

**P.E.S. College of Engineering, Mandya - 571 401***(An Autonomous Institution affiliated to VTU, Belagavi)***Fifth Semester, B.E. - Electronics and Communication Engineering****Semester End Examination; Feb. - 2021****Embedded System and IoT (Technical Skills - I)***Time: 2 hr.**Max. Marks: 50***Course Outcomes***The Students will be able to:**CO1: Understand the concepts of programming in C and Embedded C.**CO2: Analyze the implementations of embedded processors (Arduino) with different peripherals.**CO3: Illustrate the embedded systems (Arduino microcontroller) for simple automations.**CO4: Explore and understand modern tools both hardware and software used with embedded technology and IoT.**CO5: Develop the capability to learn on your own individually and in group to explore advanced technologies in embedded system and IoT.***Note: All questions are compulsory and each question carries TWO marks.**

| Q. No. | Questions                                                                                                                                                                                                                                                                                                                                          | BLs | COs | POs |
|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|
| 1.     | What is the 16-bit compiler allowable range for integer constants?<br>a) $-3.4e38$ to $3.4e38$ b) $-32767$ to $32768$<br>c) $-32668$ to $32667$ d) $-32768$ to $32767$                                                                                                                                                                             | L2  | CO1 |     |
| 2.     | Bluetooth is the wireless technology for _____<br>a) Local area network                      b) Personal area network<br>c) Metropolitan area network              d) Wide area network                                                                                                                                                            | L2  | CO1 |     |
| 3.     | Which frequency does the RFID Module operate in?<br>a) 12.98 MHz              b) 14.67 MHz              c) 19.56 MHz              d) 13.56 MHz                                                                                                                                                                                                     | L2  | CO1 |     |
| 4.     | Which of the following gives the memory address of integer variable a?<br>a) *a;                      b) a;                      c) &a;                      d) address(a);                                                                                                                                                                        | L2  | CO1 |     |
| 5.     | LoRa modules do come in different frequency ranges, the most common being the<br>a) 433 MHz              b) 915 MHz              c) 868 MHz              d) All the above                                                                                                                                                                          | L2  | CO1 |     |
| 6.     | Which one of the following is a loop construct that will always be executed at least once?<br>a) for                      b) while                      c) switch                      d) do while                                                                                                                                                 | L3  | CO2 |     |
| 7.     | What is the output of C program?<br><pre>int main() { struct laptop { int cost; char brand[10]; }; struct laptop L1={5000,"ACER"}; struct laptop L2={6000,"IBM"}; printf("Name=%s ",L1.cost); printf("Name=%s ",L2.brand); return 0; }</pre><br>a) ACER IBM                      b) IBM ACER<br>c) 5000 IBM                      d) Compiler error | L3  | CO2 |     |
| 8.     | Which of the following digital pins can be used in Arduino Nano/Uno to give interrupt?<br>a) D2              b) D62              c) D4, 2D5              d) D2, D3                                                                                                                                                                                 | L4  | CO2 |     |

9. For a servo motor to run, the three pins required of the Arduino Uno are:
- |                      |                      |    |     |
|----------------------|----------------------|----|-----|
| a) Vcc, GND, PWM     | b) Vcc, GND, Analog  | L2 | CO2 |
| c) Vcc, PWM, Digital | d) Vcc, GND, Digital |    |     |
10. What happens when the sequence 0 1 1 is fed to the L298N driver IN1, IN2 and ENA pins respectively?
- |                             |                                 |    |     |
|-----------------------------|---------------------------------|----|-----|
| a) Clockwise Motor Rotation | b) Anticlockwise Motor Rotation | L4 | CO2 |
| c) Stops Motor Rotation     | d) Stalls Motor Rotation        |    |     |
11. In Common cathode 7- Segment Display, To Display 5 what should be the value of a, b, c, d, e, f, g
- |            |            |            |            |    |     |
|------------|------------|------------|------------|----|-----|
| a) 1101101 | b) 1011011 | c) 0100100 | d) 0010010 | L4 | CO3 |
|------------|------------|------------|------------|----|-----|
12. In 16x2 LCD Display, To Generate the Heart shape Custom Character. The initialization of pixel value is
- |                                                                                             |        |
|---------------------------------------------------------------------------------------------|--------|
| a) byte H [8] = { 0b00000, 0b01010, 0b11111, 0b11111, 0b01110, 0b00100, 0b00000, 0b00000 }; |        |
| b) byte H[8] = { 0b00100, 0b01110, 0b01110, 0b01110, 0b11111, 0b00000, 0b00100, 0b00000 };  | L4 CO3 |
| c) byte H[8] = { 0b11111, 0b10101, 0b11111, 0b11111, 0b01110, 0b01010, 0b11011, 0b00000 };  |        |
| d) byte H[8] = { 0b00000, 0b00001, 0b00011, 0b10110, 0b11100, 0b01000, 0b00000, 0b00000 };  |        |
13. What should be the value of A and B to Light Led with 40% duty cycle?
- ```
void setup()
{
pinMode(13, OUTPUT);
}
void loop()
{
digitalWrite(13, HIGH);
delay(A);
digitalWrite(13, LOW);
delay(B);
}
```
- |                   |                   |                   |                   |    |     |
|-------------------|-------------------|-------------------|-------------------|----|-----|
| a) A = 40, B = 50 | b) A = 40, B = 55 | c) A = 32, B = 48 | d) A = 40, B = 40 | L4 | CO3 |
|-------------------|-------------------|-------------------|-------------------|----|-----|
14. In the following code in order to generate the fading of LED. What should be the **for loop** Initialization
- ```
//Initializing LED Pin
int led_pin = 6;
void setup()
{
//Declaring LED pin as output
pinMode(led_pin, OUTPUT);
}
void loop()
{
for( ? ; ? ; ? ) //L1
{
analogWrite(led_pin, i); delay(5);
}
for( ? ; ? ; ? ) //L2
{
analogWrite(led_pin, i); delay(5);
}
}
```
- |  |  |  |  |    |     |
|--|--|--|--|----|-----|
|  |  |  |  | L4 | CO3 |
|--|--|--|--|----|-----|



22. If 1 means an object is detected and 0 meaning no object is detected, then considering the sensor is stationary, what can be said about the movement of the object if the output by the sensor is 1010101?
- a) Object is stationary L4 CO5
  - b) Object is oscillating side by side
  - c) Object is continuously moving away
  - d) Object is continuously moving closer
23. If the PPM concentration of a gas that is being detected by the MQ2 Gas Sensor increases what will happen to its Analog Output pin?
- a) Voltage Increases L4 CO5
  - b) Voltage Decreases
  - c) Voltage becomes 0
  - d) Voltage doesn't change
24. Study the following program:
- ```
main() {  
    char x [10], *ptr = x;  
    scanf ("%s", x);  
    change(&x[4]); }  
change(char a[]) {  
    puts(a); }
```
- If abcdefg is the input, the output will be
- a) abcd L4 CO5
  - b) abc
  - c) efg
  - d) Garbage
25. How long is the LED on?
- ```
void loop() {  
    digitalWrite(13, HIGH);  
    delay(1000);  
    digitalWrite(13, LOW);  
    delay(1000);  
    digitalWrite(13, HIGH);  
    delay(2000); }
```
- a) 3 seconds L3 CO5
  - b) 100 seconds
  - c) 1 second
  - d) 100 milliseconds

\* \* \*