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) – 2015

September - 2020

BMGT E1055 - Mathematics for Business

No. of Questions: Eight (08)   Time: 03 hours

Answer any 05 questions

Question No. 01

a)   Explain the importance of Business Mathematics in management?

(05 marks)

b)   Write brief notes on the following basic mathematical terms.

(i)   Whole numbers

(ii)   Number systems

(iii)   Integers

(05 marks)

c)   Identify and explain the importance of algebra from the business point of view.

(05 marks)

d)   Compare and constrast; linear, quadratic and cubic equations.

(05 marks)

(Total 20 Marks)

Question No. 02

a) Simplify the following expression.

$$\sqrt{x^2 + 33} = x + 3$$

(05 marks)

b) Solve the following equation, using completing the square method.

$$2x^2 - 8x - 5 = 0$$

(05 marks)

c) Factorize the following expression.

$$16 - (a + b)^2$$

(05 marks)

d) Solve the following pair of equations.

$$\frac{3}{x} + \frac{4}{y} = 5$$

$$\frac{1}{2x} - \frac{2}{3y} = \frac{13}{6}$$

(05 marks)

(Total 20 Marks)

Question No. 03

(a) State the properties of indices.

(05 marks)

(b) Find x, if $3^{2x-1} + 3^{2x+1} = 270$

(05 marks)

(c) Solve the following equation.

$$(\sqrt[3]{2})^{2x+7} = (\sqrt[4]{2})^{7x+2/3}$$

(05 marks)

(d) Find the value; $\log_5 8 + \log_5 10 - \log_5 20^2$

(05 marks)

(Total 20 Marks)

Question No. 04

(a)   Given the sets,

    A = {0,1,2,3,4,5,-1,-2,-3,-4,5}

    B = {-2,-4,0,2,4}

    C = {1,2,3,4,5}

    Find   (i)   A ∪ (B ∪ C)

            (ii)   (A ∩ C) ∪ B

(05 marks)

(b)   Expand $(1 + 2x)^4$ using the binomial theorem.

(05 marks)

(c)   Among a set of 5 black balls and 3 red balls, how many selections of 5 balls can be made such that at least 3 of them are black balls.

(05 marks)

(d)   From a group of 8 men and 5 women, five persons are to be selected to form a committee so that at least 3 men are there in the committee. In how many ways can it be done?

(05 marks)

(Total 20 Marks)

Question No. 05

A motorbike was purchased for Rs. 180,000 on 1st January 2020 by a person. On the 1st January each following year, the value of the motorbike is 80% of its value on the 1st January in the previous year.

a)   What is the value of motorbike exactly 4th year after it was purchased?

(05 marks)

b)   The value of the motorbike falls below Rs. 10000 for the first time n years after it was purchased. Find the value of n.

(05 marks)

c)   An insurance company has a scheme to cover the maintenance of the motorbike. The cost is Rs. 2000 for the first year, and for every following year, the cost increased by 12%, so that for the 3rd year, the cost of the scheme is Rs. 2508.80.

Find the cost of the scheme for the 5th year giving your answer to nearest rupees.

(05 marks)

d)   Find the total cost of the insurance scheme for the first 15 years.

(05 marks)

(Total 20 Marks)

Question No. 06

Rohini took a personal loan of Rs. 1000,000 and paid equally monthly payments for five years at an interest rate of 6% compounded monthly.

(a)   Find the monthly payment.

(05 marks)

(b)   Calculate the total interest charged.

(05 marks)

(c)   If Rohini fails to pay the first five monthly payments, find the amount she has to pay on the sixth payments in order to settle the outstanding arrears. (Assume there is no penalty charges)

(05 marks)

(d)   Find the outstanding principal balance if she decided to settle the loan immediately after the 50th payment.

(05 marks)

(Total 20 Marks)

Question No. 07

(a)   Differentiate the following function.

$$Y = \sqrt[3]{x^2}\,(2x - x^2)$$

(05 marks)

(b)   The weekly total cost function for a product is,

$$C = 100 + 23x + \frac{x^2}{2}$$

Where x is the number of tons produced. The weekly revenue function R is given by,

$$R = 100x - x^2 \text{ and } x < 100$$

(i)   Find the production levels at which profit is maximized.

(ii)   Find any break - even points.

(iii)   Find the output at which revenue would be maximized.

(15 marks)

(Total 20 Marks)

Question No. 08

(a)   Evaluate the given integral $\int (3 - x^2)^2 \, dx$

(05 marks)

(b)   If marginal revenue functions is, $MR = 20 - 5x + 3x^2$, find the demand function.

(05 marks)

(c)   A manufacturer's marginal revenue function is given by, $MR = 275 - x - 0.3x^2$. Find the increase in the manufacturer's total revenue if the production is increased from 10 to 20 units, by using definite integral calculus.

(05 marks)

(d)   The demand function for a product is, $P = 100 - 5q$. If equilibrium price is Rs. 40, find the consumer surplus.

(05 marks)

(Total 20 Marks)