MUEO

MOI UNIVERSITY

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

UNIVERSITY EXAMINATIONS

2020/2021 ACADEMIC YEAR

END OF SEMESTER EXAMINATIONS

FOR THE DEGREE
IN BACHELOR OF BUSINESS MANAGEMENT

EXAM CODE:- **BBM 123**

COURSE TITLE:- **BUSINESS MATH II**

DATE:- 11TH AUGUST, 2021 **TIME:-9.00A.M. – 12.00NOON**

INSTRUCTION TO CANDIDATES

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BBM 123: BUSINESS MATHEMATICS II
MAIN EXAMINATION

INSTRUCTIONS:-

- *Answer **Questions ONE** any other **THREE.***
- ***Question One** carries 25 Marks.*
- *Time allowed: **3 hours***

QUESTION ONE – Compulsory [25 marks]

(a) Briefly explain **three** uses of forecasts in business management. **[3 marks]**

(b) "Correlation does not mean causation". Explain. **[3 marks]**

(c) Explain how differentiation and integration is used in business decision making. **[4marks]**

(d) Wanjiku made 36% loss on selling stock and as a result she lost Ksh 30,480 of what had been her buying price. What should have been her selling price if she was to make a 25% profit? **[3marks]**

(e) A firm plans to invest an amount of money at the beginning of every year in order to accrue a sum of Shs 1,000,000 at the end of a five year period. What is the value of the amount, if the investment rate is 14%? **[4 marks]**

(f) A fixed asset having a useful life of 3 years is purchased on 1 January 2014. Cost of the asset is Sh. 200,000 whereas its residual value is expected to be Sh 50,000. Calculate depreciation expense for the years ending 30 June 2014 and 30 June 2015. **[4 marks]**

(g) A company negotiates a loan of Sh 2,000,000 over 15 years at 10.5% per annum. Calculate the annual payment necessary to amortize the debt. **[3 marks]**

(h) In a beauty competition two assessors were asked to assess 10 contestants using the professional assessment skills. The scores (%) obtained were given as shown in the table below.

Contestants	1st assessor	2nd assessor
A	92	67
B	82	88
C	60	58
D	87	80
E	72	69
F	60	77
G	52	58
H	50	60
J	47	32
K	59	54

REQUIRED

Calculate the rank correlation coefficient and hence comment briefly on the value obtained. **[5 marks]**

[Total: 25 marks]

QUESTION TWO– [15 marks]

A manufacturer estimates that that the demand curve of the firm for a particular season is estimated to be;

AR=200-8Q

Where AR is average revenue in millions of shillings and Q is the output in units.

Investigation of the firm's cost profile shows that marginal cost (MC) is given by:

$MC=Q^2-28Q+211$ (in million shillings)

Further investigations have shown that the firm's cost when not producing output is sh.10 million.

Required:

(i) The equation of total cost. (3 marks)

(ii) The equation of total revenue (2 marks)

(iii) An expression for profit (2 marks)

(iv) The level of output that maximizes profit. (4 marks)

(v) The equation of marginal revenue. (2 marks)

[Total: 15marks]

QUESTION THREE – [15 marks]

XYZ Company Limited invests in a particular project and it has been estimated that after X months of running, the cumulative profit (Sh.'000') from the project is given by the function $10x-x^2-5$, where x represents time in months. The project can run for eleven months at most.

Required:

i) Determine the initial cost of the project. **[4 marks]**

ii) Calculate the break-even time in months for the project. **[4 marks]**

iii)Determine the best time to end the project. **[4 marks]**

iv)Determine the total profit within the break-even points. **[2 marks]**

{Total: 15 marks}

QUESTION FOUR– [15 marks]

(a) Give **two** uses and **two** limitations of index numbers. **[4 marks]**

(b) A company manufacturing a product known as *Kiboko* which uses five components in its assembly. The quantities and prices of the components used to produce a unit of *Kiboko* in 2013, 2014 and 2015 are tabulated as follows:

COMPONENT	2013		2014		2015	
	Prices	Quantity	Prices	Quantity	Prices	Quantity
A	10	3.12	12	3.17	14	3.20
B	6	11.49	7	11.58	5	11.67
C	5	1.40	8	1.35	9	1.31
D	9	2.15	9	2.14	10	2.63
E	50	0.32	53	0.32	57	0.32

Required:

(i) Calculate Laspyere's type price index number for the cost of one unit of *Kiboko* for 2014 and 2015 based on 2013. **[4 marks]**

(ii) Calculate Paasche type price index numbers for the cost of one unit of *Kiboko* for 2014 and 2015 based on 2013. **[4 marks]**

(iii) Compare and contrast the Laspeyre and Paasche price-index numbers you have obtained in (i) and (ii). **[3 marks]**

QUESTION FIVE– [15 marks]

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

Machines	Initial Cost	Net cash flows			
		Year 1	Year 2	Year 3	Year 4
Machine A	100,000	51,000	49,000	34,000	28,000
Machine B	90,000	25,000	31,000	42,000	76,000

Note that year 4 includes scrap value of Shs 10,000 for machine A and Shs 8,000 for machine B.

Required:

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

(a) Net present value when the cost of capital is 22% and 28 %. **[10 marks]**

(b) Estimate the Internal Rate of Return (IRR) using the results obtained in part (a) above. **[5 marks]**

QUESTION SIX– [15 marks]

The following table relates to the yearly maintenance cost (in Shs '000') to the age (in years) of nine machines of similar type in a manufacturing company.

Machine	1	2	2	4	5	6	7	8	9
Age (x)	2.3	1.7	4.2	3.3	5.2	6.0	7.3	8.4	5.6
Cost (in Sh '000') (y)	230	150	450	310	550	590	740	850	530

Required:-

(a) Find the least squares regression line of maintenance cost on age. **[11 marks]**

(b) Use the regression equation to:

(i) Estimate the cost of a machine which is 4.5 years old. **[2 marks]**

(ii) Estimate the expected average age of a machine whose costs is Sh. 900,000 **[2 marks]**

END