



**ALUPE UNIVERSITY  
COLLEGE**  
*Bastion of Knowledge...*

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OFFICE OF THE DEPUTY PRINCIPAL  
ACADEMICS, STUDENT AFFAIRS AND RESEARCH

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## UNIVERSITY EXAMINATIONS

### 2017 /2018 ACADEMIC YEAR

FIRST YEAR SECOND SEMESTER REGULAR EXAMINATION

**FOR THE DEGREE OF BACHELOR OF BUSINESS  
MANAGEMENT**

**COURSE CODE:           BBM 123**

**COURSE TITLE:         BUSINESS MATHEMATICS II**

**DATE: 19<sup>TH</sup> APRIL, 2018**

**TIME: 9 AM – 12 PM**

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### INSTRUCTION TO CANDIDATES

- SEE INSIDE

**THIS PAPER CONSISTS OF 4 PRINTED PAGES**

**PLEASE TURN OVER**

**BBM 123: BUSINESS MATHEMATICS II****STREAM: BBM****DURATION 3 HOURS****INSTRUCTIONS TO CANDIDATES**

- i. Answer Question **ONE** and any other **TWO** questions.
- ii. Question **ONE** carries **30 Marks**
- iii. Do not write on the question paper

**SECTION A****Question One**

Prior to privatization, the most recent annual sales and profit data (Shs. Million) for distribution of power to some selected towns in Kenya were as follows:

Town	Sales (Shs. Million)	Profit (Shs. Million)
Yala	5	11
Kitale	12	16
Mombasa	14	15
Eldoret	16	20
Kisumu	18	17
Kericho	21	19
Lodwar	22	25
Nakuru	23	24
Nairobi	25	21

- a) Calculate the product moment correlation coefficient between the annual sales and the profit. (12 Marks)
- b) Briefly comment on your results. (2 Marks)
- c) Explain why the existence of a significant correlation does not imply causation. (2 Marks)
- d) Briefly explain two uses of Spearman's rank correlation coefficient. (4 Marks)

**Question Two**

- a) Distinguish between marginal cost (MC) and marginal revenue (MR). (2 Marks)
- b) Give two uses of differentiation. (2 Marks)
- c) Your company manufactures large scale units. It has been shown that the marginal (or variable) cost, which is the gradient of the total cost curve, is  $(92 - 2x)$  Shs. thousands, where

$x$  is the number of units of output per annum. The fixed costs are Shs. 800,000 per annum. It has also been shown that the marginal revenue which is the gradient of the total revenue is  $(112 - 2x)$  Shs. thousands.

Required

- i. Establish by integration the equation of the total cost curve (3 Marks)
- ii. Establish by integration the equation of the total revenue curve (3 Marks)
- iii. Establish the break even situation for your company (3 Marks)
- iv. Determine the number of units of output that would
  - a) Maximize the total revenue and (3 Marks)
  - b) Maximize the total costs, together with the maximum total revenue and total costs (4 Marks)

**SECTION B**



**Question Three**

The following two capital projects, involve the purchase, use and final disposal of two machines X and Y.

	Initial Cost	Net cash flows			
		Year 1	Year 2	Year 3	Year 4
Machine X	100,000	50,000	49,000	35,000	30,000
Machine Y	90,000	25,000	30,000	40,000	80,000

**NB:** Year 4 includes scrap values of Shs.10,000 for Machine X and Shs.8,000 for machine Y.

Choose between the two projects using each of the following methods in turn:

- a) Net Present Value- using a cost of capital of 20% (and 26%). (10 Marks)
- b) Internal Rate of Return- estimate its value using the results of a). (5 Marks)

**Question Four**

The following set of data shows the number of tourists visiting Kenya in three years.

Quarter	Year 1				Year 2				Year 3			
	1	2	3	4	1	2	3	4	1	2	3	4
Passengers (millions)	2.2	5.0	7.9	3.2	2.9	5.2	8.2	3.8	3.2	5.8	9.1	4.1



- a) Calculate a set of trend values using the method of semi-averages. (12 Marks)
- b) Briefly explain three advantages of using method of semi average in obtaining a time series trend. (3 Marks)

**Question Five**

- a) Differentiate between an amortized debt and a depreciation fund. (4 Marks)
- b) A debt of Shs. 5,000,000 with interest of 10% compounded half-yearly is amortized by equal semi-annual payments over the next three years.
  - i) Find the value of each payment. (5 Marks)
  - ii) Construct an amortization schedule. (6 Marks)
  - iii)

**Question Six**

- (a) Explain the following terms as used in index numbers:
  - (i) Price index (1 mark)
  - (ii) Quantity index (1 mark)
  - (iii) Composite index (1 mark)
  - (iv) Value index (1 mark)
- (b) The following prices and quantities reflect the average weekly consumption pattern of a certain family for the years 2014 and 2015.

Item	Year 2014		Year 2015	
	Price (p <sub>0</sub> ) Sh.	Quantity (q <sub>0</sub> )	Price (p <sub>1</sub> ) Sh.	Quantity (q <sub>1</sub> )
Sugar (kg)	30	4	50	2
Petrol (Litres)	60	4	70	4
Mangoes (Piles)	60	6	80	6
Pens (Dozens)	100	2	130	2

Required:

- (i) Price relatives for each item  $\frac{p_1}{p_0} \times 100$  (3 marks)
- (ii) Laspeyres price index  $\frac{\sum p_1 q_0}{\sum p_0 q_0} \times 100$  (4 marks)
- (iii) Paasche price index  $\frac{\sum p_1 q_1}{\sum p_0 q_1} \times 100$  (4 marks)

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