



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal-500043, Hyderabad

B.Tech VII SEMESTER END EXAMINATIONS (REGULAR) - DECEMBER 2023

Regulation: UG-20

EMBEDDED SYSTEM DESIGN

Time: 3 Hours

(ECE)

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) What are the major differences between microprocessor and microcontroller? Explain the history of embedded systems. [BL: Understand| CO: 1|Marks: 7]
- (b) Discuss the conceptual specifications and detailed specifications written in UML language to design model train controller. [BL: Apply| CO: 1|Marks: 7]

MODULE – II

2. (a) How to interface an LCD display with 8051 microcontroller? Demonstrate a program to display a character using an LCD display. [BL: Apply| CO: 2|Marks: 7]
- (b) Implement the following Boolean expression using 3 input, 3 product terms and 2 outputs using PLA
 $F1 = AC + BC$
 $F2 = AC + AB'$ [BL: Apply| CO: 2|Marks: 7]

MODULE – III

3. (a) Illustrate in detail about the functional and nonfunctional requirements for real time operating system. [BL: Understand| CO: 3|Marks: 7]
- (b) Three processes with process IDs P1, P2, P3 and with estimated completion time 6, 4, 2 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) in round robin algorithm with time slice= 2ms. [BL: Apply| CO: 3|Marks: 7]
4. (a) Describe in detail how shared memory and message passing mechanisms are used in inter-process communication. [BL: Understand| CO: 4|Marks: 7]
- (b) Summarize how multiple tasks and multiple processes are handled in embedded computing systems. [BL: Understand| CO: 4|Marks: 7]

MODULE – IV

5. (a) Choose the different ways of getting the embedded software file into the target system. [BL: Understand| CO: 5|Marks: 7]

- (b) Elaborately discuss the process of building software for an embedded system with flow chart and explain cross compilers and cross assemblers. [BL: Understand| CO: 5|Marks: 7]
6. (a) Demonstrate the loading program components in embedded system using locator maps. [BL: Understand| CO: 5|Marks: 7]
- (b) Construct a basic test system, and give the necessary steps involved in testing a system. [BL: Understand| CO: 5|Marks: 7]

MODULE – V

7. (a) Summarize in detail about Von-Neumann architecture computer and Harvard architecture with neat diagram. [BL: Understand| CO: 6|Marks: 7]
- (b) Enumerate in detail with an example about addressing modes provided in DAG in SHARC processor. [BL: Understand| CO: 6|Marks: 7]
8. (a) With neat diagram explain the working of CAN bus. Illustrate about electrical interface, data frame. [BL: Understand| CO: 6|Marks: 7]
- (b) Draw the architecture of ARM processor, explain in detail about the features of ARM processor. Justify whether ARM is a microprocessor or a microcontroller. [BL: Apply| CO: 6|Marks: 7]

