**NNAMDI AZIKIWE UNIVERSITY, AWKA**

**Department of Electronic and Computer Engineering**

**First Semester 2015/2016 Examination**

**ECE 421: Assembly Language Programming**

**Time allowed – 2 hrs**

**Instructions: Answer four questions in all. Two questions from section A and two questions from section B.**

**SECTION A**

1a) Write a program in an Assembly language for an AT89C52 microcontroller to display the

word **ULOCEF** in a common cathode seven segment. Show the code table and the

interfacing diagram. Use 10 MHz crystal oscillator.

1b) Use a setbit programming technique in Assembly language to develop a program for an

ON/OFF operation of three LEDs connected to one port of AT89C52 microcontroller. Show

the interfacing diagram. Use 12 MHz crystal oscillator and a delay of one second.

2a) Write an Assembly language program for an AT89C52 microcontroller to display the

information **I AM A STUDENT OF UNIZIK** on LCD. Show the interfacing diagram. Use

10MHz crystal oscillator.

2b) Develop an Assembly language program for a microcontroller based-system to implement a

Dot Matrix Display of **YES**.

3) You are to interface a 4x4 keypad matrix to an automatic security door controller. Write an

Assembly language program to enable the system display any number to be typed on the

keypad. Use LCD for the display.

**SECTION B**

1a) Draw the schematic of a simple circuit that turn off when it goes dark

1b) Express mathematically the step angle of a stepper motor. Hence calculate the step angle of a stepper motor that completes one full revolution in exactly 80 steps and has 40 stator poles.

1c) List any three types of a sensor group that detects the presence of objects that are nearly placed without any point of contact and mention four application of such sensors

2a) It is required to supply a digital output to a circuit based on the differential input of two analog signals. Draw a schematic to show how this can be achieved.

2b) Using a common anode seven segment configuration show the binary equivalence of the sentence “**birds SLEEP too**”

2c) What is the difference between the terms Luminescence and Electroluminescence

3a) Supposing that temperature varies inversely with resistance and change in resistance is equivalent to temperature change, calculate the temperature of a room if a potential difference of 9V was recorded at the output terminals after a steady current of 3A is passed through an RTD with resistance of 2ohm placed in that room (assume the temperature of the RTD to be 30oC)

3b) Define the term electromechanical relay. Using a diagram show the parts of an electromechanical relay

3c) What is the major difference between photo-emissive cell and photoconductive cell