

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/  
COMMERCIAL PRACTICE, APRIL - 2025**

**EMBEDDED SYSTEM**

[Maximum marks: 100]

[Time: 3 Hours]

**PART – A**

**Maximum marks: 10**

**I.** (Answer *all* the questions in one or two sentences. Each question carries **2** marks)

1. List any two features of AVR family.
2. What are assembler directives?
3. Give the structure of macro.
4. Which is the highest priority interrupt in ATmega32?
5. List two application areas of embedded systems.

(5 x 2 = 10)

**PART – B**

**Maximum marks: 30**

**II.** (Answer any *five* of the following questions. Each question carries **6** marks)

1. Compare various members of AVR family.
2. Compare between SRAM and EEPROM in ATmega32.
3. Explain the arithmetic instructions with an example.
4. Describe I/O port programming in AVR.
5. Explain about serial Communication- $I^2C$  and SPI.
6. Describe the concept of arduino development board.
7. List the characteristic features of an embedded system.

(5 x 6 = 30)

**PART – C**

**Maximum marks: 60**

(Answer *one full* question from each unit. Each full question carries **15** marks)

**UNIT – I**

- III.** (a) Write a short note on ATmega32 status register. (8)
- (b) Explain the data memory of ATmega32 with diagram. (7)

**OR**

- IV.** (a) Explain any four addressing modes of AVR microcontroller. (8)  
(b) Explain the simplified block diagram of AVR microcontroller. (7)

**UNIT – II**

- V.** (a) Explain any four branch instructions with example. (8)  
(b) Explain the structure of assembly language program with an example. (7)

**OR**

- VI.** (a) Explain rotate instructions and two shift instructions with an example. (8)  
(b) Write an assembly language program to find number of one's in a given byte. (7)

**UNIT - III**

- VII.** (a) Explain the registers associated with Timer0 in ATmega32. (8)  
(b) Describe ATmega32 connection to RS232. (7)

**OR**

- VIII.** (a) Explain programming of external hardware interrupts. (8)  
(b) Write a AVR C program to toggle all bits of Port B 50000 times. (7)

**UNIT – IV**

- IX.** (a) Explain the general architecture of embedded operating system. (8)  
(b) List the different categories of embedded operating system with example. (7)

**OR**

- X.** (a) Explain task scheduling, context switching and mutual exclusion of an embedded operating system. (8)  
(b) Describe the concept of raspberry pi development board. (7)

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