KABARAK UNIVERSITY

EXAMINATIONS

2008/2009 ACADEMIC YEAR

FOR THE CERTIFICATE OF PRE - UNIVERSITY MATHEMATICS

COURSE CODE: **PMATH 022**

COURSE TITLE: **BASIC CALCULUS**

STREAM: **SEMESTER TWO**

DAY: **WEDNESDAY**

TIME: **2.00 – 4.00 P.M.**

DATE: **18/03/2009**

INSTRUCTIONS:

Attempt **QUESTION ONE** and **ANY OTHER TWO** questions.

PLEASE TURN OVER

Question One (30mks)

(a) A real valued function is defined by f( ) = 2 (4 – 1) + 2. Find

(i) f(0) **(2mks)**

(ii) f (2) **(2mks)**

(iii) + 1 **(3mks)**

(iv) fff (1) **(3mks)**

(b) Using the first principle technique find — of the following functions at a specified point.

(i) y = 2 + 4 + 9 at = 2 **(3mks)**

(ii) ( ) = — at = 1 **(3mks)**

(iii) ( ) = √ + 3 at = 3 **(3mks)**

(c) Find — of the following functions

(i) ( ) = √ + 4 + 2 **(2mks)**

(ii) ( ) = + — – 2 **(2mks)**

(d) Evaluate the following limits

(i) $\lim_{x\to 3} \frac{x^2+5x+6}{x^2+8x+15}$ **(3mks)**

(ii) $\lim_{x\to 2} \frac{(x+4)^2}{(x-4)^2}$ **(3mks)**

(iii) $\lim_{x\to -1} x^2+4x+2$ **(1mk)**

Question Two (20mks)

(a) Let ( ) = – 2 + 4 + 1, ( ) = – 2

Find (i) ( ) · 3 ( ) **(2mks)**

(ii) fog **(2mks)**

(iii) fof **(2mks)**

(iv) $\frac{(\ )}{(\ )}$ **(4mks)**

(b) Show that

(i) $\lim_{\rightarrow} \quad 4 \quad + 8 = 16$ **(4mks)**

(ii) $\lim_{\rightarrow} \quad + \ 4 \quad + 2 = 7$ **(4mks)**

(iii) $\lim_{\rightarrow} \quad =$ **(2mks)**

Question Three (20mks)

(a) Find — of the following functions.

(i) $= (2 \quad + 4 \quad + 1)(\quad + 2 \quad + 3)$ **(3mks)**

(ii) $= (\quad + 4 \quad + 1) (\quad + 9$ **(3mks)**

(iii) $= \frac{^{2} + 2 \quad + 7^{11}}{(\quad + 2)^{2}}$ **(3mks)**

(iv) $= \sqrt{8 \quad + 4 \quad + 7}$ **(3mks)**

(b) Evaluate the following limits

(i) $\lim_{x \to -1} x^2 + 4x + 2$ **(1mk)**

(ii) $\lim_{x \to 0} \frac{x^2 + x}{x}$ **(2mks)**

(c) Show that $\lim_{x \to -1} 2x^2 + 4x + 1 = 3$ **(5mks)**

Question Four (20mks)

(a) Find the velocity and acceleration at a time t = 1 for a particle moving in straight line if its motion obeys the law

(i) $= \quad + 5 \quad + 4$ **(6mks)**

(ii) When is the particle stationary **(3mks)**

(b) Write the equation of tangent and normal to the curve $( ) = 4 \quad + 2 \quad + 1$ at a point (2, 3) **(6mks)**

(c) Find the equation of the curve given the gradient is $4 \quad - 2$ at (1, 2) **(5mks)**

Question Five (20mks)

(a) Investigate the local extrema to the function $( ) = 2 \quad - 3 \quad - 12 \quad + 5$ **(5mks)**

(b) $\int (2 \quad + 4 \quad + 1)$ **(3mks)**

(c) Find the area tender the curve $= \quad - 4$ **(6mks)**

(d) Give an implicit function

$$+ \quad + \quad + 8 = 0$$

Find $\frac{}{}$ **(6mks)**