

R18

Code No: 155CF

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year I Semester Examinations, January - 2025

MICROPROCESSORS AND MICROCONTROLLERS

(Common to ECE, EIE)

Time: 3 Hours

Max. Marks: 75

Note: i) Question paper consists of Part A, Part B.

ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.

iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART - A

(25 Marks)

- 1.a) What is the role of the ALE and READY signals in 8086? [2]
- b) List and explain any three addressing modes of the 8086 microprocessor. [3]
- c) Define an interrupt in the context of the 8051 microcontroller. [2]
- d) What is the difference between a microcontroller and a microprocessor? [3]
- e) What is the purpose of interfacing an LCD with the 8051 microcontroller? [2]
- f) Define the concept of key debouncing in the context of keyboard interfacing. [3]
- g) Name the key features of the ARM architecture. [2]
- h) What is the role of the pipeline in an ARM processor? [3]
- i) Define the Harvard architecture as used in Cortex processors. [2]
- j) State two key applications of the OMAP processor. [3]

PART - B

(50 Marks)

- 2.a) Draw and explain the functional block diagram of the 8086 microprocessor.
- b) Compare the 8086 in minimum mode and maximum mode. [5+5]

OR

- 3.a) Explain the following instructions with examples:
PUSH and POP
INC and DEC
SHR and SHL
- b) Write a program to sort an array of 10 numbers in ascending order using 8086 instructions. [5+5]

- 4.a) Explain the architecture of the 8051 microcontroller with a neat diagram.
- b) Discuss the different types of addressing modes in the 8051 microcontroller with examples. [5+5]

OR

- 5.a) Explain the role and configuration of I/O ports in the 8051 microcontroller.
- b) Compare and contrast the various interrupts available in the 8051 microcontroller with their vector addresses. [5+5]

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- 6.a) Explain the process of interfacing a 16×2 LCD with the 8051 microcontroller. Include a circuit diagram and example code.
- b) Describe how external RAM and ROM can be interfaced with the 8051 microcontroller. Illustrate with necessary diagrams. [5+5]

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OR

- 7.a) Discuss the serial communication standards and their significance in microcontroller systems. Compare RS232 and USB.
- b) Describe the SPI communication protocol and its implementation in microcontroller systems. Provide an example. [5+5]

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- 8.a) Describe the ARM processor's register set and the role of the CPSR in detail.
- b) Explain the types of exceptions and interrupts in the ARM architecture and their handling mechanisms. [5+5]

OR

- 9.a) Discuss load and store instructions in ARM architecture, providing examples of their usage.
- b) Explain the concept of conditional execution in ARM and its advantages in instruction execution. [5+5]

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- 10.a) Discuss the key features and advantages of the Cortex-M series processors for embedded systems.
- b) Compare the OMAP processor architecture with ARM Cortex architecture in terms of performance and power efficiency. [5+5]

OR

- 11.a) Compare and contrast the Cortex-A, Cortex-R, and Cortex-M series processors in terms of design and applications.
- b) Explain the architecture of the OMAP processor. [5+5]

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