R18

Code No: 156AV

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year II Semester Examinations, January/February - 2025

EMBEDDED SYSTEM DESIGN

(Electronics and Communication Engineering)

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 are the major components of an embedded system?	[2]
b)	What are the key characteristics of an embedded system?	[3]
c)	What is the purpose of a watchdog time in embedded systems?	[2]
d)	Briefly explain the concept of load-store operation.	[3]
e)	What is a super loop based approach?	[2]
f)	State the purpose of Reset circuit.	[3]
g)	Define the term hard real-time and soft real-time systems.	[2]
h)	Write the difference between task, process and thread in operating system context.	[3]
i)	What is meant by a Device Driver?	[2]
j)	How are Pipes IPC different from Message Queues?	[3]

PART – B

(50 Marks)

2. Explain the different applications of an embedded system. [10]

OR

3. Summarize the history and evolution of embedded systems. [10]

4.a) Make a comparison between a microprocessor and a microcontroller.
b) Discuss the characteristics and features of RISC and CISC processors. [5+5]

OR

5.a) What is Programmable Peripheral Interface(PPI)? Explain the interfacing of 8255 PPI with an 8-bit Micocontroller.
b) Explain the functionality of RS232 interface in detail. [5+5]

6.a) What are the advantages and disadvantages of assembly language based embedded firmware development?
b) What is a brown-out protection circuit? How does a brown-out protection circuit detect a drop in voltage levels and prevent system malfunction? Explain briefly. [5+5]

OR

7. What are some common design approaches used in embedded firmware development? Explain. [10]

8.a) List and explain the functions of Real time kernel.

b) Explain briefly about Multitasking, Multiprocessing and Multithreading. [5+5]

OR

9.a) Three processes with process IDs P1, P2, P3, P4 with estimated completion time 10, 5, 7, 9 milliseconds respectively enter the ready queue together in the order P1, P2, P3, P4. Calculate the average waiting time and average Turn Around Time (TAT) for each process using FIFO and LIFO scheduling (Assuming there is no I/O waiting for the processes in the FIFO and LIFO scheduling.

b) Illustrate various scenarios and solutions in the Dining Philosopher's problem. [5+5]

10. Explain how pipes facilitate inter-task communications in an embedded system with an illustrative example. [10]

OR

11. Describe event based and signal based synchronization mechanisms in detail. [10]

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