(10) Design IOT based pollution control system which monitor CO, ammonia etc and gives alarm or send message.

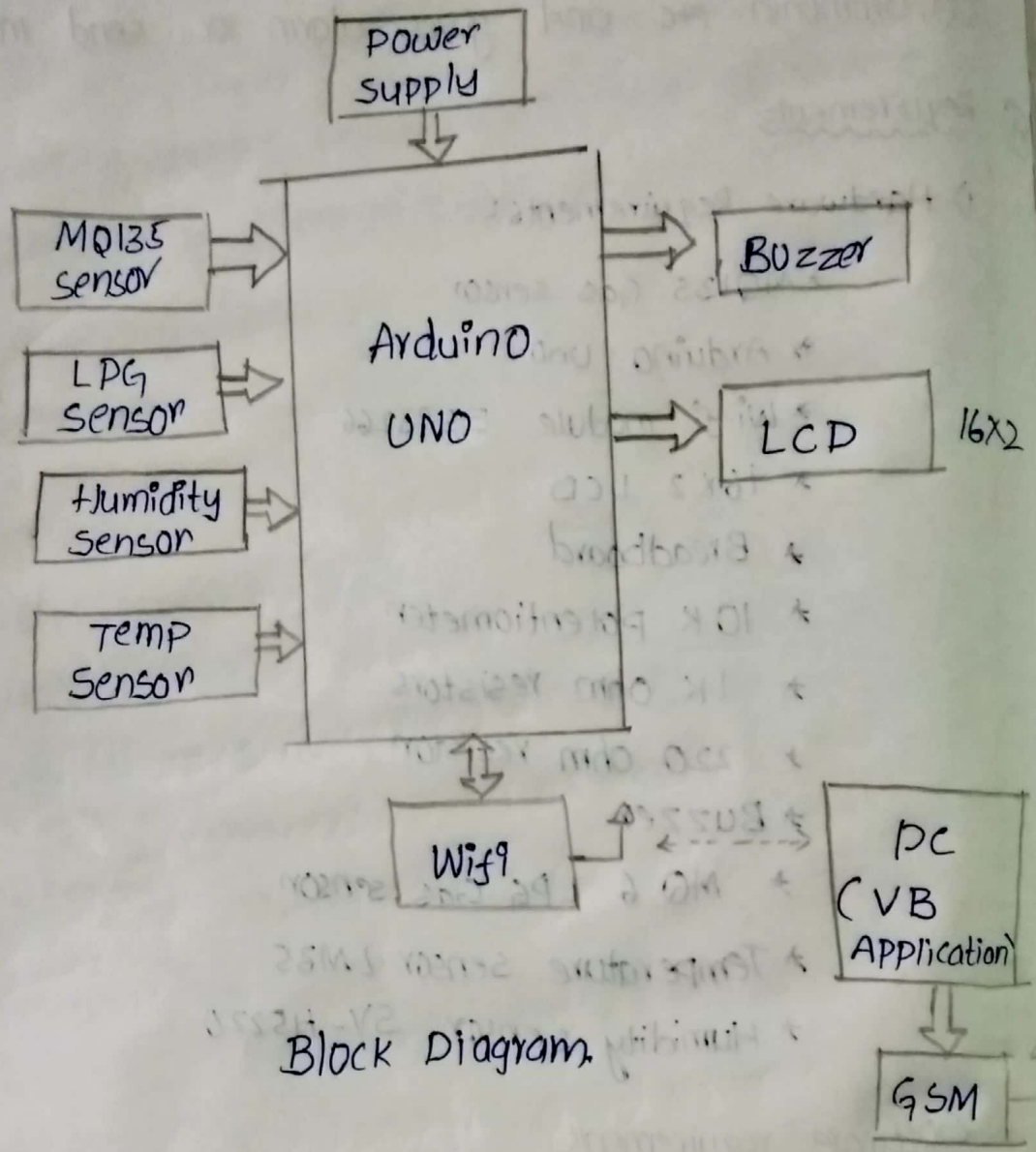
(A) Requirements:

1) Hardware Requirements:-

* MQ135 Gas sensor
* Arduino Uno
* Wi-fi module ESP8266
* 16X2 LCD
* Breadboard
* 10K potentiometer
* 1K ohm resistors
* 220 ohm resistor
* Buzzer
* MQ 6 LPG Gas senson
* Temperature sensor LM35
* Humidity sensor SV-H5220

Software requirements

1) Arduino 1.6.13 software
2) Embedded C language



Block Diagram.

Procedure:

* First of all we will connect the ESP8266 with Arduino.
* connect the VCC and CH_PD to the 3.3V pin of Arduino.
* The Rx pin of ESP8266 works on 3.3V and will not communicate with the Arduino.

* Connect the Tx pin of ESP8266 to the pin 10 of the Arduino and the Rx pin of the esp8266 to the pin 9 of Arduino through the resistors.

* ESP8266 wi-fi module gives your projects access to wi-fi or internet.

* Then connect the MQ135 sensor with the arduino. Connect the VCC and the ground pin of the sensor to the 5V and ground of the Arduino and Analog pin of sensor to A0 of the Arduino.

* In last, we will connect LCD with the Arduino.

  * connect pin1 (VEE) to ground
  * connect pin2 to the 5V.
  * connect pin 3 (VO) to the middle pin of the 10K potentiometer
  * connect pin 4 (RS) to the pin 12 of the Arduino
  * connect pin 5 to ground of Arduino
  * connect pin 6 to the pin 11 of the Arduino.
  * connect pin 11 to pin 5 of the Arduino
  * connect pin 12 to pin 4 of the Arduino
  * connect pin 13 to pin 3 of Arduino
  * connect pin 14 to pin 2 of Arduino
  * connect pin 15 to VCC through 220 Ω resistor
  * connect pin 16 to Ground.

Code:-

```
#define MQ2pin 5
#define buzz 350
float sensorvalue;
void setup() {
    serial.begin(9600);
}
void loop() {
    sensorvalue = analogRead(0);
    input pin 0
    serial.print("AirQua = ")
    if (buzz< sensorvalue) {
        if (sensorvalue >350 && sensorvalue <450) {
            Serial.println("CO2 gas is Detected");
        }
        else if (sensorvalue >450 && sensorvalue <560) {
            serial.println("CO and N2 gases detected");
        }
        Serial.println("crossed limit");
    }
    else
    {
        serial.println("not crossed limit");
    }
    Serial.print(sensorvalue, DEC);
    serial.println("PPm");
    delay(1000);
}
```

Output:

not crossed limit

AirQua = 310

not crossed limit

AirQua = 330

not crossed limit

AirQua = 370

CO_2 gas detected

crossed limit

AirQua = 410

CO_2 gas detected

crossed limit

AirQua = 490

CO, N_2 gases detected

crossed limit

AirQua = 510

CO and N_2 gases detected

crossed limit

AirQua = 520

CO and N_2 gases detected

crossed limit.