NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

CFI 5101

FACULTY OF COMMERCE DEPARTMENT OF FINANCE

MSc FINANCIAL ENGINEERING

CFI 5101: FINANCIAL COMPUTING

NOV/DEC 2015 EXAMINATION

Time : 3 hours

INSTRUCTIONS:

Candidates should attempt **ALL QUESTIONS.**

This paper carries 100 Marks.

Save ALL your work in a folder named your student number.

ZIMRA 2015 Tables are provided.

QUESTION 1 **[25]**

Code a VBA User Defined Function to calculate the Black-Scholes Put and Call option values. The formualae are given below:

$$\begin{aligned} C &= N(d_1)S_0e^{-yT} - N(d_2)Xe^{-rT} \\ P &= N(-d_2)Xe^{-rT} - S_0N(-d_1)e^{-yT} \\ d_1 &= \frac{\ln(S_0/X) + (r - y + 0.5\sigma^2)T}{\sigma\sqrt{T}} \\ d_2 &= d_1 - \sigma\sqrt{T}. \end{aligned}$$

QUESTION 2 **[25]**

a. Develop a VBA function that calculates and prints/displays the real roots of a quadratic function.

b. Develop a VBA function that reads three numbers and prints the value of the largest number with the message "The largest number is".

QUESTION 3 **[25]**

Using the ZIMRA 2015 Tax Tables, build a Matlab script or function that calculates monthly PAYE given a salary.

QUESTION 4 **[25]**

A salaries model for a certain company is New Salary = \$954+0.2738 × Old Salary − 6.1147 × Age + 23.0593 × Qualification.

Build a Matlab program that calculates any new employee's salary given their Old Salary (per month), Age (in years) and Qualification (number of degrees). Your program should

classify the employees according to their salaries as per the following scale:

0.00-500.00: Below Datum Poverty Line; 500.00-1000.00: Surviving; Over 1000: Quite Surviving.

END OF EXAMINATION PAPER