UNIVERSITY EXAMINATION FOR THE DEGREE OF SCIENCE

ACTUARIAL SCIENCE

1ST YEAR 2ND SEMESTER 2013/2014 ACADEMIC YEAR

CENTRE: MAIN

COURSE CODE: SAS 104

COURSE TITLE: PROGRAMMING METHODOLOGY

EXAM VENUE: LR 1   **STREAM: BSc. Actuarial**

DATE: 11/12/2013   **EXAM SESSION: 9.00 – 11.00 AM**

TIME: 2 HOURS

<u>Instructions:</u>

1. **Answer question 1 (Compulsory) and ANY other 2 questions.**
2. **Candidates are advised not to write on the question paper.**
3. **Candidates must hand in their answer booklets to the invigilator while in the examination room.**

QUESTION ONE (COMPULSORY) **[30 MARKS]**

(a) What is *programming methodology*? Why is it considered an important study for actuarial science students? [4 Marks]

(b) Define the following terms and concepts as applies to computer programming. [4 Marks]

    (i)   Source Code   (iii)   Debugging

    (ii)   Linking   (iv)   Pointers

(c) "In order to get a computer perform a specific task it must be given a sequence of unambiguous instructions called *program*"

    (i)   Do you agree with the above statement? Support your answer [2 Marks]

    (ii)   What relationship does a <u>program</u> has with *programming*, *programmer* and *programming language*? Explain. [3 Marks]

(d) Give a reason why *comments* are considered useful when writing a computer programming code. Use an example to show how it is used in C programming language.
[2 Marks]

(e) Explain the <u>three</u> components of a programming structure. [3 Marks]

(f) Name and explain the key characteristics of an algorithm. Use an example to support your answer. [5 Marks]

(g) Develop an algorithm that can be used to solve the roots of a quadratic equation. Convert the provided algorithm into programming codes compilable by C compiler. [7 Marks]

QUESTION TWO

(a) In reference to programming language, explain the meaning of the term *paradigm.* Give any TWO such paradigms you know. [4 Marks]

(b) Differentiate between the following as applies to computer programming. [4 Marks]

    (i)   Algorithm and Program

    (ii)   Compiler and Interpreter

(c) "Data representation refers to methods used internally to represent information stored in a computer". Use appropriate conversions examples between number systems (binary, octal, denary and hexadecimal) to support the above statement. [6 Marks]

(d) "Study of algorithm can be classified in <u>four</u> distinct areas". Explain in support of this statement. [4 Marks]

(e) Distinguish between *top down design model* and *bottom up design model* as applied in problem solving process. [2 Marks]

QUESTION THREE

(a) "There are <u>three</u> types of control flow in *structured programming* "

(i) What is structured programming? [2 Marks]

(ii) Using appropriate diagrams, explain the three types of control flow as indicated above. [3 Marks]

(iii) Provide sample programming codes to support your explanation in (ii) above.

[3 Marks]

(b) Write programming codes in C that can be used for solving; [12 Marks]

(i) the factorial of n

(ii) reversing integer digits

(iii) the maximum out of 1000 integers

QUESTION FOUR

(a) "Programming is a process of problem solving". Use a suitable example the problem solving process [5 Marks]

(b) Explain the following as applies to C programming [4 Marks]

(i) Executable Statements

(ii) Preprocessor Directive

(iii) Operator Precedence

(iv) Primitive Data Types

(c) Give a command that can be used to compile the file *test1.c*. [1 Mark]

(d) Write a C program that accepts two integers, compares them and display the relationship between them i.e. whether they are the same or one is greater than the other. [6 Marks]

(e) Name and explain any TWO C Standard Library you know. [4 Marks]

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QUESTION FIVE

(a) Define the following terms and concepts [4 Marks]

    (iii)   Library Procedures   (iv)   Subroutines

    (ii) Recursions   (v) Functions

(b) Fibonacci numbers are the numbers in the Fibonacci sequence 0, 1, 1, 2, 3, 5, 8, 13, 21, . . ., each of which, after the second is the sum of the two previous ones.

(i) Develop an algorithm that can be used to generate and display the first 'n' Fibonacci numbers, where 'n' is specified by the user. [6 Marks]

(ii) Convert the algorithm in (i) above into C programming codes that can generate a Fibonacci sequence. [10 Marks]

- **END -**