UNIVERSITY OF SWAZILAND

SUPPLEMENTARY EXAMINATION 2011/12

BASS I

TITLE OF PAPER	:	ELEMENTARY QUANTITATIVE METHODS I
COURSE NUMBER	:	MS011
TIME ALLOWED	:	THREE (3) HOURS
INSTRUCTIONS	:	1. THIS PAPER CONSISTS OF SEVEN QUESTIONS. 2. ANSWER ANY FIVE QUESTIONS
SPECIAL REQUIREMENTS	:	NONE

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

QUESTION 1

(a) Solve, giving solutions between 0^o and 360^o, the equation

$$\sin^2\theta + 2\cos\theta = 2$$

[10]

(b) Find the exact value of $\cos 15^0$ [10]

(c) Solve for x

(i) $2x = 64$ $2^x = 64$

(ii) $3x = \frac{1}{81}$ $3^x = \frac{1}{81}$ [10]

QUESTION 2

(a) Use the remainder theorem to find the remainder when $p(x) = 5x^3 - 14x + 3$ is divided by $D(x) = x - 2$ [6]

(b) Use the factor theorem to determine whether $D(x) = x-5$ is a factor of $p(x) = x^3+2x^2-25x-5$.

[8]

(c) Solve $\tan 3\theta = 1$ [6]

QUESTION 3

(a) Given that $f(x) = \dfrac{2x+3}{x-1}$ find

(i) $f(3)$

(ii) $f^{-1}(x)$

(iii) $f^{-1}(2)$ [12]

(b) Solve $2\log_5 x = \log_5(2x+3)$ [8]

QUESTION 4

a) Find the simple interest on E4000 at 20% for 9 years. [5]

b) Find the amount at the end of 12 years on a principal of E8 000 at 8% compounded quarterly. [5]

c) Solve for x

(i) $4^x = 1024$.

(ii) $3^x = 7$. [10]

QUESTION 5

a) Determine whether $p(x) = x^3 - x^2 + 2$ is divible by $D(x) = x + 1$. [6]

b) Find all rational roots of $p(x) = x^4 - 5x^2 + 4$. [8]

c) Use synthetic division to evaluate $(x^8 - 1) \div (x + 1)$. [6]

QUESTION 6

a) Prove the following identity

$$\frac{\sin\theta}{1-\cot\theta}+\frac{\cos\theta}{1-\tan\theta}=\sin\theta+\cos\theta$$

[10]

b) Find an equation of a straight line in

(i) through $(5,-5)$ parallel to $4x+y-1=0$

(ii) through $(4,3)$ perpendicular to $3x+2y-2=0$ [10]

QUESTION 7

a) Find the quotient and remainder when $p(x)=3x^4-4x^3+2x+1$ is divided by $D(x)=x^2+2x$

[10]

b) Two rectangular rooms each have an area of $240m^2$. If the length of one of the rooms is x metres and the other room is $4m$ longer, write down the width of each room in terms of x. If the width of the rooms differ by 3m form an equation in x and show that this reduce to $x^2+4x-320=0$. Solve this equation. [10]