

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/  
MANAGEMENT/COMMERCIAL PRACTICE, APRIL – 2026**

**EMBEDDED SYSTEM AND REAL TIME OPERATING SYSTEM**

[Maximum Marks: 75]

[Time: 3 Hours]

**PART-A**

**I. Answer ‘all’ the following questions in one word or one sentence. Each question carries ‘one’ mark.**

**(9 x 1 = 9 Marks)**

		Module Outcome	Cognitive level
1.	Write the total number of I/O pins available in ATmega32 microcontroller.	M1.03	R
2.	Give an example for a soft real time system.	M1.01	R
3.	Write AVR C statement to set PA0 pin of port A to function as input and rest of the pins as output.	M2.02	U
4.	Name the predefined function in AVR C to generate time delays.	M2.02	R
5.	What will be the output after executing the instruction, 1 << 3.	M2.03	U
6.	Define baud rate in serial communication.	M3.01	R
7.	Name any two registers of ATmega 32 ADC.	M3.02	R
8.	What is Kernel?	M4.01	R
9.	Define thread.	M4.03	R

**PART-B**

**II. Answer any ‘eight’ questions from the following. Each question carries ‘three’ marks.**

**(8 x 3 = 24 Marks)**

		Module Outcome	Cognitive level
1.	Describe the role of sensors and actuators in embedded systems.	M1.02	U
2.	Write short notes on the registers associated with I/O port of ATmega32.	M1.03	R
3.	Explain the classification of embedded systems based on complexity and performance.	M1.01	U
4.	Explain the logic operators used in AVR C programming with example.	M2.03	U
5.	Write an AVR C program to toggle all the pins of PORTA continuously using EX-OR operator.	M2.03	A
6.	Explain the steps to program AVR Timer to count external events.	M2.05	U
7.	List the features of ATmega32 ADC.	M3.02	R
8.	Draw the diagram for interfacing ATmega32 with RS232 and state the purpose of MAX232 IC.	M3.01	R
9.	Explain device driver software.	M4.07	U
10.	Describe Remote Procedure Call.	M4.06	U

**PART-C**

Answer 'all' questions from the following. Each question carries 'seven' marks.

**(6 x 7 = 42 Marks)**

		Module Outcome	Cognitive level
III.	Compare embedded systems with general purpose computers. <b>OR</b>	M1.01	U
IV.	Explain the basic architecture of AVR microcontroller with diagram.	M1.03	U
V.	Three LEDs are connected to PA0, PA1, PA2 pins of PORTA. Write an AVR C program to turn ON each LED, one at a time starting from PA0, with a delay of 1 second. <b>OR</b>	M2.02	A
VI.	Write an AVR C program to convert the ASCII digits '2' and '5' to packed BCD and display them on PORTC.	M2.04	A
VII.	Explain the basic registers of AVR Timers. <b>OR</b>	M2.05	U
VIII.	Describe the various steps in executing an interrupt in AVR.	M2.07	U
IX.	Explain the steps to send data and commands to LCD with the help of a diagram. <b>OR</b>	M3.01	U
X.	Draw the connection diagram of 4x4 matrix keyboard with AVR and explain the steps to detect a key press.	M3.01	U
XI.	Compare real time and general purpose operating systems with examples. <b>OR</b>	M4.02	U
XII.	Explain the different states of a process with the help of a diagram.	M4.03	U
XIII.	What is task scheduling? Explain any task scheduling algorithm with example. <b>OR</b>	M4.05	U
XIV.	State the significance of real time operating systems in embedded systems. Explain the non functional requirements in choosing a real time OS.	M4.08	U

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