**NNAMDI AZIKIWE UNIVERSITY AWKA**

**DEPARTMENT OF ELECTRONIC AND COMPUTER ENGINEERING**

**FIRST SEMESTER 2014/2015 REGULAR EXAMINATION**

**ECE 421: Assembly Language Programming**

*Time Allowed: 2hrs*

***Instruction:*** *Answer* ***four (4)*** *questions only;* ***two (2)*** *from* ***Section A*** *and* ***two (2)*** *from* ***Section B*** *(question 1 of section B is* ***compulsory****).*

**SECTION A**

1. Write an Assembly language program which is to be executed by AT89C52 microcontroller for the display of “Obi is a boy” on LCD. Use 10MHz crystal oscillator.

2. An AT89C52 microcontroller-based system is to display a word “Udoh” in a common anode seven segment. Develop an Assembly language program for this operation. Use 12MHz crystal oscillator.

3. A passworded door controller was designed such that a keypad was interfaced to an AT89C52 microcontroller. Develop a 4x4 keypad matrix program for the controller. Use 10MHz crystal oscillator.

**SECTION B**

1. You have been requested to design an auto garage door which detects when a car approaches the garage, lifts the garage door an switches on the garage light.

a) List the components you are going to use to design this project (paying particular attention to the devices you studied)

b) In each case, enumerate the features/characteristics of each component or device that qualifies it to be used in the project

c) Hence describe the working of your project.

2. Clearly distinguish between the brushed dc motor and the brushless dc motor (use tabular method of comparison)

b) Use well labelled diagram(s) to demonstrate the complete rotation of a stepper motor

c) Use a well labelled schematic to show how to apply contrast adjustment to an LCD device.

3. Show diagrammatically, the two simplest configurations for voltage comparators

b) The output of a comparator satisfies two basic rules, enumerate them.

c) Draw the schematic of a simple circuit that turn on when it goes dark