

Enrollment No.....



Faculty of Engineering  
End Sem Examination May-2023

RA3CO22

Microcontroller &amp; Programmable Logic Controllers

Programme: B.Tech.

Branch/Specialisation: RA

**Duration: 3 Hrs.****Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

- Q.1 i. 8051 is \_\_\_\_\_ microcontroller. 1  
 (a) 4-bit (b) 8-bit  
 (c) 16-bit (d) 32-bit
- ii. Which of the following is Features of 8051 Microcontroller? 1  
 (a) 16-bit program counter and data pointer  
 (b) Four 8-bit ports  
 (c) Three internal and two external Interrupts  
 (d) All of these
- iii. Expand IDE full form \_\_\_\_\_. 1  
 (a) Integrated Development Environment  
 (b) Interfaced Developed Module  
 (c) Interleaving Deficit Expander  
 (d) Interleaving Developed Environment
- iv. If the voltage is greater than \_\_\_\_\_, then the Arduino board will be damaged. 1  
 (a) 10 (b) 30 (c) 20 (d) 05
- v. Which raspberry pi model has an Ethernet port? 1  
 (a) Model A+ (b) Model B+  
 (c) Both a and b (d) None of these
- vi. How much RAM does raspberry pi 4 model B have? 1  
 (a) 1GB (b) 4GB (c) 8GB (d) 10GB
- vii. The programmable logic controllers are used in \_\_\_\_\_. 1  
 (a) Manufacturing (b) Automation  
 (c) Both (a) and (b) (d) None of these

P.T.O.

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- viii. What are the types of programmable logic controllers? **1**  
 (a) Fixed, uniform PLC (b) Modular, uniform PLC  
 (c) Fixed and Modular PLC (d) None of these
- ix. The PLC internally operates, stores, and calculates the value in \_\_\_\_\_. **1**  
 (a) Binary format (b) Decimal format  
 (c) Octal format (d) Any of these
- x. The amount of time for which a Timer is programmed is- **1**  
 (a) Preset (b) Set point  
 (c) Done bit (d) Accumulated time

- Q.2 i. Write a single program to perform the mathematical operations on 06H **4**  
 and 02H in the following sequence and show the final value stored in  
 the accumulator.  
 (a) Addition (b) Subtraction  
 (c) Multiplication (d) Division
- ii. Draw the Pin Diagram of 8051 Microcontroller, and describe the pin **6**  
 functions.
- OR iii. How many addressing modes are provided by 8051 micro-controllers? **6**  
 Explain each of them with an example.

- Q.3 i. Write a program to blink the LEDs in the following manner- **4**

Phase	LED1	LED2	LED3
ON	1	1	0
Delay	0	1	1
Delay	1	1	0

- ii. Describe Arduino Uno Board components with their functions. **6**
- OR iii. Write the various steps involved in hardware and software testing and **6**  
 troubleshooting with Arduino.
- Q.4 i. What is Raspberry Pi? How does it work? **4**
- ii. Write the Hardware & Software requirement for headless setup of **6**  
 Raspberry Pi.
- OR iii. Explain the functions of any 6 pin on GPIO header, available with **6**  
 current Raspberry Pi boards.

- Q.5 i. In terms of operations how PLC differ from relay panel. **4**
- ii. Draw the block diagram of PLC architecture & explain each block in **6**  
 detail.

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- OR iii. Verify each type of 'comparison instructions' in PLC using suitable **6**  
 examples.
- Q.6 Write a short note on any two:
- i. Selection of PLC and its Maintenance. **5**
- ii. PLC timer functions. **5**
- iii. PLC counter functions. **5**

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### Marking Scheme

#### RA3CO22 (T) Microcontroller and Programmable Logic

- Q.1 i) 8051 is \_\_\_\_\_ microcontroller. **1**  
b. 8-bit
- ii) Which of the following is Features of 8051 Microcontroller? **1**  
d. All of these
- iii) Expand IDE full form \_\_\_\_\_? **1**  
a. Integrated Development Environment
- iv) If the voltage is greater than \_\_\_\_\_, then the Arduino will destroy. **1**  
c. 20
- v) Which raspberry pi model has an Ethernet port? **1**  
c. Both a and b
- vi) How much RAM does raspberry pi 4 model B have? **1**  
b. 4GB
- vii) The programmable logic controllers are used in \_\_\_\_\_ **1**  
c. Both a and b
- viii) What are the types of programmable logic controllers? **1**  
c. Fixed and Modular PLC
- ix) The PLC internally operates, stores, and calculates the value in \_\_\_\_\_ **1**  
a. Binary format
- x) The amount of time for which a Timer is programmed is- **1**  
b. Set point
- Q.2 i. 1. Addition -**0.5 Marks** **4**  
2. Subtraction- **0.5 Marks**  
3. Multiplication- **1 Marks**  
4. Division- **1 Marks**  
final value stored in the accumulator. **1 Marks**
- ii. Draw the Pin Diagram of 8051 Microcontroller **2 Marks** **6**  
describe the pin functions. **4 Marks**
- OR iii. How many addressing modes are provided by 8051 micro- **6**  
controllers? - **2 Marks**  
Explain each of them with an example. **4 Marks**
- Q.3 i. Write a program to blink the LEDs in the following manner- **1** **4**  
**Marks for each step**
- |       |      |      |      |
|-------|------|------|------|
| Phase | LED1 | LED2 | LED3 |
|-------|------|------|------|

ON	1	1	0
Delay	0	1	1
Delay	1	1	0

- ii. Describe Arduino Uno Board components with their functions. **6**  
**(1x6 Marks)**
- OR iii. hardware testing and troubleshooting with Arduino. **3 Marks** **6**  
software testing and troubleshooting with Arduino. **3 Marks**
- Q.4 i. What is Raspberry Pi? **2 Marks** **4**  
How does it work? **2 Marks**
- ii. Hardware Requirement **3 Marks** **6**  
Software Requirement **3 Marks**
- OR iii. Explain the functions of any 6 pin on GPIO header, available with **6**  
current Raspberry Pi boards. **(1x6 Marks)**
- Q.5 i. It terms of operations how PLC differ from relay panel? **4**  
**Diagram 1 Mark**  
**Explanation 3 Marks**
- ii. Draw the block diagram of PLC architecture & explain each block **6**  
in detail.  
**Diagram 2 Mark**  
**Explanation 4 Marks**
- OR iii. Any 3 types of PLC comparison instructions with example. **(2x3** **6**  
**Marks)**
- Q.6 Write a short note on any two:
- i. Selection of PLC and its Maintenance. **Explanation 5 Marks** **5**
- ii. PLC timer functions. **Explanation with figures 5 Marks** **5**
- iii. PLC counter functions. **Explanation with figures 5 Marks** **5**

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