University of Kelaniya - Sri Lanka

Centre for Distance and Continuing Education

Faculty of Commerce & Management Studies

Bachelor of Business Management (General) Degree First Examination (External) – 2024

April / May 2026

BMGT E1055 - Mathematics for Business

No of questions – Eight (08) Time : 03 Hours

Answer any five (05) questions.

Non-programmable Calculators are allowed only.

Question No. 1

(a) (i) Define Business Mathematics and state its key objectives.

(05 marks)

(ii) Describe the role of mathematical concepts in solving business problems with relevant examples.

(05 marks)

(b) Categorize the following numbers into the correct categories; Natural, Whole, Integer, Rational, and Irrational, and provide a brief justification for each answer.

(i) -5

(ii) 0

(iii) 7

(iv) 3/4

(v) $\sqrt{2}$

(10 marks)

(Total 20 marks)

Question No. 2

(a) Solve the following equation for x

$x = \frac{4}{5}(x + 10)$

(05 marks)

(b) Express the following as a perfect square.

$6x^2 + 7x + 8$

(05 marks)

(c) Factorize the following expression.

$3(x-1)^2 - 12$

(05 marks)

(d) Solve the following pair of simultaneous equations.

$11x + 8y = 34$

$9x - 4y = 10$

(05 marks)

(Total 20 marks)

Question No. 3

(a) Simplify the expression, $\frac{a^{\frac{1}{5}} \times a^{\frac{2}{3}}}{a^{\frac{3}{5}}}$

(05 marks)

(b) Simplify the expression, $\sqrt[3]{\frac{2^3 \times 3^8}{3^2}}$

(05 marks)

(c) Solve the following logarithmic equation for x

$2\log_{10} x + \log_{10} 3 = \log_{10} 75$

(05 marks)

(d) Solve the following logarithmic equation for x

$\log_5(125x) = 4$

(05 marks)

(Total 20 marks)

Question No. 04

(a) A group consists of 4 girls and 7 boys. In how many ways can a team of 5 members be selected if the team has

(i) no girls

(02 marks)

(ii) at least one boy and one girl

(04 marks)

(iii) at least three girls

(04 marks)

(b) In a group of 150 people, 95 can speak English, 70 can speak French, and 40 can speak German. It is also known that:

- 45 people can speak both English and French
- 30 people can speak both English and German
- 25 people can speak both French and German
- 15 people can speak all three languages

Find:

(i) The number of people who can speak **only English**

(ii) The number of people who can speak **only French**

(iii) The number of people who can speak **only German**

(iv) The number of people who can speak **exactly two languages**

(v) The number of people who can speak **none of these languages**

(02 marks for each)

(Total 20 marks)

Question No. 05

(a) An auditorium has 20 seats in the first row, 24 seats in second row, and 28 seats in the third row, continuing the same pattern. If there are 30 rows in the auditorium,

(i) How many seats are in the last row?

(05 marks)

(ii) What is the total number of seats in the auditorium?

(05 marks)

(b) Each year a company gives a grant to a charity. The amount given each year increase by 5% of its value in preceding year. The grant in 2025 was Rs. 50,000.

Then find,

(i) the grant that will be given in 2030.

(05 marks)

(ii) the total amount of money given to the charity from year 2025 to 2030. (including 2025 and 2030)

(05 marks)

(Total 20 marks)

Question No. 06

(a) An investment of Rs.500,000 grows to Rs.1,500,000 in 8 years under annual compound interest. What is the annual interest rate?

(10 marks)

(b) How long, to the nearest year, will it take for an investment of Rs.20000 to reach Rs.31000 if it is invested at 5% per annum compounded quarterly? (Answer to the closet years)

(10 marks)

(Total 20 marks)

Question No. 07

(a) If, Demand Function is $p = 500 - 0.05x$ and Cost function is $C = 50x + 0.01x^2$. Find the revenue-maximizing output level.

(05 marks)

(b) The cost and revenue functions of a firm are given as follows:

$C(x) = 500+40x+0.05x^2$

$R(x) = 100x - 0.7x^2$

where x is the number of units produced and sold.

Required:

(i) Find the **marginal cost (MC)** and **marginal revenue (MR)** functions.

(ii) Determine the **profit function** P(x).

(iii) Determine the **output level that maximizes profit**.

(iv) Verify your above answer(iii) using the **second derivative test.**

(v) Find the maximum profit .

(02 marks for each)

(c) The marginal revenue function of a commodity is given by:

$MR=1200-4x^2-8x$

(i) Find the **total revenue function.**

(02 marks)

(ii) Determine the **corresponding demand function**.

(03 marks)

(Total 20 marks)

Question No. 08

(a) Matrices A and B are given below

$$A=\begin{bmatrix}3 & -5 & 1\\ 4 & 0 & 2\end{bmatrix} \quad B=\begin{bmatrix}5 & -2 & 1\\ 1 & -4 & 3\end{bmatrix}$$

Find,

i. $A+B$

(02 marks)

ii. A^T (transpose of A)

(03 marks)

(b) Find the product of the following matrices A and B

$$A=\begin{bmatrix}4 & 1\\ 3 & 2\\ 6 & 4\end{bmatrix} \quad B=\begin{bmatrix}1 & 2 & 2\\ 6 & 3 & 1\end{bmatrix}$$

(05 marks)

(c) Solve the following system of linear equations, using matrix inversion method.

$2x+y=24$

$3x+2y=8$

(10 marks)

(Total 20 marks)