Total No. of Questions : 5]

SEAT No. :

P-3765

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M.B.A.

302 : GC-12 : DECISION SCIENCE

(2019 Pattern) (Semester - III)

Time : 2½ Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Each question carries 10 marks.***
2) ***Graph paper will lnot be provided.***
3) ***Use of non-scientific calculator is allowed.***

Q1) Solve any five of the following : **[5 × 2 = 10]**

a) Define optimistic time estimate in PERT.

b) Enlist different queue discipline in queuing theory.

c) What is saddle point in Game theory?

d) Define Markov Chain.

e) Mention assumptions underlying Linear Programming Problem (LPP).

f) Write different methods of initial solution to transportation problem.

g) Write condition for balanced assignment problem.

h) What do you mean by optimal solution in solving transportation problem?

Q2) Solve any two of the following : **[2 × 5 = 10]**

a) Solve the following LPP by graphical solution

Max $Z = 9x_1 + 3x_2$

Subject to

$2x_1 + 3x_2 \leq 13$

$2x_1 + x_2 \leq 5$

$x_1 + x_2 \geq 0$

P.T.O.

b) Explain the steps in solving transportation problem.

c) Explain the use of various tools of decision theory in today's business environment.

Q3) Solve any one of the following : **[1 × 10 = 10]**

a) Three brands of product P, Q and R having market share as 30%, 30% and 40% respectively. Customers shift their brands. Brand switching matrix every quarter is given below.

	To		
From	P	Q	R
P	50%	30%	20%
Q	20%	70%	10%
R	20%	20%	60%

Apply concept of Markov Chain to find market share at the end of First & Second quarter.

b) Using the following cost matrix determine i) Optimal job assignment ii) Optimal cost assignment.

Cost ('000 Rs.)

	Job				
Machinist	1	2	3	4	5
A	10	3	3	2	8
B	9	7	8	2	7
C	7	5	6	2	4
D	3	5	8	2	4
E	9	10	9	6	10

Q4) Solve any one of the following : **[1 × 10 = 10]**

a) XYZ company is considering three options for managing its data processing operations: continue with own staff, outsourcing or the use of combination. The annual profit of each option depends on demand as follows :

Staffing option	Demand		Profit ('000 Rs.)
	High	Medium	Low
Own staff	650	650	600
Outsourcing	900	600	300
Combination	800	650	500

Determine Optimal strategy for

i) Maxi-min

ii) Laplace

iii) Hurwicz ($\alpha = 0.6$) &

iv) Regret criterion.

b) The machine operator has to perform two operations, turning and threading on a number of different jobs. The time required to perform these operation on these machines is given below.

Determine sequencing of jobs to minimize the total time. Also find idle time of operations on both machines.

Jobs	1	2	3	4	5	6
Turning time (in min)	03	12	05	02	09	11
Threading time (in min)	08	10	10	06	03	01

Q5) Solve any one of the following : **[1 × 10 = 10]**

a) Vijay has started new retail outlet in the mid of the market. In market there is business & competition, therefore survival of new outlet is very rare chance of survival is almost 5%. Vijay has started such 7 new retail outlet. Find out the probability i) no shop will survive and ii) exactly 5 shops will survive.

b) The three estimates for activities of a project are given below :

Activity	1-2	1-3	1-4	2-5	3-5	4-6	5-6
Pessimistic duration	7	7	12	15	1	8	7
Most likely duration	6	1	4	6	1	2	4
Optimistic duration	5	1	2	3	1	2	1

Draw network diagram. Find out Critical path & Project duration. Estimate expected Standard deviation of critical path.

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