UNIVERSITY OF SWAZILAND

SUPPLEMENTARY EXAMINATIONS 2008/2009

B.A. Hums. / B.A.S.S. I

TITLE OF PAPER	:	ELEMENTARY QUANTITATIVE TECHNIQUES
COURSE NUMBER	:	MS 012
TIME ALLOWED	:	THREE (3) HOURS
INSTRUCTIONS	:	1. THIS PAPER CONSISTS OF SEVEN QUESTIONS. 2. ANSWER ANY FIVE QUESTIONS 3. ONLY NON-PROGRAMMABLE CALCULATORS MAY BE USED.
SPECIAL REQUIREMENTS	:	NONE

THIS EXAMINATION PAPER SHOULD NOT BE OPENED UNTIL PERMISSION HAS BEEN GRANTED BY THE INVIGILATOR.

QUESTION 3

Evaluate the following integrals:

(a) $\int (x^3 + 2x^2 + 4)dx$ [3 marks]

(b) $\int_{-2}^{0} (x^2 + 5x - 1)dx$ [6 marks]

(c) $\int \sqrt{x+1}dx$ [5 marks]

(d) $\int 2x\cos(x^2 + 3)dx$ [6 marks]

QUESTION 4

Evaluate the limit for the following functions:

(a) $\lim_{x \to 5} \sqrt{x^3 - 3x - 1}$ [4 marks]

(b) $\lim_{x \to 2} \dfrac{x^2 - 4}{x - 2}$ [6 marks]

(c) $\lim_{x \to \infty} \dfrac{2x^2 + 1}{6 + x - 3x^2}$ [5 marks]

(d) $\lim_{x \to \infty} \dfrac{x}{x^2 + 5}$ [5 marks]

QUESTION 5

(a) The cost of making x articles per day is $E(\frac{1}{2}x^2 + 50x + 50)$ and the selling price of each one is $E(80 - \frac{1}{4}x)$. Find:

(i) the daily profit in terms of x, [4 marks]

(ii) the value of x to give the maximum profit. [5 marks]

(b) Write the polynomial with integer coefficients that has the following roots: $-1, \frac{3}{4}$. [4 marks]

(c) Determine the polynomial whose roots are $-1, 1, 2$ and sketch its graph. [7 marks]

QUESTION 6

(a) Given the function $f(x) = x^4 - 2x^3 + 6$, find the roots of the second derivative of $f(x)$. [6 marks]

(b) An arithmetic progression has 3 as its first term. Also, the sum of the first 8 terms is twice the sum of the first 5 terms. Find the common difference. [9 marks]

(c) Use synthetic division to find the remainder when $P(x) = x^4 + 2x^3 + 10x - 12$ is divided by $x + 3$. [5 marks]

QUESTION 7

(a) Write down the first five terms of the AP with first term 8 and common difference 7. [5 marks]

(b) Find the sum of the first 50 terms of the sequence $1, 3, 5, 7, 9, ...$ [5 marks]

(c) Find the 10th and 20th terms of the GP with first term 3 and common ratio 2. [5 marks]

(d) Find the sum of the geometric series $8 - 4 + 2 - 1 + ...$ where there are 5 terms in the series. [5 marks]

END OF EXAMINATION