical path 4+12=16

Or

b) From the following information of a transportation problem find out the initial feasible solution using North West Corner method and optimal solution using U-V method.

Sources / Destinations	A	B	C	D	Demand
I	3	1	7	4	250
II	2	6	5	9	350
III	8	3	3	2	400
Supply	200	300	350	150	

16

5. Answer the following question :

a) A tourist company has one car at each of five depots A, B,C, D, and E. A customer requires a car in each town Barpeta, Bongaigaon, Dhubri, Goalpara and Kokrajhar. Distance (in kms) between depots and towns (destinations) are given in the following distance matrix :

Towns	Depots				
	A	B	C	D	E
Barpeta	160	130	175	190	200
Bongaigaon	135	120	130	160	175
Dhubri	140	110	155	170	185
Goalpara	50	50	80	80	110
Kokrajhar	55	35	70	80	105

How should cars be assigned to customers so as to minimize the distance travelled ? 16

Or

b) (i) A motor garage has a single mechanic in the garage. He works 8 hours a day, and on an average six machines than on the basis of Poisson and Exponential model, calculate various

constants relating to a waiting line system. 6

(ii) At a certain petrol pump, customer arrives in a Poisson process with an average time of 5 minutes between arrivals. The mean time taken to service a unit is 2 minutes. Calculate various constants relating to queuing theory.

By how much should the flow of customers be increased to justify the opening of a second service point if the management is willing to open the same provided the customer has to wait for 5 minutes for the service ? 10

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