

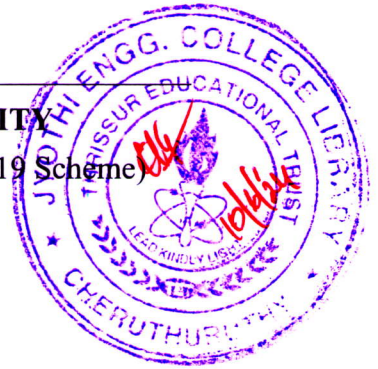
0200RAT206122303

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Fourth Semester B.Tech Degree (R,S) Examination May 2024 (2019 Scheme)

**Course Code: RAT206****Course Name: RAT206 MICROCONTROLLERS AND EMBEDDED SYSTEMS**

Max. Marks: 100

Duration: 3 Hours

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

Marks

- | | | |
|----|---------------------------------------------------------------------------------------|---|
| 1 | List the main features of 8051 Microcontroller. | 3 |
| 2 | Describe the different types of buses used in 8051 Microcontroller. | 3 |
| 3 | Explain the function of the instructions in 8051 microcontroller:
MUL AB & DIV AB. | 3 |
| 4 | Differentiate ALP & embedded C programming. | 3 |
| 5 | Define an Embedded system. | 3 |
| 6 | Explain the need of Tool chains in embedded system. | 3 |
| 7 | Describe the memory allocations in Arduino Uno. | 3 |
| 8 | Justify the recommendation for Arduino Uno board over other boards for beginners. | 3 |
| 9 | Explain the different functional layers of a computer system? | 3 |
| 10 | List the advantage and disadvantages of Monolithic Kernel. | 3 |

PART B*(Answer one full question from each module, each question carries 14 marks)***Module -1**

- | | | |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| 11 | a) Explain the architecture of 8051 Microcontroller with neat block diagram. | 10 |
| | b) Write an assembly language code to push R5, R6 and A onto the stack and then pop them back into R2, R3 and B, where register B=register A, R2=R6 and R3=R5. | 4 |
| 12 | a) Explain in detail about the memory organization of 8051 Microcontroller. | 10 |
| | b) Write an ALP program to transfer a block of data from internal memory location to external memory location. | 4 |

Module -2

- | | | |
|----|---------------------------------------------------------------------------------|---|
| 13 | a) Explain the various interrupts in 8051 microcontrollers with their priority. | 7 |
|----|---------------------------------------------------------------------------------|---|

- b) Explain the structure of TMOD register 7
- 14 a) Explain about the Interfacing of LCD peripherals to 8051 Microcontroller. Write an ALP to display the message 'HELLO' in LCD Display. 7
- b) Explain about the serial communication registers in 8051 Microcontroller. 7

Module -3

- 15 Explain in detail the steps involved in embedded system design process with neat diagram. 14
- 16 Explain in detail any two embedded product life cycle models with necessary diagrams. 14

Module -4

- 17 a) Explain the different pins of Arduino Uno Board. 7
- b) Write an Arduino sketch to control speed and direction of spin of a dc motor. 7
- 18 Write a program to monitor the room temperature by interfacing LM35 and seven segment display with Arduino Uno board. 14

Module -5

- 19 a) Explain the functional block diagram of an OS. 7
- b) Compare General Purpose OS and Real Time OS. 7
- 20 a) Explain SPI communication protocol. 7
- b) Explain how RS232 helps in communication. 7
