REFORMED CHURCH UNIVERSITY

FACULTY OF COMMERCE

Bachelor of Commerce Honours Degree in Business Management

Business Mathematics

HBUM 102/HLSM 108

Part 1 Semester 1 Examination

Total Marks [100]

Date: November 2019

Time: 3 Hours

INSTRUCTIONS

1. This paper has ***six (6)*** questions
2. Answer question ***one (1)*** and ***any*** other ***three (3)***
3. Each question carries ***25 marks***
4. Start each question on a new page
5. Use of non-programmable scientific calculators is permissible

1. (a) Explain the benefits a Business Manager derives from the knowledge of Business Mathematics. (10)

(b) Four pencils and 6 pens cost $2.72. 6 pencils and 5 pens cost $3.28. Calculate the cost of each pencil and each pen. (8)

(c) A chicken farmer discovers that he incurs fixed cost of 20 000. Each chicken costs $4 to produce and will sell for $9.

(i) Formulate the cost and revenue equations. (2)

(ii) Hence. Calculate the farmer's break even-point. (5)

2. (a) Giving relevant examples, briefly explain the importance of linear programming. (5)

(b) Two products Alfa and Beta are to be manufactured with unit profits of $80 and $70 respectively. Maximum material available is 120kg while maximum labour available is 192 man hours. Each unit of Alfa needs 4kg of material and 6 man-hours, whereas each unit of Beta needs 8kg of material and 6 man-hours. Find the optimal units of Alfa and Beta to be manufactured in order to maximise profits. (20)

3. (a) Distinguish between

(i) Simple interest and compound interest (3)

(ii) Present value and, maturity value (2)

(b) (i) Find the maturity value of $600 invested for 3 years at 15% per annum simple interest. (5)

(ii) How much would you have to deposit in an account today to have $6 000 in 3 year term deposit at maturity if interest is 12% per annum compounded quarterly. (5)

(c) What quarterly payment is required to pay off a loan of $5 000 in 3 years if interest is compounded quarterly. (10)

4. (a) Define a sinking fund. (3)

(b) A business firm plans to purchase a new machine valued at $10 000 in 5 years' time. To accumulate this sum, it will make annual deposits in a sinking fund. How much should each deposit be if:

(i) The fund did not earn interest? (4)

(ii) The fund earns interest at the rate of 4% compounded annually? (6)

(c) Construct a sinking fund schedule. (12)

5. During the past 10 years, a firm owned two stocks that had the following rates of return.

Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Stock A %	19	8	-12	-3	15	18	20	-10	-6	15
Stock B %	8	3	-9	2	4	5	10	12	8	11

(a) Compute the mean annual rate of return for each stock. (6)

(b) Compute the standard deviation of annual rates of return for each stock (10)

(c) Compare the coefficient of variation of rates of return for each stock. (6)

(d) Which of the above stocks is more risky? Justify your answer. (3)

6. An ice cream vendor was interested in the relationship between daily sales of ice cream and maximum daily temperature.

Maximum Temperature	26	24	28	24	23	30	15	12
Sales ($)	48	27	45	30	20	54	18	16

(a) Draw a scatter plot of the data and comment on the relationship shown. (8)

(b) Estimate the OLS regression equation. (7)

(c) Interpret the slope coefficient of the regression equation. (3)

(d) Find the coefficient of determination and comment on its magnitude. (7)

End of paper