The Open University of Sri Lanka
Department of Electrical and Computer Engineering

ECX3163 – Introduction to computing

Final Examination 2012/2013 **Closed Book Test**

Date: 24th March 2013 Time: 09.30-12.30

*Answer **question 1** and **two** other questions. Write your answers clearly.*

Part A – 50 marks

Q1. **Aascharya** International School is to open a new branch at Hambanthota. You are appointed as an advisor in setting up computer lab(s).
The School expects to start offering classes from Grade 6 upwards in the English medium, leading to GCE O/L. The expected annual intake is about 150 students in all. Students may offer the subject Information Technology for O/Levels.
Following Requirements are forwarded: 2 computer labs for students – for seniors and juniors, 1 lab for staff, and 1 machine for the Principal's Office.

a) Describe briefly 5 purposes each that senior and junior students may use their respective computer lab.
b) How many computers do you propose to purchase for each student lab? Justify your answer.
c) What are the main hardware that you propose for a computer at each lab? Describe types/ specifications for **five** main items, and list another **four**.
d) What are the main software necessary for above purposes? Describe briefly.
e) Five additional machines should be acquired for the use of the Principal and Staff. Describe any change of specifications (both hardware and software) for these machines compared to c) and d).
f) A general purpose computer needs to be upgraded after about 3 - 5 years. What are **five** main components most likely to be replaced within **5** years? Give the reasons for your choices.
g) You intend to install the new components in the lab(s), with the help of the students. Give **three** important practical precautions to take when upgrading a computer.
h) Describe briefly the steps to follow when installing an additional hard disk and making it ready for use.

Part B – 25 marks each – Answer any 2 questions

Q2. Solve the following. ***Write all relevant intermediate steps.***

a) Convert $14B_{16}$ to the equivalent **binary** value.

b) Convert 125.175_{10} to the equivalent **binary** value.

c) Perform the following **binary** operations.
i) $1011011_2 \times 1111_2$ ii) $10110001_2 \div 1100_2$

d) Calculate the value of **m** if $345_m = 412_{10}$

e) Subtract 6 from 3, using **two's complement** representation. [3 – 6]

Q3. a) You are to write an algorithm to sort **three** numbers in **descending** order. *You may assume that these numbers are integers. State any other assumptions you may make.*

Present your algorithm with a flowchart using standard shapes, showing the sorting algorithm.

b) In the course **ITE3266,** the students take part in three activities. All activities are given marks out of 100, and the continuous assessment (CA) is calculated by averaging the marks of 2 best activities. (Average of 2 highest marks) Based on your flowchart from above, show an algorithm to calculate and present the CA marks for the 30 students who are enrolled to **ITE3266** this year.

Q4.

a) i. What are the three main addressing modes used at processor level programming?

ii. Use three suitable examples to describe each of those modes.

iii. Describe briefly the main functions of Accumulator, Data Register, Index Register, and Stack Pointer within a Microprocessor.

b) i. What are the two main types of software?

ii. Describe two main tasks for each of the two types.

c) i. What are the three main levels of programming languages?

ii. Describe the differences of these levels.

d) Compare Bottom-up and Top-down programming methodologies.