VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD-31
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

INTERNET OF THINGS

Pre-lab Questions - 2023-24 VI Semester

Experiment -1
Program to operate RGB LED's using push buttons.

1. Draw the architecture of Raspberry PI3.
2. Draw the high level architecture of IoT.
3. Write about I2C and SPI protocol.
4. What is the difference between a push button and a key on a keyboard?
5. What is the significance of Board mode and BCM mode in Raspberry PI?
6. What is the role of MCP3008?

Experiment -2
Program to read data from BME280 onboard sensor on Raspberry PI development kit.

1. What is a sensor? List different types of Analog and Digital sensors.
2. Give the details of BME280 sensor. What are the ranges supported by this sensor?
3. What is an IO expander?
4. What are the power modes supported by BME280?
5. Write the applications of BME280.

Experiment - 3
Program to interface ultrasonic and PIR sensors to RPi.

1. What is the range of ultrasonic sensors?
2. What is the working principle of ultrasonic sensor?
3. How does a PIR sensor work?
4. List the application areas of PIR sensor.
5. What are the different types of motion sensors and how they work?
6. What is the sensitivity range of PIR?

Experiment - 4
Demonstration of soil moisture sensor for agriculture application.

1. How to measure accuracy of soil moisture sensor?
2. What is the difference between volumetric water content (VWC) and gravimetric water content (GWC)?
3. After installing the sensor probes, there is some variability between readings, even though they are all buried at the same depth. Why?
4. Difference between EC-5 and ECH2O sensors.

Experiment - 5
PIR sensor data to control servo motor and LED's

1. Draw the connection diagram to interconnect the components.
2. List the application areas of servo motors.
3. Differentiate between servo motor and a DC motor.
4. Classify different motors available?

Experiment - 6
Arduino Uno

1. How many analog pins are available on Arduino Uno?
2. How does Tinkercad allow the design of circuits?
3. Draw a circuit to enable the LED connected to a digital pin?
4. Differentiate between Arduino Uno and Raspberry PI.

Experiment - 7
Demonstration of communication protocol Bluetooth

1. What are the applications of Bluetooth protocol?
2. What are Bluetooth profiles?
3. How is Bluetooth security implemented?
4. Can we use Bluetooth products on airlines? Justify your answer.
5. What are the improvements of BLE 4.0?

Experiment - 8
ZigBee

1. What is the range supported by ZigBee?
2. Compare ZigBee and Bluetooth.
3. What is mesh networking? How is this helpful?
4. How do we configure the ZigBee node as coordinator?
   (Refer to
   https://www.digi.com/products/embedded-systems/digi-xbee/digi-xbee-tools/xctu)
5. Write a few applications where Zigbee can be used?

Experiment - 9
LoRa

1. What is the range of LoRa?
2. Write a few applications of LoRa.
3. How is LoRa different from ZigBee?
4. What is the approved frequency band for LoRa in India?
5. Can we use LoRa for Geolocation?

Experiment - 10

MQTT- Publish

1. What are the applications of MQTT protocol?
2. What is meant by Topic in MQTT?
3. What is MQTT-SN? Can we use this over a Zigbee based network?
4. Illustrate the MQTT message format.
5. What is the significance of Mosquitto? Give the list of some popular IoT platforms that support MQTT.

Experiment - 11

MQTT- Subscribe

1. What are the functions of MQTT brokers?
2. How to subscribe to a topic in MQTT?
3. What is the naming pattern for the MQTT topic?
4. What is the purpose of RabbitMQ?.

Experiment - 12

Industrial IoT

1. Define the purpose of using Node-Red.
2. List the different types of nodes present in Node-Red.
3. What do you mean by IIoT and what is its relevance to Industry 4.0?
4. What are vibration sensors?