G. Narayanamma Institute of Technology & Science
(**Autonomous**)   (*for Women*)

Shaikpet, Hyderabad- 500 104

IV-B.Tech I-Semester *Regular/Supplementary Examinations, Nov-Dec - 2023*

EMBEDDED SYSTEM DESIGN

(*Common to ECE & ETE*)

Max. Marks: 70   Time: 03 Hours

Note:
1. Question paper comprises of **Part A** and **Part B**.
2. **Part A** is compulsory which carries 10 marks. Answer all questions in Part A.
3. **Part B** (for 60 marks) consists of **five questions** with **"either" "or"** pattern. Each question carries 12 marks and may have a,b,c as sub questions. The student has to answer any one full question.

PART-A
(*Answer 05 questions. Each question carries **2 marks***)

Q.No.	Question	Marks	CO	B L
Q.1	a) How does an embedded system differ from a general-purpose computer?	[02]	CO1	[L2]
	b) List out the characteristics of CISC processors?	[02]	CO2	[L1]
	c) What is embedded firmware, and how does it differ from software in general?	[02]	CO2	[L2]
	d) What is monolithic and microkernel? Which one is widely used in real-time operating systems?	[02]	CO5	[L2]
	e) What are the advantages of using message passing for task communication?	[02]	CO5	[L2]

END OF PART A

PART-B
(*Answer **05** full questions. Each question carries **12 marks***)

Q.No.	Question	Marks	CO	B L
Q.2(a)	What are the different criteria for classifying embedded systems based on their functions?	[06]	CO1	[L2]
(b)	What are the major application areas where embedded systems play a crucial role?	[06]	CO1	[L3]
	OR			
Q.3(a)	What is the purpose of real-time embedded systems, and where are they commonly used?	[06]	CO2	[L2]
(b)	Enumerate and provide explanations for the Quality Attributes inherent in Embedded Systems.	[06]	CO1	[L2]
Q.4(a)	Which are the components used as the core of an embedded system? Explain the merits and drawbacks.	[06]	CO2	[L4]
(b)	What is Programmable Logic Device (PLD)? What are the different types of PLDs? Explain the role of PLDs in Embedded System design.	[06]	CO3	[L4]
	OR			
Q.5(a)	Explain the sequence of operation for communicating with an I2C slave device.	[08]	CO2	[L2]
(b)	Differentiate between PLD and ASIC.	[04]	CO3	[L4]

Q.6(a)	Explain the role of Watchdog Timer in Embedded System.	[06]	CO2	[L2]
(b)	What are some best practices for designing reset circuits and brown-out protection in embedded systems? Explain how they can enhance the reliability of embedded system.	[06]	CO2	[L4]

OR

Q.7(a)	Why is a precise clock signal important in embedded systems? What are the factors to consider when selecting an oscillator type for an embedded system?	[06]	CO2	[L2]
(b)	What are some key considerations when designing software for interacting with an RTC in embedded systems? How can they enhance the functionality and reliability of embedded systems?	[06]	CO2	[L4]

Q.8(a)	Compare threads and processes in detail.	[06]	CO5	[L4]
(b)	Three processes with process IDs P1, P2, P3 with estimated completion time 8, 4, 7 milliseconds respectively enter the ready queue together in the order P3, P1, P2. P1 contains an I/O waiting time of 2 milliseconds when it completes 4 milliseconds of its execution. P2 and P3 do not contain any I/O waiting. Calculate the waiting time and Turn Around Time (TAT) for each process and the average waiting time and Turn Around Time in the LIFO scheduling. All the estimated execution completion time is excluding I/O wait time.	[06]	CO6	[L4]

OR

Q.9(a)	Describe the concept of 'multithreading'. What are the advantages of multithreading.	[06]	CO6	[L2]
(b)	Explain context switching, context saving and context retrieval.	[06]	CO5	[L2]

Q.10(a)	What is Inter Process Communication (IPC)? Give an overview of different IPC mechanisms adopted by various operating systems.	[06]	CO5	[L4]
(b)	Explain Race condition in detail, in relation to the shared resource access.	[06]	CO5	[L2]

OR

Q.11(a)	What is semaphore? Explain the different types of semaphores. Where is it used?	[06]	CO5	[L2]
(b)	Draw the architecture of device driver? Explain its role in the OS context.	[06]	CO5	[L4]

END OF PART B
END OF THE QUESTION PAPER