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Question Paper Code	12481
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**B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2023**  
Fourth Semester  
**Electronics and Communication Engineering**  
(Common to Fifth Semester - Computer and Communication Engineering)  
**20ECPC402 - MICROCONTROLLERS AND EMBEDDED SYSTEMS**  
(Regulations 2020)

Duration: 3 Hours

Max. Marks: 100

**PART - A (10 × 2 = 20 Marks)**

Answer ALL Questions

- |   | <i>Marks,</i><br><i>K-Level, CO</i> |
|---|-------------------------------------|
| 1. What are called as assembler directives? Give two examples.                            | 2,K1,CO1                            |
| 2. Define stack register.   | 2,K1,CO1                            |
| 3. What is the function of the DPTR register in 8051?                                     | 2,K1,CO2                            |
| 4. Write an ALP for addition of two numbers using 8051.                                   | 2,K2,CO2                            |
| 5. List the four display modes of 8279 keyboard and display controller.                   | 2,K1,CO3                            |
| 6. Compare Simplex and Duplex transmission.   | 2,K2,CO3                            |
| 7. State the difference between requirement and specifications in embedded system design. | 2,K1,CO5                            |
| 8. Define round robin scheduling.   | 2,K1,CO5                            |
| 9. Interpret the term "ARM7 TDMI".  | 2,K1,CO6                            |
| 10. Name five peripherals in the LPC 2148 MCU.  | 2,K1,CO6                            |

**PART - B (5 × 13 = 65 Marks)**

Answer ALL Questions

- |   |           |
|---|-----------|
| 11. a) Draw and explain about the internal architecture of 8086.  | 13,K2,CO1 |
| <b>OR</b>   |           |
| b) Explain Data transfer, arithmetic and branch instructions with examples.   | 13,K2,CO1 |
| 12. a) Explain the architecture of the 8051 microcontroller with a neat diagram.  | 13,K2,CO2 |
| <b>OR</b>   |           |
| b) Discuss the timers of 8051 microcontroller.  | 13,K2,CO2 |
| 13. a) With functional block diagram, explain the operation and programming of 8251 USART (Serial communication Interface in detail). | 13,K2,CO3 |

*K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create*

**12481**

**OR**

b) Explain in detail about DMA controller with its diagram. *13,K2,CO3*

14. a) Describe the requirement, specification and state diagram of a model train controller with necessary illustrations. *13,K2,CO5*

**OR**

b) Explain task scheduling algorithm in embedded real time system. *13,K2,CO5*

15. a) Classify the ARM instruction set and explain any one type of instruction set with examples. *13,K2,CO6*

**OR**

b) Draw the architecture of the ARM 9 processor and explain its functional units. *13,K2,CO6*

**PART - C (1 × 15 = 15 Marks)**

16. a) Interface a DAC to 8051 microcontroller and write an assembly language program to generate sine wave using the DAC interface. *15,K2,CO4*

**OR**

b) Draw the block diagram of traffic light control system using 8051. *15,K2,CO4*