

**KABARAK**



**UNIVERSITY**

**UNIVERSITY EXAMINATIONS**

**2009/2010 ACADEMIC YEAR**

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

**COURSE CODE: BMIT 122**

**COURSE TITLE: BUSINESS MATHEMATICS**

**STREAM: Y1S2**

**DAY: WEDNESDAY**

**TIME: 3.00 – 6.00 P.M.**

**DATE: 07/04/2010**

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**INSTRUCTIONS:**

- Answer question ONE and any other THREE questions
- Begin each question on a separate page
- Show your workings clearly

**PLEASE TURNOVER**

### **QUESTION ONE (40 MARKS)**

- a) Use laws of logic to classify the following expressions as tautologies or contradictions
- i)  $(P \wedge \neg q) \vee (\neg p \vee q)$  (4 marks)
- ii)  $[p \rightarrow (q \rightarrow p)] \Leftrightarrow (p \wedge \neg p)$  (4 marks)
- b) Consider the relation less than on the set  $A = \{1, 2, 3, 4\}$
- i) List all the ordered pairs for which the relation is true (2 marks)
- ii) Draw the graphical representation of the relation less than (3 marks)
- iii) Write down the relation matrix for the relation (3 marks)
- c) A random sample of 25 with a mean of 80 and a standard deviation of 30 is taken from a population of 1000. Find an interval estimate for the population mean at (i) 95% (ii) 99% confidence intervals. (6 marks)
- d) Differentiate the following by first principles
- i)  $f(x) = 4x^2 + 4$  (4 marks)
- ii)  $f(x) = 3x^2 + 5x - 2$  (4 marks)
- e) Find the limits of the following functions
- i)  $\lim_{x \rightarrow \infty} \left( \frac{5x^3 + 3}{3x^2 - 2} \right)$  (3 marks)
- ii)  $\lim_{x \rightarrow 3} \left( \frac{x^3 - 4x}{x^2 + 7} \right)$  (3 marks)
- f) How many ways can you choose chairman, Vice- chairman, Secretary, Vice-secretary, Organizing secretary and Tresearer from a group of 10 Christians? (4 marks)

### **QUESTION TWO (20 MARKS)**

- a) Find the sum of 9, -3, 1, ..... to 6 terms (5 marks)
- b) Find  $\frac{dy}{dx}$  if  $x^2 + y^2 - 6xy + 3x - 2y + 5$  at the point (1,-1) ( 8 marks)

- c) The following data represents the population estimates in million for Kenya , Uganda , Tanzania , Zambia and Nigeria

Country	population estimates (1986)
Kenya	20.2
Uganda	14.7
Tanzania	21.7
Zambia	6.8
Nigeria	91.2

Depict the data graphically using a pie chart

(7 marks)

### QUESTION THREE (20 MARKS)

- a) Chesumo & Grace company operates a chain of supermarkets where in each they employ cashiers, attendants and drivers as shown

	<b>Type of supermarket</b>		
	Large	Medium	Small
Cashiers	4	2	1
Attendants	12	6	3
Drivers	6	4	2

#### **The number of supermarkets are**

	Mombasa	Nairobi
Large Supermarkets	3	7
Medium Supermarkets	5	8
Small Supermarkets	12	4

How many of the various types of staff are employed in Mombasa and Nairobi (6 marks)

- b) Solve triangle ABC , given that  $C = 42.9^\circ$   $a = 14.6\text{cm}$  and  $r = 11.4\text{cm}$  (6 marks)

- c) Find the stationary value and stationary point of the following function

i)  $Y = x^3 - 3x^2 + 2$  (4 marks)

ii)  $Y = (x - 2)(x + 3)$  (4 marks)

**QUESTION FOUR (20 MARKS)**

- a) The table given below reports the aggregate consumption Y in billions and disposal income X in billions for a developing economy for 12 years

Year	n	$Y_i$	$X_i$
1988	1	102	114
1989	2	106	118
1990	3	108	126
1991	4	110	130
1992	5	122	136
1993	6	124	140
1994	7	128	148
1995	8	130	156
1996	9	142	160
1997	10	148	164
1998	11	150	170
1999	12	154	178

- i) Draw a scatter diagram for the above data (2 marks)  
 ii) Find the regression equation (6 marks)  
 iii) Plot the regression line on the scatter diagram and show the deviations of actual values from the estimated values (2 marks)

- b) Differentiate and integrate the following function

i)  $\frac{dy}{dx} = (3x^2 + 2x)^4 (6x^2 + 4x^2)^5$  at  $x = 1$  (5 marks)

ii)  $\frac{dy}{dx} = \frac{(4x^2 + 4x^3)^3}{(x + 5)^3}$  at  $x = 1$  (5 marks)

**QUESTION FIVE (30 MARKS)**

Class interval (Salary in 000's)	frequency (no. of workers)
0 – 9	1
10 – 19	8
20 – 29	12
30 – 39	11
40 – 49	12
50 – 59	11
60 – 69	19
70 – 79	12

80 – 89	8
90 – 99	6

- a) Draw Histogram and frequency polygon (4 marks)
- b) Draw an ogive by less than method and determine (1 marks)
- i) The number of workers earning between 25,000 and 75,000 (2 marks)
- ii) The number of workers earning less than 85,000 (2 marks)
- c) Draw an ogive by more than method and determine (1 mark)
- i) The of workers earning more than 15,000 (2 marks)
- ii) The number of workers earning between 25,000 and 75,000 (2 marks)
- d) Obtain the median salary and median worker (1 mark)
- e) Find the area of the region bounded by the line  $y = 4x$  and the curve  $y = x^3 + 3x^2$  (5 marks)