

KABARAK



UNIVERSITY

EXAMINATIONS

2008/2009 ACADEMIC YEAR

**FOR THE DEGREE OF BACHELOR OF BUSINESS
MANAGEMENT & INFORMATION TECHNOLOGY**

COURSE CODE: BMIT 122

COURSE TITLE: BUSINESS MATHEMATICS

STREAM: Y1S2

DAY: WEDNESDAY

TIME: 9.00 – 12.00 P.M.

DATE: 18/03/2009

INSTRUCTIONS:

- i. Answer Question **One** and Any **Other Three** questions.*
- ii. All Workings Leading to Answers Must Be Clearly Shown*
- iii. Tables are provided at the end.*

PLEASE TURN OVER

QUESTION ONE: (Compulsory) (40 Marks)

a) Evaluate

$$\lim_{x \rightarrow 1} \frac{x^2 - 1}{1 - x} \quad (3\text{Mks})$$

b) How long does it take money to double if it is invested at a rate of 30% compounded annually? **(3Mks)**

c) A televised talk will include 4 women and 3 men as panelists.

i. In how many ways can the panelists be seated in a row of 7 chairs? **(2Mks)**

ii. In how many ways can the panelist be seated if the men and women are to be altered **(2 Mks)**

d) Given the sets $U = \{x \mid x \text{ is a positive integer } \leq 20\}$

$$A = \{5, 10, 15, 17\} \quad B = \{2, 4, 6, 8, 10\} \quad \text{and} \quad C = \{1, 5, 9, 15, 17\}$$

Find

i. $A \cap B$ **(1Mk)**

ii. $A' \cap B'$ **(3Mks)**

iii. $(A \cap B \cap C)'$ **(3Mks)**

iv. $A' \cup C'$ **(2Mks)**

e) Given a normal distribution where $\mu = 50$ and $\delta = 8$. Determine Z values corresponding to

i. 56

ii. 42

iii. 66

iv. 75 **(4Mks)**

f) Determine the average rate of change in the value of y moving from $x = 1$ and $x = 2$ from the function $y = f(x) = x^2 - 2x + 3$ **(2Mks)**

g) Determine $\int_2^4 (8x^3 + 6x^2 - 10x + 5) dx$ **(2Mks)**

h) The following marks were scored by 20 students in BMIT 122

79 52 93 61 74 63 77 68 82 55 74 72
84 64 79 55 72 80 67 75.

Using a suitable class interval, represent the data in a frequency table **(2Mks)**

i) Evaluate $|A|$ given

$$A = \begin{bmatrix} 4 & 6 & 3 \\ 2 & 8 & 4 \\ 1 & 6 & 2 \end{bmatrix}$$

- i) Mutually exclusive events. **(2Mks)**
- ii) Collectively exhaustive events **(2mks)**
- iii) Diagonal matrix **(1mk)**
- iv) Differentiation **(1Mk)**

QUESTION TWO (OPTIONAL)

(a) Solve for x, y, and z in the following simultaneous equations using matrices.

$$2x + y + z = 3$$

$$4x + 3y + 2z = 2$$

$$2x - y - z = 1$$

(7Mks)

(b) In a certain exam, 50% of the students passed Mathematics, 62% passed History, 63% passed Psychology, 22% passed Mathematics and History, 27% passed Mathematics and Psychology, 35% passed Psychology and History and 4% passed none of the three subjects.

What percentage of the students

- i. Passed in all the 3 subjects **(6Mks)**
- ii. Passed Mathematics and History but not Psychology **(2Mks)**
- iii. Passed only one subject **(2Mks)**

(c) Determine whether the following are prepositions

- i. Go down Moses! **(1Mk)**
- ii. The gross National product regulates will be less than 1 trillion dollars in 2015. **(1Mk)**
- iii. Where will be the next meeting? **(1Mk)**

QUESTION THREE (OPTIONAL)

a) Define the following terms

- i. Zero or Null matrix **(1Mk)**
- ii. Sample space **(1Mk)**
- iii. An event **(1Mk)**
- iv. A sequence **(1Mk)**

b) Evaluate the following leaving your answer in $\sqrt{a} + \sqrt{b}$.

- i. $\sin 75^\circ$ (3Mks)
 - ii. $\cos 15^\circ$ (3Mks)
- c) Using the data below for the retirees, determine
- i. Mean (2Mks)
 - ii. Median (2Mks)
 - iii. Mode (2Mks)
 - iv. SD (4Mks)
- | Class | Frequency |
|--------|-----------|
| 20- 29 | 5 |
| 30-30 | 18 |
| 40-49 | 42 |
| 50- 59 | 27 |
| 60- 67 | 8 |

QUESTION FOUR (OPTIONAL)

- a) Investigate the continuity of the function $y= 3x$ (3Mks)
- b) In a certain group of 75 students, 16 students are taking Psychology, Geology and English. 24 students are taking Psychology and Geology, 30 students are taking Psychology and English, 22 students are taking Geology and English. However 7 students are only taking Psychology, 10 are taking only Geology and 5 are taking only English.
 - i. How many of the students are taking Psychology? (2Mks)
 - ii. How many of the students are taking Psychology and English but not Geology? (3Mks)
 - iii. How many students in this group are not taking any of the three subjects? (2Mks)
- c) Distinguish between type I and type II errors. (4Mks)
- d) A lot of 8 items is known to have three defective and five good items. A random sample of these items is chosen. Assuming that it is not replaced in the lot, what is the probability that sample will have
 - i. All the 3 items defective (2Mks)

ii. Two defective and one good (2Mks)

iii. All the 3 items good (2Mks)

QUESTION FIVE (OPTIONAL)

a) Discuss four properties of a good estimator. (4Mks)

b) In an NGO, a population is normally distributed with a Standard Deviation of 50. A random sample size of 25 is drawn from the population and the sample mean of 70 is calculated. Test at 1% level of significance that the population mean is 100. (6Mks)

c) A sum of Kshs. 100,000 is invested at a rate of 6%. If all the interest is re-invested, what will be the value of the investment after 5 year if the interest is compounded

i. Annually (2Mks)

ii. Semi-annually (2Mks)

iii. Quarterly (2Mks)

d) Differentiate the following function using the first principles

$$Y = 3x^2 + 4x + 20 \quad (4Mks)$$

QUESTION SIX (OPTIONAL)

a) Show that the rational function $f(x) = \frac{x+1}{x-2}$

is continuous at $x = 3$ (3Mks)

b) Prove that $\sqrt{2}$ is irrational (8Mks)

c) An enterprise produced 600 units in the 3rd year of existence and 700 units in its 7th year.

i. What was the initial production in the first year? (2Mks)

ii. What was the production in the 5th year? (2Mks)

d) What is an annuity? (2Mks)

e) Christine has Kshs. 20,000 which she want to invest in a bank giving interest at a rate of 15%.how long will it take for the money to grow to Kshs. 150,000 compounded annually? (3Mks)