INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)
Dundigal-500043, Hyderabad

B.Tech VII SEMESTER END EXAMINATIONS (REGULAR) - DECEMBER 2023
Regulation: UG-20
EMBEDDED SYSTEMS

Time: 3 Hours   (CSE | CSE (AI & ML) | CSE (DS) | CSE (CS) | CSIT | IT)   **Max Marks: 70**

Answer ALL questions in Module I and II
Answer ONE out of two questions in Modules III, IV and V
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

MODULE – I

1. (a) Classify embedded systems based on complexity and performance requirements and give some examples. [BL: Understand| CO: 1|Marks: 7]

   (b) Design a digital camera with software and hardware units and also illustrate how it is works based on embedded design. [BL: Apply| CO: 1|Marks: 7]

MODULE – II

2. (a) Demonstrate the steps of binding and running embedded C program in Keil IDE with an example program. [BL: Understand| CO: 2|Marks: 7]

   (b) Develop a basic embedded C application that can read and write bits and provide an explanation. [BL: Apply| CO: 2|Marks: 7]

MODULE – III

3. (a) List the features of RTOS. Describe in detail about multiprocessing and multitasking with example. [BL: Understand| CO: 3|Marks: 7]

   (b) Three processes with process IDs P1, P2, P3 with estimated completion time 10, 5, 7 milliseconds respectively enters the ready queue together in the order P1, P2, P3. Calculate the waiting time and turn around time (TAT) for each process and the average waiting time and turn around time (Assuming there is no I/O waiting for the processes) [BL: Apply| CO: 3|Marks: 7]

4. (a) Compare the characteristics of tasks, task states, process and threads in operating systems. [BL: Understand| CO: 4|Marks: 7]

   (b) Summarize different task communication synchronization issues encountered in inter process communication. [BL: Understand| CO: 4|Marks: 7]

MODULE – IV

5. (a) Illustrate a comprehensive detail on integrated development environment tools based on embedded systems. [BL: Understand| CO: 5|Marks: 7]

(b) Write a detail note on how the system is getting embedded software into the target system?

[BL: Apply| CO: 5|Marks: 7]

6. (a) Describe the problems faced in designing an RTOS. What techniques are used to overcome it?

[BL: Understand| CO: 5|Marks: 7]

(b) Give a brief explanation of the testing that is done on the host system during debugging procedures and mention its importance. [BL: Understand| CO: 5|Marks: 7]

MODULE – V

7. (a) Compare the various architectural features of one of the SHARC processors of your choice with its functional block diagram. [BL: Understand| CO: 6|Marks: 7]

(b) Design an elevator controller embedded system with the necessary hardware and software.

[BL: Apply| CO: 6|Marks: 7]

8. (a) With neat diagram, describe concepts of ARM programming model and list its features.

[BL: Understand| CO: 6|Marks: 7]

(b) Demonstrate I2C bus communication with its devices and indicate how does control area network (CAN) differ from I2C. [BL: Apply| CO: 6|Marks: 7]

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