6302
M.B.A. 1ˢᵗ SEMESTER EXAMINATION, 2019
Paper – II
Quantitative Methods
Time: Three Hours

Maximum Marks: 80

PART – A (खण्ड – अ)   *[Marks: 20]*

Answer all questions (50 words each).

All questions carry equal marks.

सभी प्रश्न अनिवार्य हैं। प्रत्येक प्रश्न का उत्तर 50 शब्दों से अधिक न हो।

सभी प्रश्नों के अंक समान हैं।

PART – B (खण्ड – ब)   *[Marks: 40]*

Answer five questions (250 words each).

Selecting one from each unit. All questions carry equal marks.

प्रत्येक इकाई से **एक–एक** प्रश्न चुनते हुए, कुल पाँच प्रश्न कीजिए।

प्रत्येक प्रश्न का उत्तर 250 शब्दों से अधिक न हो।

सभी प्रश्नों के अंक समान हैं।

PART – C (खण्ड – स)   *[Marks: 20]*

Answer any two questions (300 words each).

All questions carry equal marks.

कोई **दो प्रश्न** कीजिए। प्रत्येक प्रश्न का उत्तर 300 शब्दों से अधिक न हो।

सभी प्रश्नों के अंक समान हैं।

PART – A

Q.1 (a) Find the sum of the series:

72 + 70 + 68 + ……….. + 40

(b) Find the sum of the series:

1 + 3 + 9 + 27 + ……… + to 10 terms.

(c) What do you understand by a Markov chain?

(d) What is Variance?

(e) What are the components of a time series?

(f) What is Correlation Analysis?

(g) Define Mutually Exclusive Events.

(h) Find the Binomial Distribution whose mean is 3 and variance is 2.

(i) Define Slack and Surplus variables in Linear Programming Problem.

(j) How you will identify optimality in maximization case of Linear Programming

Problem.

PART – B

UNIT –I

Q.2 The sum of first 13 terms of an A. P. is 21 and the sum of the first 21 terms is 13. Find the sum of the first 34 terms.

Q.3 The sum of four numbers in G. P. is 60 and the arithmetic mean of the first and last number is 18. Find the numbers.

UNIT –II

Q.4 Solve the following system of equations using matrix method.

$$2x - y + 3z = 9$$

$$x + y + z = 6$$

$$x - y + z = 2$$

Q.5 Find arithmetic mean, median and mode from the following data:

Class Interval	0 – 5	5 – 10	10 – 15	15 – 20	20 – 25	25 – 30	30 – 35
Frequency	9	12	15	20	12	8	4

UNIT –III

Q.6 In a partially destroyed laboratory on an analysis of correlation data, the following results only are legible:

Variance of x = 9

Regression equations:

$$8x - 10y + 66 = 0$$

$$40x - 18y = 214$$

Find out on the basis of the above information:

(i) Mean value of x and y

(ii) Correlation coefficient between x and y

(iii) Standard deviation of y

(iv) Estimate y when x = 10.

Q.7 What is trend? How would you find out the trend values by the method of least squares? Illustrate by a numerical example.

UNIT –IV

Q.8 What do you meant by Analysis of Variance (ANOVA)? State the assumptions and applications of ANOVA.

Q.9 (a) Enumerate various properties of a Normal Distribution.

(b) Hotel Deluxe maintains two luxury rooms in an experimental basis for hiring them out on daily basis. The demand for luxury rooms has been estimated to be 2 rooms per day at an average following Poisson distribution. Calculate the expected number of days in a year when:

(i) Neither of the rooms will be used.

(ii) Some demand will be refused because of full occupancy.

UNIT –V

Q.10 A company makes two kinds of leather belts. Belt A is high quality belt and belt B is of lower quality. The respective profits are ₹ 4 and ₹ 3 per belt. The production of each of type A requires twice as much time as a belt of type B, and if all belts were of type B, the company could make 1000 per day. The supply of leather is sufficient for only 800 belts per day (both A and B combined). Belt A requires a fancy buckle and only 400 per day are available. There are only 700 buckles a day for belt B. What would be the daily production of each type of belt? Formulate this problem as linear programming model and solve it by Simplex Method.

Q.11 Write short note on Basic Quantitative Methods Packages.

PART – C

Q.12 (a) Write short note on the Business applications of mathematical functions for managerial decisions.

(b) For a firm under perfect competition it is given that.

$$P = 19, C = \frac{x^3}{3} - 5x^2 + 28x + 27,$$

Where P is the price per unit, x is the units of output and C is the total cost of x units.

(i)   Find the quantity produced at which profit will be maximum and the amount of maximum profit.

(ii) What happens to equilibrium output and maximum profit if P = 12?

Q.13 A factory produces two types of electric lamps A and B. In an experiment relating to their life, the following results were obtained:

Length of Life (in hours):	500-700	700-900	900-1100	1100-1300	1300-1500
No. of Lamps (A) :	50	110	260	100	80
No. of Lamps (B) :	40	300	120	80	60

Using your knowledge of average and dispersion, list your conclusions.

Q.14 (a) Distinguish between correlation and regression analysis.

(b) Following are the figures of production (in thousand quintals) of a factory:

Year :	1995	1997	1998	1999	2000	2001	2004
Production:	77	88	94	85	91	98	90

(i) Fit a linear trend by least squares method by taking the year of origin at 1999.

(ii) Eliminate the trend. What components of the time series are thus left over?

(iii) What is the monthly increase/decrease in the production?

(iv) Estimate the production in 2005.

Q.15 (a) The customer accounts of certain Departmental Store have an average balance of

₹ 1000 with a standard deviation of ₹ 400. Assuming that the account balances are

normally distributed,

(i) What proportion of the accounts is more than ₹ 1600?

(ii) What proportion of the accounts is between ₹ 800 and ₹ 1600?

(b) The following mistakes per page were observed in a book:

No. of mistakes per page :	0	1	2	3	4
No. of times the mistakes occurred:	211	90	19	5	0

Fit a Poisson distribution to the above data.

Q.16 (a) What is the significance of duality theory of Linear Programming?

(b) A timber manufactures three types of plywood. The data below gives the

production hours per unit in each of three production operations, maximum time

available, and profit per unit:

Plywood	Operation (Hours)			Profit per unit (₹)
	I	II	III	
Grade A	2	2	4	40
Grade B	5	5	2	30
Grade C	10	3	2	20
Max Time Available:	900	400	600	

How many units of each grade of plywood should be produced to maximize the

total profit? Write the dual and use it to cheek the optimal solution.