



MUEO

MOI UNIVERSITY

**OFFICE OF THE DEPUTY VICE CHANCELLOR, ACADEMIC
AFFAIRS, RESEARCH & EXTENSION**

**UNIVERSITY EXAMINATIONS
2013/2014 ACADEMIC YEAR**

FIRST YEAR END OF SEMESTER I/II EXAMINATIONS

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

EXAM CODE:- BBM 108

COURSE TITLE:- BUSINESS MATHEMATICS II

DATE:- 27TH FEBRUARY, 2014

TIME:- 9.00A.M. - 12.00 NOON.

INSTRUCTION TO CANDIDATES

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BBM 108: BUSINESS MATHEMATICS II
MAIN EXAMINATION

INSTRUCTIONS:-

- Answer Question **ONE** and any other **THREE** questions.
- Question **ONE** carries **25 Marks**

QUESTION ONE – Compulsory [25 marks]

- (a) Explain the meaning and significance of correlation. [5 marks]
- (b) Distinguish between nominal and effective interest rates. [2 marks]
- (c) Briefly explain how Time Series Analysis plays a significant role in business decision making. [4 marks]
- (d) Distinguish between fixed base relatives and chain base relatives as used in time series. [4 marks]
- (e) The table below shows rankings of a group of employees in order of potential to perform managerial tasks by two assessors.

Employee	Ranking by Assessor I	Ranking by Assessor II
A	9	10
B	4	2
C	2	1
D	3	4
E	1	3
F	5	6
G	6	5
H	8	8
I	7	7
J	10	9

Required:

Compute the coefficient of rank correlation and comment on the value.

[10 marks]

QUESTION TWO

(a) Give **two** differences between Regression and Correlation. **[4 marks]**

(b) The following table shows the test scores obtained by salespersons on an intelligence test and their weekly sales.

Salespersons	1	2	3	4	5	6	7	8	9	10
Test score	5	10	15	20	30	30	30	50	50	60
Sales (Kshs '000')	190	240	250	300	310	335	300	300	350	395

Required:

- (i) Find the least regression line of sales on test score and use this to predict sales for a salesperson scores 40 in the test. **[10 marks]**
- (ii) If the company would want to recruit salespersons that would make sale turnover above Kshs 400 000, what should be the minimum cut-off in the test score?

[1 marks]

QUESTION THREE

In the beginning of the New Year, a company has to make a decision regarding one of its machines, M_1 , which has its current market value of Shs 30,000. There are three possibilities.

- (i) Sell M_1 and buy new machine costing Shs 150,000;
- (ii) Overhaul and upgrade M_1 ;
- (iii) Continue with M_1 as at present.

Relevant data on these decisions are as given below:

Decision	Initial Outlay (Kshs)	Economic Life Years	Resale value after 5 years (Kshs)	Annual service contract plus operating cost (payable annually in advance) (Kshs)
(i)	150,000	5	20,000	40,000
(ii)	50,000	5	20,000	54,000
(iii)	0	5	0	64,000

Required:

Using the concept of Net Present Value (NPV), find which decision would be in the best financial interest of the company, stating why, and including any reservations and assumptions. Assume the appropriate rate of interest to be 12% and ignore taxation.

[15 marks]

QUESTION FOUR

ABC Ltd is a large-scale manufacturer of a certain product. It has been established that the Marginal Cost is $(92-2x)$ thousands shillings, where x is the number of units of output per annum. The fixed costs are Shs 800,000 per annum. It has also been established that the marginal revenue is $(112-2x)$ thousands shillings

Required:

- (a) Establish the equation of the total cost curve. [3 marks]
- (b) Establish the equation of the total revenue curve. [3 marks]
- (c) Establish the break-even point for the company. [2 marks]
- (d) Determine the number of units of output that would:
 - (i) Maximise the total revenue. [2 marks]
 - (ii) Maximise the total costs. [2 marks]

(e) Assume that the company cannot manufacture more than 60 units of output per annum, what interpretation can be put on the results obtained in part (d) above? [you may sketch the total revenue and cost curves]

[3 marks]

QUESTION FIVE

(a) Briefly explain two commercial, industrial or business uses of index numbers.

[2 marks]

(b) You have been requested by Uasingishu governor to research into the areas of salaries paid to a section of its employees, and prepare a report for a pay review to be carried out. The following table shows salaries together together with the retail price index (or consumer price index) for the years 2005 - 2013

Year	Average Salary (Kshs)	Retail Price Index (2003 = 100)
2005	9,500	135.1
2006	10,850	146.2
2007	13,140	165.8
2008	14,300	165.8
2009	14,930	218.8
2010	15,580	237.7
2011	16,200	248.6
2012	16,800	261.0
2013	17,500	276.8

Required:

- (i) Tabulate the percentage increases on a year earlier for the average salary and the retail price index. [6 marks]
- (ii) Revalue the average salary for each year to its equivalent 2013 value using the retail price index. [5 marks]
- (iii) Using the results from (i) and (ii) above, comment on the average salary of the employees in the county. [2 marks]

QUESTION SIX

- (a) At the beginning of each year a company sets aside Shs 10,000 out of its profits to form a reserve fund. This is invested at 10% per annum compound interest. What will be the value of the fund after four years? [3 marks]
- (b) A new machine is expected to last for four years and to produce year end savings of shs 2,000 per annum. What is its present value, allowing interest at 7% per annum? [3 marks]
- (c) On 1st January, 2010 , Shs 100,000 was invested. It remained invested and on 1st January of each successive year, Shs. 10,000 was added to it. What sum will have accumulated by 31st December, 2014 if interest is compounded each year at 10% per annum? [3 marks]
- (d) Shs. 200,000 is borrowed from a Micro-finance institution, repayable over 20 years at 14% per annum compound interest. How much must be repaid each year? [3 marks]
- (e) A debt of Shs. 50,000 with interest at 5% compounded 6-monthly is amortised by equal semi-annual payments over the next three years. Find the value of each payment. [3 marks]

END