SABARAGAMUWA UNIVERSITY OF SRI LANKA
FACULTY OF MANAGEMENT STUDIES

BSc DEGREE PROGRAMME IN BANKING & INSURANCE
YEAR I SEMESTER I EXAMINATION – SEPTEMBER/OCTOBER 2017

BUSINESS MATHEMATICS – BI 1134 ®

Time allowed: THREE (3) hours

Answer any FIVE (05) questions only.

1. Simplify

i $12 - [2x + 5\{3 - (2 - x)\} + 10]$

ii $10x^2 - 2xy - 3y^2 + (2x^2 - 3xy + 5y^2$

iii $9x^2 - 3x^2y - 4xy - (4x^2 - 2x^2y + 5xy)$

iv $(x + 3)(x^2 - 5)$

v $3x + 12y - 15z$

vi $8x^4 - 128$

vii $32a^3 - 4$

viii $3x^2 + 10x + 3$

ix $\frac{3x^2}{x^2 - 1} - \frac{x + 4}{x^2 - 1}$

x $\frac{3}{y - 2} - \frac{2}{y + 2} - \frac{4}{y^2 - 4}$

(20 Marks)

2 Solve

i $3x - 4(2 - x) = 3(x - 2) - 4$

ii $x^2 + 8x + 15 = 0$

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

iv $x^2 + y^2 = 13$
$4x + y = 5$

v $9^3 + 3^x = 81$

(20 Marks)

3 i Mr. Kamal is waiting for a job which has a basic salary of Rs. 18000/= per month. He is entitled a salary increment of Rs. 900/= per annum. Calculate his salary at year five and total salary for first 05 years. (05 Marks)

ii A company is increasing their profit 10% per annum. It's profit of the year one is Rs. 3.5 million. Calculate the profit of year 10 and the total profit for first 10 years. (05 Marks)

iii A commercial bank calculates interest monthly. Their compound rate of interest is 18% per annum. If a customer wish to deposit a sum of Rs. 10,000/= end of each month for next 05 years, find the total sum he would receive. (05 Marks)

iv A person obtained a leasing facility to purchase a motor vehicle of Rs. 10 million at a compound rate of interest of 20% per annum. The term of the lease is 05 years. You are required to calculate the value of monthly installment. (05 Marks)

4 i Find the turning points of the function of $Y = 3x^4 + 4x^3 - 12x^2 + 60$ and state whether they are maximum or minimum depicting a rough graph. (10 Marks)

ii Differentiate followings.

a) $Y = (2x^3 + 2)(3x^2 - x)$

b) $Y = \left(\frac{5x - 3x^2}{3x - 5x^2}\right)$

c) $Z = (3x^2 + 2)^3$

d) $Y = 5x^3 + 7x^2 - 8$

(10 Marks)

5 i A company identified the relationship in between the price of the product and the quantity of sales as follows.

Price (Rs.)	Quantity (Units)
12	60
6	120

Assuming that the relationship in between the price and the quantity is linear and the fixed cost per week is Rs. 60/= and variable cost per unit is Rs. 3/= per unit, you are required to derive the Total Cost Function, the Total Revenue Function and the Total Profit Function. (10 Marks)

ii A demand function of a producer is $8q = 1600 - 2p$ and the total cost function is $TC = 0.8q^2 + 16q + 1600$. (P and TC given by Rupees). You are required to determine the optimum level of production which maximizes the profit and the price of the product at the profit maximization. (10 Marks)

6 i A company understand that their marginal cost function and marginal revenue functions as follows.

MC = 400 - 0.8q

MR = 400 - 0.4q

a) If the volume of turnover increased from 20 to 60 units, calculate the total increase in the total revenue.

b) What is the total revenue in selling 80 units?

c) If the fixed cost is Rs. 20,000/= calculate the total cost of producing 100 units. (10 Marks)

ii A company estimated their demand function as $P = -q + \frac{15}{2}$ and supply function as $P = \frac{q^2}{2}$

You are required to calculate producer surplus and consumer surplus. (10 Marks)