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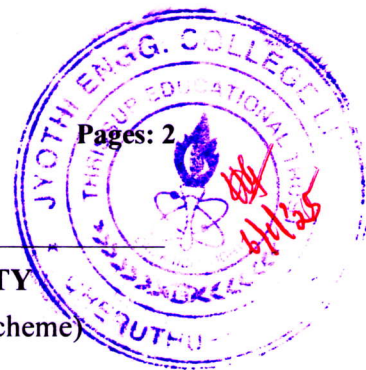
0200RAT206122302

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Reg No.: \_\_\_\_\_

Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
B.Tech Degree S4 (S, FE) Examination December 2024 (2019 Scheme)



**Course Code: RAT206**

**Course Name: MICROCONTROLLERS AND EMBEDDED SYSTEMS**

Max. Marks: 100

Duration: 3 Hours

**PART A**

*(Answer all questions; each question carries 3 marks)*

		Marks
1	Explain the clock circuit used in 8051 microcontroller.	3
2	Define stack and stack pointer in 8051.	3
3	Explain Interrupt Enable (IE) special function register of 8051.	3
4	Explain SCON special function register of 8051.	3
5	List the applications of embedded system.	3
6	Explain the testing process in embedded system design process.	3
7	List the features of Arduino IDE.	3
8	Describe the components of an Arduino Uno board.	3
9	Explain the need of an OS in embedded system.	3
10	Describe SPI communication protocol.	3

**PART B**

*(Answer one full question from each module, each question carries 14 marks)*

**Module -1**

- |    |  |    |
|----|--|----|
| 11 | a) Explain the register organization in 8051 microcontroller.  | 7  |
|    | b) Describe the input output ports of 8051 microcontroller.  | 7  |
| 12 | a) Explain the operation of PUSH and POP instructions in 8051 microcontroller.                           | 4  |
|    | b) Write an assembly language program to copy a value of A3 H into RAM memory locations 40H to 45H using |    |
|    | 1. Direct addressing method  | 10 |
|    | 2. Register indirect addressing method   |    |

**Module -2**

- |    |   |    |
|----|---|----|
| 13 | Write an Embedded C program to interface key board to 8051 microcontroller. Also draw the circuit connection. | 14 |
|----|---|----|

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- 14 Explain LCD interfacing with 8051 microcontroller. Write an embedded C program to send letters M,D and E to the LCD using delays. 14

### Module -3

- 15 a) Describe the general model of an embedded system. 4  
b) Explain hardware components in embedded system architecture with necessary diagrams. 10
- 16 Explain the various steps involved in the design process of an embedded system. 14

### Module -4

- 17 Explain in detail the interfacing of a seven-segment display with relevant program and circuit connection. 14
- 18 Draw the board level schematic representation of Arduino Uno and explain each block. 14

### Module -5

- 19 Describe kernels in operating system and its different types 14
- 20 Explain SPI and USB communication protocols. 14

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