ABV-INDIAN INSTITUTE OF INFORMATION TECHNOLOGY & MANAGEMENT GWALIOR

Hardware Workshop (Major Exam)

Semester – II (IMT, IMG)

Faculty: Dr. P. K. Singya

Date: 28/04/2024
Time: 2 PM-5 PM

Total Marks: 50

- **All questions are compulsory.**
- **Consider standard assumption if needed.**

Q. 1 Which BJT terminal controls the current flow? [1]

Q. 2 Which BJT configuration produces the highest current and power gain among all configurations [1]

Q. 3 What is the default bootloader in Arduino UNO? [1]

Q. 4 How many times should the setup() function run on every Arduino startup? [1]

Q. 5 What is the full form of EEPROM? [1]

Q. 6 Write the objective of the following Arduino codes: [3]

(a)
```
void main() {
  int a = 0;
    double d = 10.21;
    printf("%lu", sizeof(a + d));
}
  void loop() {
}
```

(b)
```
#include<EEPROM.h>
  int pin=13;
  void setup() {
   pinMode(pin,OUTPUT);
     Serial.begin(9600);
  }
  void loop() {
  for(int i=0;i<EEPROM.length();i++) {
  EEPROM.write(i, 1);
  }
  digitalWrite(pin,HIGH);
  exit(0);
  }
```

(c)
```
    void setup() {
     Serial.begin(9600);
     }
     void setup() {
     Serial.write(40);
     }
```

Q. 7 The depletion layer across a p+-n junction lies mostly in which region? [1]

Q. 8 What is the tolerance of the silver stripe in the resistor? [1]

Q. 9 What is the purpose of the 6th color band in the resister over the 5-band resistors? [1]

Q. 10 Considering no tolerance band in the resister, the default tolerance is _____ [1]

Q. 11 What is the color coding of a 340 KΩ resistor with 5% tolerance? [1]

Q. 12 What is the color code of a (47±4.7) KΩ resistor? [1]

Q. 13 Find the resistance of a 4-band resistor with white, brown, red, and silver stripes. [1]

Q. 14 What is a PCB? What is the use of PCB? [2]

Q. 15 What is a seven-segment display? How it works?

Q. 16 What is a PIR module? How it works? [2]

Q. 17 What is 555 IC timer? Draw its pin diagram. [2]

Q. 18 What is a thermistor? How many types of thermistors exist? Explain how it works. [2]

Q. 19 Explain the pin diagram of an LCD. How to integrate an LCD with Arduino? [2]

Q. 20 Define HC 05 Bluetooth Module. How it works? [2]

Q. 21 What is ESP8266 Module? How it works? [2]

Q. 22 What is a voltage regulator, and how it works? [2]

Q. 23 What is the difference between Arduino UNO and Arduino Nano? [2]

Q. 24 Describe Arduino UNO with its circuit diagram and pin description. [2]

Q. 25 Define drift and diffusion current in PN junction diode. What is their role? [2]

Q. 26 Explain resistance, capacitance, and inductance. [3]

Q. 27 Write the detailed working of BJT for CB configuration. Also, draw the input-output VI characteristics. [7]

Q. 28 Describe your HWS project with its objectives, circuit diagram, components, methodology, applications, limitations, and future scope.