

KABARAK



UNIVERSITY

UNIVERSITY EXAMINATIONS

2010/2011 ACADEMIC YEAR

**FOR THE DEGREE OF BACHELOR OF COMMERCE
AND BACHELOR OF EDUCATION**

COURSE CODE: MATH 100

COURSE TITLE: GENERAL MATHEMATICS

STREAM: Y1S1

DAY: FRIDAY

TIME: 2.00 – 4.00 P.M.

DATE: 10/12/2010

INSTRUCTIONS:

- Answer Question **ONE** and any other two Questions

PLEASE TURNOVER

QUESTION ONE (30 MARKS)

- (a) (i) Given that $f(x) = 3x^2 - 1$ and $g(x) = 1 - 2x^2$, find $(f \circ g)(x)$ [2 Marks]
(ii) If $f(x) = x + 3$ and $g(x) = 2x$ find $(f \circ g)^{-1}(x)$ [3 Marks]
- (b) Solve the equation $5x^2 - 6x = 2$ by completing the square method [4 Marks]
- (c) Solve for x $4^{2x} - 4^{x+2} = 80$ [3 Marks]
- (d) Express $\frac{x^2 + 10x + 6}{x^2 + 2x - 8}$ in terms of partial fractions [4 Marks]
- (e) The sum of the first 12 terms of an AP is 450. The sum of the first seven terms of the same AP is 175. Find the first term and the common difference. [3 Marks]
- (f) Solve for x if $\log_{10} 2x^3 - \log_{10} x = \log_{10} 16 - \log_{10} x$ [4 Marks]
- (g) The daily profit for a shop selling a certain type of toy is given by $P(x) = -x^2 + 18x + 144$, where x is the number of toys sold.
(i) find the total number of toys sold that will maximize the daily profits
(ii) Determine the maximum daily profit. [7 Marks]

QUESTION TWO (20 MARKS)

- (a) Solve for x if $2\log_x 5 + \log_5 x = 3$ [5 Marks]
- (b) Solve for x $25^{x+2} = 5^{3x-4}$ [4 Marks]
- (c) Calculate the area enclosed by the curve $y = x^2 - x - 6$ and the x -axis [6 Marks]
- (d) Solve for x to three significant figures $6^{3x+1} = 7^{2-x}$ [5 Marks]

QUESTION THREE (20 MARKS)

- (a) Solve using the quadratic formula method $x^2 + 7x + 5 = 0$ [4 Marks]
- (b) From the first principles, find the derivative of $y = 2x^2 - 6x + 3$ [6 Marks]
- (c) The roots of the quadratic equation $x^2 + 2x + 3 = 0$ are α and β . Find a quadratic equation whose roots are $\alpha + \frac{1}{\beta}$ and $\beta + \frac{1}{\alpha}$. [5 marks]
- (d) Express $\frac{x^2}{(x-1)(x^2+1)}$ in terms of partial fractions [5 Marks]

QUESTION FOUR (20 MARKS)

- (a) Differentiate the following functions:

(i) $y = x^4 - 2x^2 - \frac{1}{x^2}$ [3 Marks]

(ii) $y = \frac{x^5 + x^2 - 2}{x^4 + 1}$ [4 Marks]

- (b) Evaluate the following integrals

(i) $\int_1^2 \left(x^3 - \frac{1}{x^2} \right) dx$ [3 Marks]

(ii) $\int (2-x)^2 dx$ [3 Marks]

- (c) The first three terms of a G.P are $3(q+5)$, $3(q+3)$ and $(q+7)$ respectively.

- (i) Calculate the possible values of q [4 marks]
- (ii) For each possible value of q , find the common ratio of the geometric series. [3 marks]

QUESTION FIVE (20 MARKS)

(a) Find the maximum and minimum points of $y = x^4 - 2x^3 + x$ [7 Marks]

(b) The following data gives the distribution of test results of 200 students

Mark	Frequency
10-19	18
20-29	34
30-39	58
40-49	42
50-59	24
60-69	10
70-79	6
80-89	8

Find the,

- (i) Median score [3 Marks]
- (ii) Mode score [3 Marks]
- (iii) Mean score [3 marks]
- (iv) Standard deviation score [4 Marks]