



ECX3163 – Introduction to computing

Final Examination 2015/2016

Closed Book Test

Date: 09th July 2016

Time: 09.30-12.30

Answer **questions 1 and 2 (Part A) and two other questions (from Part B)**. Write your answers clearly.

Part A – 60 marks

- Q1. You decide to buy a desktop computer to be used by your family at home. As you have gained eligibility in 'Introduction to computing' you decide to assemble a PC to suite your needs.
- Describe briefly 5 main purposes this machine will be used by your family.
 - Identify special software and any additional hardware that is needed for each of the above 5 tasks separately.
 - Write a specification for your computer so that it can handle all the above tasks.
 - Describe types/versions and approximate cost for **six** main hardware items and for **four** main software from above specification. (3-4 sentences for each)
 - After about a year you find that you are running short of storage space and decide to add another hard disk. Describe briefly the steps to follow when installing an **additional** hard disk and making it ready for use.

(40 marks)

- Q2. You are to devise an algorithm that facilitates the **selection of odd numbers** from amongst ten (10) random positive integers and **calculating their sum**.

Your algorithm should:

- Let the user input 10 integers in sequence.
- After each input of each number decide whether it is an odd number (which cannot be divided exactly by 2)
- Keep count of how many odd numbers there are, and the sum of values of all odd numbers
- Once 10 numbers are fed in, output
 - How many odd numbers were there and
 - What the total sum of those odd numbers is

State any assumptions you may make.

Give your algorithm using a flowchart drawn with standard shapes.

(20 marks)

Part B – Answer any 2 questions – 20 marks each

Q3. Solve the following. Write all relevant intermediate steps.

- a) Convert 11011011011001_2 to a hexadecimal value.
- b) Convert 105.625_{10} to a binary value.
- c) Perform the following **binary** operations.
 - i) $1011101_2 \times 1111_2$
 - ii) $1100011_2 \div 1100_2$
- d) Find the value of m if $249_m = 295_{10}$
- e) Subtract 6 from 3, using two's complement representation. [3 – 6]

Q4. You are to design a digital system that will identify even digits. When a digit (0-9) in binary is fed into the system a high (1) output should be produced for an even digit, while a low (0) should be the output for an odd digit.

- a) Write the truth table for this system.
- b) Simplify the resulting function using a Karnaugh Map.
- c) Draw the circuit for the simplified function using standard gates.

Q5.

- a)
 - i. What is the function of an Assembler?
 - ii. Describe briefly the 3 types of Assemblers.
- b)
 - i. What is the function of a Compiler?
 - ii. Describe the difference between a cross-compiler and a self-compiler.
- c)
 - i. What are the three main levels of programming languages?
 - ii. Describe the differences of these levels.
- d)
 - i. Describe briefly the fetch-execute cycle of a microprocessor.
- e)
 - i. Name and describe briefly 2 insider threats and 2 outsider threats respectively to computer security.
 - ii. Describe briefly 5 measures to ensure computer security.