**SCHOOL OF COMPUTING AND INFORMATICS**

**Bachelor's Degree in Computer Science**

**CSC 222 Assembly Language Programming and Microprocessor Systems - CAT 2**

**Submission Deadline: Thursday 5th May 2022 by 5PM**

1. The main internal hardware of a PC consists of the **processor, memory** and **the registers**.

   (i) Briefly state the role of registers in microprocessor systems **[1 mark]**

   (ii) Illustrate using a diagram the anatomy of an extended register (32 bit). **[2 marks]**

   (iii) State the roles of the following three general registers – EAX, EBX and ECX **[3 marks]**

2. Assembly language statements are entered one statement per line.

   (i) State the format which assembly language statements follow **[2 marks]**

   (ii) Write an assembly language code that compiles and displays the string 'Hello World' on the screen **[4 marks]**

3. State two reasons why assembly language is considered to be more efficient than high level language such as C++? **[2 marks]**

4. A FLAG register is a 16-bit register with six conditional flags and three control flags
   (i) Illustrate using a diagram the structure of a flag register indicating the positions of all flags **[4 marks]**

   (ii) Using the same diagram, state the positions that are reserved and undefined **[2 marks]**

5. A computer must be able to take input, process it and produce output.

   (i) How is the Information represented in a computer? **[2 marks]**
   (ii) Briefly state how the input and output is presented in a form that is understood by users **[2 marks]**

6. Define the following terms applicable in microprocessor systems and assembly language programming;

   (i) CALL statement **[2 marks]**
   (ii) Instruction format **[2 marks]**

7. In the 8086 microprocessor systems, the two most ways in which the operand of an instruction are specified are register and immediate addressing modes. Briefly explain in three point form how each of the two addressing modes operate **[2 marks]**