

BUSINESS MATHEMATICS AND STATISTICS PAPER 4

OVERALL AIM

To equip the learner with skills and techniques to solve and interpret mathematical and statistical problems in a business/ organisational setting.

LEARNING OUTCOMES

On completion of this course, the learner should be able to:

| | Learning outcomes | K | C | A | An | S | E |
|----|---|----------|----------|----------|-----------|----------|----------|
| 1. | Explain concepts and techniques used in solving mathematical and statistical problems | ✓ | | | | | |
| 2. | Apply statistical techniques in planning for and control of resources | | | ✓ | | | |
| 3. | Apply differential calculus to optimise output and costs | | | ✓ | | | |
| 4. | Apply mathematical techniques to solve financial problems | | | ✓ | | | |
| 5. | Demonstrate an understanding of the applicability of measures of central tendency, dispersion and indices in business | | | ✓ | | | |
| 6. | Present information using tables, pictograms, pie charts, bar charts/ histograms and Ogives | | | ✓ | | | |
| 7. | Apply the knowledge of probability to solve business problems | | | ✓ | | | |

LEVEL OF ASSESSMENT

The examination will test learner's knowledge and ability to apply mathematical and statistical techniques to solve problems in business.

EXAMINATIONS STRUCTURE

There will be a three-hour examination made up of sections A and B. Section A will comprise 20 compulsory multiple-choice questions of 20 marks. Section B will comprise five questions of 20 marks each, of which the candidate will be required to attempt any four.

DETAILED SYLLABUS

A BASIC MATHEMATICS

1. Percentages and proportions
2. Indices
3. Formulae and substitution
4. Linear, quadratic and two-variable simultaneous equations

B MATRICES

1. Data within a matrix
2. Addition, subtraction and multiplication of matrices
3. Null, identity and inverse matrices
4. Solving problems using matrices

C SET THEORY

1. Concept of a set and subsets
2. Venn diagrams and their applications
3. Complement of a set, intersection and union of sets, universal set

D DIFFERENTIAL CALCULUS

1. Concept of differential calculus
2. Role of differential calculus
3. Differentiation:
 - (a) Methods of differentiation
 - (b) 1st and 2nd derivatives excluding 1st principles, exponential and logarithmic functions

4. Turning points and their application to profit, costs and revenue

E. FINANCIAL MATHEMATICS

1. Cash and trade discounts, commissions, mark-ups and margins
2. Simple and compound interest; effective interest rate; continuous compounding
3. Present and future values
4. Annuities:
 - (a) Sinking fund payments
 - (b) Present value of an annuity
 - (c) Amortisation
5. Depreciation and methods of depreciation, including straight line, reducing balance, revaluation, sinking fund, sum-of-digits and machine-hour

F DATA COLLECTION AND PRESENTATION

1. Types and sources of data
2. Data collection including methods of data collection
3. Sample data and population data; sampling techniques
4. Tabulation of data
5. Frequency distributions
6. Presentation of data using pictograms, pie charts, bar charts/ histograms and Ogives

G MEASURES OF LOCATION/ CENTRAL TENDENCY

1. Arithmetic mean, geometric mean, harmonic mean, mode and median
2. Estimating the mode and median graphically
3. Characteristics, merits and limitations of each measure of location

H DISPERSION AND SKEWNESS

1. Measures of dispersion and skewness
2. Relationship between measures of dispersion, location and skewness

I PROBABILITY

1. Concept of probability
2. Basic rules of probability
3. Conditional probabilities
4. Expected values and decision trees
5. Discrete and continuous random variables
6. Permutations and combinations
7. Normal probability distributions, including properties of a normal distribution, standardisation of variables and probabilities under a normal distribution curve

J INTRODUCTION TO INDEX NUMBERS

1. Uses and limitations of index numbers
2. Price and quantity indices

REFERENCES

1. ICPAU, Quantitative Techniques, Kampala.
2. Andre, F and Ben M., 2014. Business Mathematics and Statistics, 7th ed, Andover: Cengage Learning, Hampshire.
3. Doane, D., 2012. Applied Statistics in Business and Economics, 4th ed, New York: McGraw-Hill.
4. Shashi, K., 2010. Quantitative Techniques & Methods, Delhi India: Gyan Publishing house.
5. Vohra N.D, Hiteshi A., 2021. Quantitative Techniques & Methods, 6th ed, Delhi India: McGraw Hill.