

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/  
COMMERCIAL PRACTICE, NOVEMBER - 2024**

**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 1 mark.**

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

		Module outcome	Cognitive level
1	Define embedded systems.	M1.01	R
2	Name the register that contains the data to be written into a port.	M1.03	R
3	Give the code value to turn on eight LEDs connected to port B.	M2.02	R
4	Name any two embedded C data types.	M2.01	R
5	Name the different modes of operation of timers.	M2.05	R
6	Tell the LCD operations.	M3.01	R
7	List any two characteristics of DAC.	M3.02	R
8	List the various queues maintained by OS with CPU scheduling.	M4.05	R
9	List the non-functional requirements in selecting a RTOS.	M4.08	R

**PART B**

**II. Answer any eight questions from the following. Each question carries 3 marks.**

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

		Module outcome	Cognitive level
1	Outline the specific function registers in the ATmega32.	M1.03	U
2	Compare sensors and actuators.	M1.02	U
3	List the different classification criteria of embedded systems.	M1.03	R
4	Name the hardware interrupts in avr ATmega32.	M2.07	R
5	List the various sources of interrupts.	M2.08	R
6	Develop the algorithm of data serialization while implementing through C program. LSB should go first.	M2.04	A
7	Outline the sequence of actions of keyboard when a key pressed.	M3.01	U
8	List the Characteristics of ADC.	M3.02	R
9	Outline the concept of threads.	M4.03	U
10	Summarize the types of multitasking.	M4.04	U

**PART C**

**Answer all questions. Each question carries seven marks.**

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

		<b>Module outcome</b>	<b>Cognitive level</b>
III	Illustrate the simplified view of AVR microcontroller. <b>OR</b>	M1.03	U
IV	Explain the purpose and applications of Embedded system.	M1.02	U
V	Develop an embedded C program to convert packed BCD to ASCII and show the result bytes in PORTB and PORTC LEDs. <b>OR</b>	M2.02	A
VI	Develop an embedded C program to count from 0x00 to 0xFF to the LEDs connected to PORTD with 1 sec interval. Use timer0 in normal mode, no prescaler, to create time delay.	M2.06	A
VII	Explain about the timer registers of ATmega32. <b>OR</b>	M2.05	U
VIII	Identify the steps the microcontroller executes when an interrupt occurs.	M2.07	A
IX	Illustrate keyboard interfacing. <b>OR</b>	M3.01	U
X	Illustrate LM34/35 temperature sensor interfacing.	M3.02	U
XI	Summarize the key concepts of inter-task Communication. <b>OR</b>	M4.06	U
XII	Explain the key factors of Task Scheduling algorithms.	M4.05	U
XIII	Explain about the task synchronization issues. <b>OR</b>	M4.06	U
XIV	Explain multiprocessing in operating system.	M4.04	U

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