Sheet 1
Micro Controllers

Question1:

Using the Arduino Uno, design a built-in Air Condition control board. Given the following

- Air Condition uses AC power from a wall socket to power the internal Compressor/ Fan.
- 2 x built push buttons to Increase / Decrease temperature
- 1 x built switch to enable/disable air swing servo/stepper motor
- 2 x Single Digit 7 Segment Display for Temperature Value
- 1 x Analog Temperature Sensor(AD22100) { Output Voltage is Ranging from 0.25 V at −50°C to +4.75 V at +150°C } and it has linear response and the Temperature Coefficient of 22.5 mV/°C}, voltage at 0°C is 1.375

a. Show the wiring diagram of different devices and add any necessary components (active/passive) to ensure correct operations.
b. Write the main sketch functions calls to operate the AC when
   - Monitoring Temperature setting versus actual measured temperature to start / stop Compressor/Fan with delayed response 2 seconds
   - Read New Temperature Input Setting from push buttons ranging from 16°C to 28°C
   - Activate / Deactivate air swing servo (As in LAB)

Question2:

Using the Arduino Uno, design a plant watering/sprinkler system to take care of your plant pots while you are away.

a. Write the code required to operate the sprinkler with 1 liter of water when moister level is less than 30%. make sure that during the watering process, the readings of the sensor don't stop the watering operation until the amount of water is poured. Make sure that the watering process doesn't repeat within at least 12 hours even if the moister level gets less than 30%.

b. Extend the moister conditions when having 2 types of plants; one that requires watering when moister level is less than 30% with 1 liter of water and another type that requires watering when the moisture level is below 5% with half liter of water. Note that if it is the time to water any of the plants and you didn't for more than half an hour the plant will die.

In this system:

- The water is provided by a water pump, the water pump is derived by a DC motor works on 12 volts.
- Each plant pot has an electric valve that allows or prevents the water from the pump to pass to the plant, and each valve also needs 12 volts to operate properly.
- For the moister sensor, the output voltage ranges from 0 V at 0 moisture level to 4.2 V at 100 moisture level].
- Assume that the water system takes one hour to pour 1 liter of water.