Code: **BA1T5**

PVP 12

I MBA - I Semester – Supplementary Examinations
January - 2020

QUANTITATIVE TECHNIQUES FOR BUSINESS DECISIONS

Duration: 3hours   Max. Marks: 70

SECTION-A

1. Answer any FIVE of the following: 5 x 2 = 10 M

a) If n_{c_3}=220 then find the value of n.
b) Define "Random Variable". How do you distinguish between discrete and continuous random variables?
c) What is meant by Probability Distribution of a random variable?
d) What is a test Statistic? How is it used in hypothesis testing?
e) Explain the theory of dominance in the solution of rectangular games.
f) What is meant by a feasible solution of an LP problem?
g) Define slack and surplus variables in a linear programming problem.
h) Explain Minimax and Maximin principle used in the theory of games.

SECTION – B

Answer the following: **5 x 10 = 50 M**

2. a) The following figures relate to monthly output of cloth of a factory in a given year:

S.No	**Month**	**Output (in '000 mt)**	**S.No**	**Month**	**Output (in '000 mt)**
1.	Jan	80	7.	July	96
2.	Feb	88	8.	August	100
3.	Mar	92	9.	Sept	92
4.	Apr	84	10.	Oct	84
5.	May	96	11	Nov	98
6.	June	92	12.	Dec	86

Calculate the average monthly output.

OR

b) Calculate standard deviation and its coefficient of variation from the following data:

Measurements	0-5	5-10	10-15	15-20	20-25
Frequency	4	1	10	3	2

3. a) A bag contains 3 red balls and 2 white balls; a man is to draw two balls at random without replacement. He gains Rs. 20 for each red balls and Rs. 10 for each white one. What is the expectation of his draw?

OR

b) The following table gives the number of days in a 50-day period during which automobile accidents occurred in a city:

No. of accidents	0	1	2	3	4
No. of days	21	18	7	3	1

Fit a Poisson distribution to the data.

4. a) What is sampling? Explain the importance in solving a business problem. Critically examine the well-known methods of probability sampling and non-probability sampling.

OR

b) Safal, a tea manufacturing company is interested in determining the consumption rate of tea per household in Delhi. The management believes that yearly consumption per household is normally distributed with an unknown mean μ and standard deviation of 1.50kg.

i) If a sample of 25 household is taken to record their consumption of tea for one year, what is the probability that the sample mean is within 500g of the population mean?

ii) How large a sample must be in order to be 98 percent certain that the sample mean is within 500g of the population mean?

5. a) Use the graphical method to solve the following LP problem.

Maximize $Z= 15x_1+10x_2$

Subject to constraints

$4x_1+6x_2<=360$, $3x_1+0x_2<=180$, $0x_1+5x_2<=200$ and $x_1>=0$, $x_2>=0$.

OR

b) Determine an initial basic feasible solution to the following transportation problem by using LCM (Least cost Method), NWCC (North West corner cell method)

SOURCES		DESTINATIONS				SUPPLY
		D1	D2	D3	D4	
	A	11	13	17	14	250
	B	16	18	14	10	300
	C	21	24	13	10	400
	DEMAND	200	225	275	250	950/950

6. a) Solve the following game graphically:

PLAYER A		PLAYER B	
		B1	B2
	A1	1	2
	A2	4	5
	A3	9	-7
	A4	-3	-4
	A5	2	1

OR

b) Explain the following terms:

i. Two-person zero-sum game

ii. Principles of dominance

iii. Pure strategy in game theory.

SECTION – C

7. Case Study **1 x 10 = 10 M**

Determine an initial basic feasible solution to the following transportation problem by using Vogel's Approximation Method(VAM)

SOURCES		DESTINATIONS				SUPPLY
		D1	D2	D3	D4	
	A	19	30	50	10	7
	B	70	30	40	60	9
	C	40	8	70	20	18
	DEMAND	5	8	7	14	34/34