PES UNIVERSITY

PES University, Bengaluru

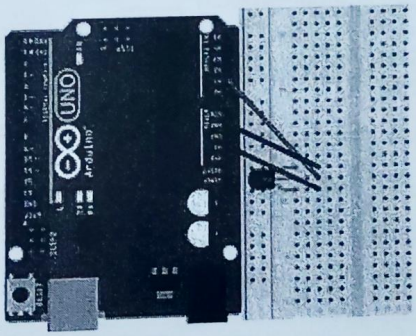
(Established under Karnataka Act No. 16 of 2013)

UE19CS313

DECEMBER 2021: END SEMESTER ASSESSMENT (ESA) B TECH 5th SEMESTER

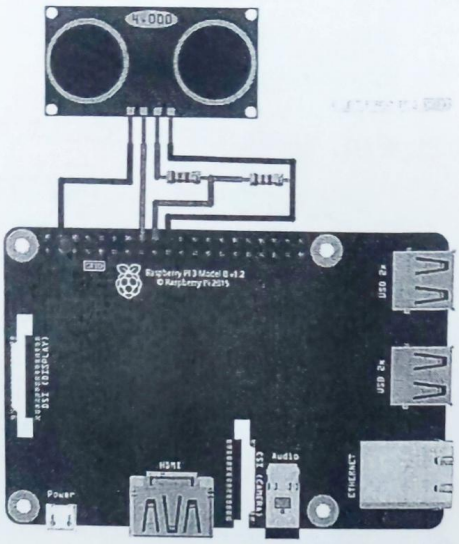
UE19CS313 – INTERNET OF THINGS

Time: 3 Hrs	Answer All Questions	Max Marks: 100

1	a)	Bring out the differences between the four phases of Internet evolution with examples.	4
	b)	Safety, Mobility and Environment are the current challenges being addressed by Connected Roadways. Explain any one of the challenge with example.	4
	c)	Compare the Operational Technology (OT) Network and Enterprise Information Technology (IT) Network.	6
	d)	Explain the Core IoT Functional Stack of the Simplified IoT Architecture.	6
2	a)	Explain the Characteristics of a Smart Object.	4
	b)	Among the most significant impacts of precision agriculture are those dealing with sensor measurement of a variety of soil characteristics. Tabulate the following aspects of different sensors to measure the same. (a) Sensor (b) Sensor Type (c) Sensor Category (d) Description	4
	c)	 Complete the sketch given below to read the Temperature from the LM35 sensor interfaced with Arduino as given in the Figure above and display the same every 5 seconds.	6

```
int tempPin = 1;
void setup()
{
  Serial.begin(9600);
}

void loop()
{
  //Write the code here to read the temp from pin

  float mv = ( val/1024.0)*5000;
  float cel = mv/10;

  //Write the code here to print the temp in Celsius

  //Write the code here to display the temp once in 5secs
}
```

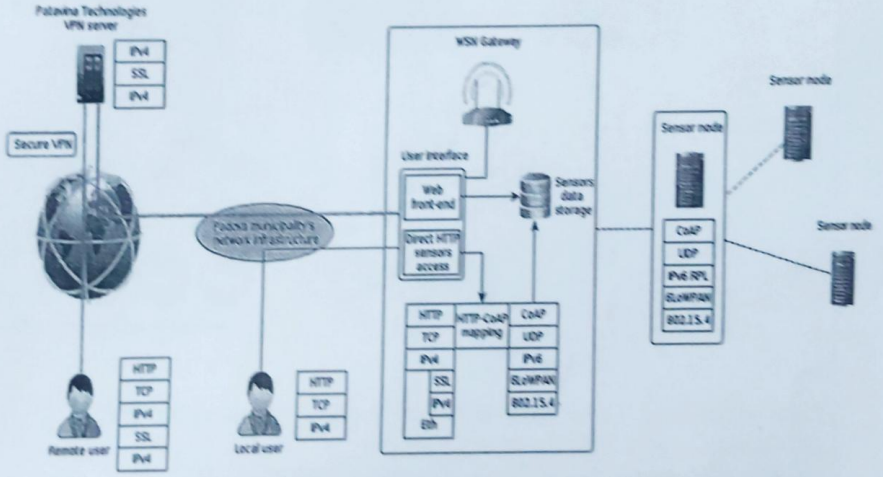
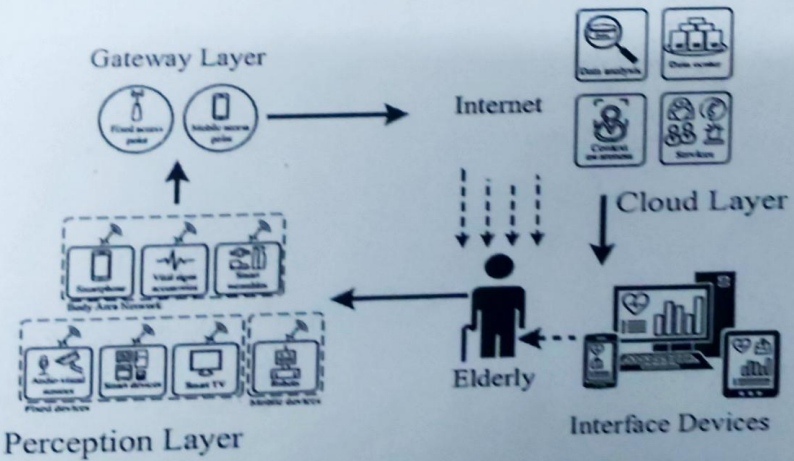
d)



Complete the Python code given here to read the Distance from the HC-SR04 sensor interfaced with RaspberryPi as given in the Figure above and alert only if the distance is less than 10CM with a delay of 5 seconds between each measurement.

```
import RPi.GPIO as GPIO
import time

GPIO.setmode(GPIO.BOARD)

TRIG = 16
ECHO = 18

// Write the code here to set the mode of the pins

GPIO.output(TRIG, False)

time.sleep(2)

try:
    while True:
        GPIO.output(TRIG, True)

        time.sleep(0.00001)

        GPIO.output(TRIG, False)

        while GPIO.input(ECHO)==0:
            pulse_start = time.time()

        while GPIO.input(ECHO)==1:
            pulse_end = time.time()

        pulse_duration = pulse_end - pulse_start
        distance = pulse_duration * 17150
        distance = round(distance+1.15, 2)

        //write the code here to check if the dist is > 10CM

        //write the code here to give a delay of 5 seconds

except KeyboardInterrupt:
        GPIO.cleanup()
```

SRN

3	a)	List and Explain the six Communication Criteria with examples.	4
	b)	Explain how security is provisioned in LoRaWAN with a neat diagram.	4
	c)	Comment on the Header Compression and Fragmentation in 6LoWPAN with neat diagrams.	6
	d)	Explain the CoAP protocol Message Format and fields with a neat diagram.	6
4	a)	List and Explain the Features and Advantages of Could Computing.	4
	b)	Bring out the differences between IaaS, PaaS and SaaS with examples.	4
	c)	List and Explain the Vulnerabilities found in the following protocols, (a) Modbus (b) DNP3 (c) Inter-Control Center Communications Protocol	6
	d)	Explain the Steps and Phases of OCTAVE Allegro risk assessment framework.	6
5	a)	 Comment on the above image of Padova Smart City system architecture	5
	b)	 Explain each of the Layers depicted in the above image of an elderly monitoring system.	5

SRN

c) 5

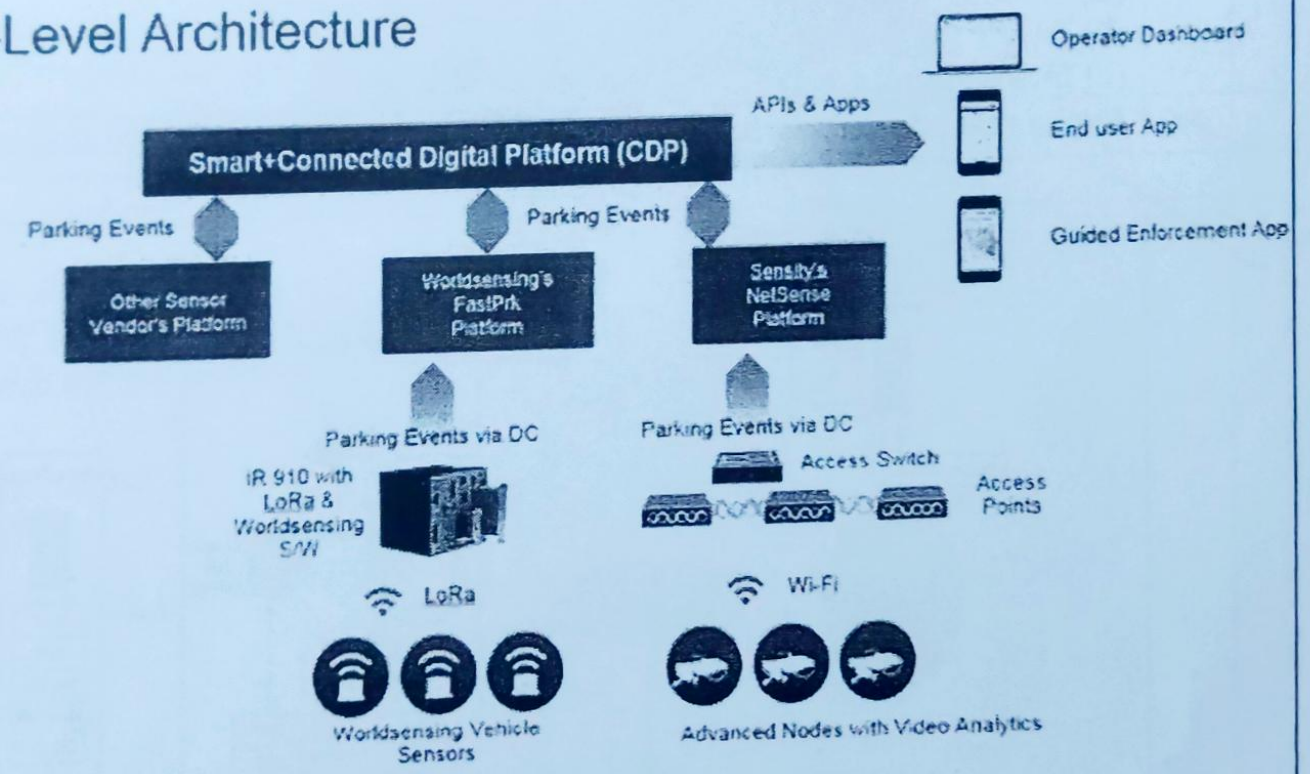
Provide an overall architecture for the Smart Garbage Management System.

Talk about the choices of the following for the same,
(a) Sensors
(b) Actuators
(c) Access Technologies
(d) Cloud Platform requirements

Also, draw an architecture diagram.

d) 5

High-Level Architecture



Look at the High-Level Architecture of the Smart Parking System.
(a) Comment on the all the layers you see.
(b) Why do you see two different access technologies?
(c) What are the roles of Access Switches?
(d) What Applications can be developed with the help of Smart-Connected Platform ?