



B.E/B.TECH DEGREE EXAMINATIONS: NOV/DEC 2024

(Regulation 2018)

Fifth Semester

ELECTRONICS AND INSTRUMENTATION ENGINEERING

U18EII5202: Embedded Microcontrollers

COURSE OUTCOMES

CO1: Relate microcontroller architecture to embedded development

CO2: Develop algorithms for embedded system design

CO3: Practice serial protocol programming with microcontrollers

CO4: Specify appropriate protocol for given application

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 2 = 20 Marks)

(Answer not more than 40 words)

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|---|-----------------------|
| 1. Recall interrupt vector table. | CO1 [K ₁] |
| 2. List the importance of volatile keyword. | CO1 [K ₁] |
| 3. What is GPIO? | CO2 [K ₁] |
| 4. List the functions of GPIO drivers. | CO2 [K ₁] |
| 5. List the UART interrupts. | CO3 [K ₁] |
| 6. How many wires are used in UART Communication? | CO3 [K ₁] |
| 7. What are the protocol operating modes in I2C? | CO4 [K ₁] |
| 8. How do you write TX/RX API in I2C? | CO4 [K ₁] |
| 9. Recall SPI essentials. | CO3 [K ₁] |
| 10. Define SPI Master/Slave communication. | CO4 [K ₁] |

Answer any FIVE Questions:-
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

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|-----|----|---|----|-----|-------------------|
| 11. | a) | Illustrate the working operation of ARM architecture. | 8 | CO1 | [K ₂] |
| | b) | Explain the operation of MCU interrupt design with the neat vector table. | 8 | CO1 | [K ₂] |
| 12. | a) | Elaborate on the working principle of GPIO controller for peripheral devices that use the GPIO pins with the neat sketch. | 10 | CO2 | [K ₃] |
| | b) | Explain the programming structure of GPIO with a suitable sketch. | 6 | CO2 | [K ₃] |
| 13. | a) | Explain the operation of a functional block diagram of STM 32 UART with a suitable block diagram. | 8 | CO3 | [K ₃] |
| | b) | How do you write TX/RX function STM 32 UART? | 8 | CO3 | [K ₃] |
| 14. | a) | Discuss the Interrupt Handling Mechanisms in I2C Communication. | 8 | CO4 | [K ₂] |
| | b) | Explain the Key Peripheral Registers in an I2C Interface. | 8 | CO4 | [K ₂] |
| 15. | a) | Identify and Describe the important Registers in an SPI Interface. | 8 | CO5 | [K ₃] |
| | b) | Outline the Steps to Write an SPI Driver Header File. | 8 | CO5 | [K ₂] |
| 16. | a) | Write a Sample Application for I2C Master Communication, Including Code. | 8 | CO4 | [K ₃] |
| | b) | Describe the Functional Block Diagram of an I2C Interface and the role of Clocks. | 8 | CO4 | [K ₂] |
