CSARC
COMPUTER SCIENCE &
ROBOTICS CERTIFICATION

CERTIFICATION IN ARDUINO

FOR LEARNERS

Sample Questions

(For reference only, score composition for various questions and sections may vary.)

Total Time: 2 hours
Total Score: 25

Answer ALL questions in pen.

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Section A: Theory

NOTE: Laptop use for this section is not allowed. Submit Section A for marking before turning on your laptop.

1. CIRCLE one error in the sketch below. [1]

```
void setup() {
  pinMode(A0, INPUT);
  pinMode(13, OUTPUT);
}

void loop() {
  if (analogRead(A0) < 0) {
    digitalWrite(13, HIGH);
  } else {
    digitalWrite(13, LOW);
  }
}
```

2. What is the value of Q at the end of the while loop? [1]

```
count = 0
Q = 3
while (count >= 5) {
  Q = Q + 2;
  count++;
}
```

Answer:

NOTE: Submit section A before turning on your laptop and starting with Section B.

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Section B: Practical Task 1 (Grade 1)

3. Build a circuit with the following components: [4]
    a. Push Button 1 connected to Digital Pin 2
    b. Push Button 2 connected to Digital Pin 3
    c. LED connected to Digital Pin 9
    d. Potentiometer connected to Analog Input Pin A0

    You are to use the appropriate resistors for wiring these components.

4. Using the circuit built in question 3, program the following
    a. Create a variable "brightness" with value of 500 at the start of the program. [1]
    b. When Button 1 is pressed, "brightness" value increases by 100. When Button 2 is pressed, "brightness" value decreases by 100. [1]
    c. "brightness" value must be between 0 to 1000 (inclusive). [1]
    d. Use "brightness" value as an analog output to LED. [1]

5. Using the circuit built in question 3, program the following
    a. Create a variable "duration". The value of this variable is determined by the analog value of the Potentiometer as follows: [1]

Potentiometer Value (X)	**Duration Value**
$X \leq 300$	300 ms
$300 < X \leq 700$	600 ms
$X > 700$	900 ms

    b. When Button 1 is pressed, LED will blink on and off with a duration of "duration". [1]
    c. Write the "duration" value to the Serial Monitor. [1]

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Section C: Practical Task 2 (Grade 2)

6. Build a circuit with the following components [3]
    a. LCD Screen (with I2C driver)
    b. Ultrasonic Sensor
    c. Servo Motor

    You are to use the appropriate resistors for wiring these components.

7. Using the circuit built in question 6, program the following:
    a. Use the Ultrasonic Sensor to sense the distance of the nearest object in front of it in cm. Write this program as a custom function in the following format. [3]

```
float ultrasonic() {

}
```

    b. Display the Ultrasonic Sensor distance on the LCD Screen. [2]
    c. Write the Servo Motor position based on the Ultrasonic Sensor distance as follows. [2]

Ultrasonic Sensor (cm)	**Servo Motor**
cm ≤ 30	0 degrees
cm > 30	90 degrees

- End of Paper -

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