



UNIVERSITY OF KELANIYA – SRI LANKA
Centre for Distance and Continuing Education
Faculty of Commerce & Management Studies

Bachelor of Commerce (Special) Degree First Year Examination (External) – 2023

May – 2025

BCOM E 1045 - Mathematics for Business

No. of questions: Seven (07)

Answer any five (05) questions

Time: 03 hours

Question No. 01

- a) Briefly explain how business mathematics can be used in the field of accounting and in the field of economics .

(04 Marks)

- b) Simplify the following expressions.

i. $\frac{8xy^2}{4xy} - \frac{6x^2}{12xy} + \frac{5xy}{10xy}$

ii. $4(3x-2) - 5(2x+1) = 6$

iii. $\left(\frac{8x^{-6}y^3z^7}{32x^{12}y^9z^4} \right)^{-6}$

(06 Marks)

- c) Solve following simultaneous equations and find the values of x,y,z.

$$4x + 2y - z = 35$$

$$-3x + y + 5z = 12$$

$$2x - 4y + 3z = 7$$

(05 Marks)

- d) Simplify the following using factorization knowledge.

$$\frac{x^2 - 64}{x^2 - 25} \div \frac{x^2 - 2x - 80}{x^2 + 10x + 25}$$

(05 Marks)

(Total 20 Marks)

Question No. 02

- a) A company produces two products, A and B. The profit from each unit of product A is Rs. 50, and from each unit of product B is Rs. 40. The total profit in a day is Rs. 6,200. The total number of units produced in a day is 160, and the number of units of product A is 10 more than twice the number of units of product B. Formulate a system of equations based on this information and find how many units of each product were produced?

(06 Marks)

- b) A manufacturer produces two types of tables: Standard and Deluxe. The cost to produce one Standard table is Rs. 2,000, and for one Deluxe table is Rs. 3,500. The company spends Rs. 118,000 on producing a total of 40 tables. If the profit on a Standard table is Rs. 800 and on a Deluxe table is Rs. 1,200, and the total profit from selling all 40 tables is Rs. 38,000, how many of each type of table did the company produce?

(06 Marks)

- c) A company conduct rent a car services using two packages as package A and package B of two methods of payment. Method A requires Rs: 6,500 per day and Rs: 65 per kilometer, and under the method B requires Rs: 11,375 per day and Rs: 39 per kilometer.
- Which method is cheaper for 300 kilometers of use in one day?
 - At what level of use per day are the costing methods equally expensive?
 - A competitor to the company charged Rs: 12,025 for a day's use during which 80 km were driven, and Rs: 12,900 for a day during which 120 km were driven. Assume the cost function to be linear and find the cost, (C), as a function of distance traveled, x.

(08 Marks)

(Total 20 Marks)

Question No. 03

- a) If the 5th term of an arithmetic progression is 23 and the 12th term is 65, what is the 20th term?

(03 Marks)

- b) The sum of the first 10 terms of an arithmetic progression is 320, and the 10th term is 50. Find the first term and the common difference.

(05 Marks)

- c) Sarah is carrying out a series of experiments which involve using increasing amounts of a chemical. In the first experiment she uses 6g of the chemical and in the second experiment she uses 7.8 g of the chemical. Given that the amounts of the chemical used form an arithmetic progression, find the total amount of chemical used in the first 30 experiments.

(06 Marks)

- d) A company launches a new product and decides to invest in advertising such that the advertising budget doubles every month. In the first month, the company spends Rs. 100,000 on advertising.

i. What is the advertising budget for the fifth (5th) month?

ii. What is the total advertising expenditure over the first six (06) months?.

(06 Marks)

(Total 20 Marks)

Question Number 04

- a). Differentiate the following function using first principles of differentiation.

i. $y = f(x) = x^3$ When $\lim_{h \rightarrow 0}$

(03 Marks)

ii. $\lim_{x \rightarrow 3} \left[\frac{x^2 (x^2 + 5x + 3)}{(x - 5)} \right]$

(03 Marks)

- b). Give that $TR = 80q - 3q^3$, derive MR function

(TR = Total Revenue , MR = Marginals Revenue)

(04 Marks)

- c). If a firm faces the total cost function $TC = 6 + 4q^2$ derive the Marginal cost function (MC)

(04 Marks)

- d). A firm faces the demand schedule $P = 184 - 4q$ and the Total cost function

$TC = q^3 - 21q^2 + 160q + 40$, calculate output maximize the profit

(06 Marks)

(Total 20 Marks)

Question Number 05

- a). Give two (02) examples in the fields of business can apply matrices practically.

(04 Marks)

- b). Explain the following matrices using two examples each.

- i. Square matrix
- ii. Identity matrix

(06 Marks)

- c). In a certain factory , manufacturing unit produces three types of television sets A , B and C
The following matrix shows television sales of two different cities.

$$\begin{matrix} & \begin{matrix} A & B & C \end{matrix} \\ \begin{pmatrix} 400 & 300 & 200 \\ 300 & 200 & 100 \end{pmatrix} \end{matrix}$$

If the cost of each set A, B, C is Rs.1000 , Rs.2000 and Rs.3000 respectively , and selling prices are Rs.15000 , Rs.30,000 and Rs.40,000 respectively. Find the total profit using matrix algebra.

(05 Marks)

d). If $A = \begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{pmatrix}$ and $B = \begin{pmatrix} 0 & 1 & 2 \\ 3 & 4 & 5 \end{pmatrix}$

Verify $(A + B) = (B + A)$

(05 Marks)

(Total 20 Marks)

Question Number 06

- a) Express the following linear equations system in matrix form $AX = B$

$$x + y + z = 7$$

$$x + 2y + 3z = 16$$

$$x + 3y + 4z = 22$$

(04 Marks)

b). Find the determinant of the matrix A of above equation system.

(06 Marks)

c). Solve the above equations system using Cramer's Rule.

(06 Marks)

d). If $A = \begin{pmatrix} 3 & 5 \\ 4 & 6 \end{pmatrix}$ and $B = \begin{pmatrix} -1 & 0 \\ 4 & 7 \end{pmatrix}$ Find the product of the matrices

(04 marks)

(Total 20 marks)

Question Number 07

a. Expand $\left(3x - \frac{1}{2}y\right)^4$ with the help of binomial theorem.

(05 Marks)

b. How many different words can be formed with the letters of "HARYANA"? In how many of these H and N are together? How many of these words begin with H and end with N?

(05 Marks)

c. Find the number of arrangement that can be made out of the letters of the word "ASSASSINATION"

(05 marks)

d. From six boys and 4 girls, 5 are to be selected to admission for a particular conference. In how many ways can this be done if there must be exactly 02 girls.

(05 marks)

(Total 20 marks)

