



## **EC1308-EMBEDDED SYSTEMS**

### **UNIT-I**

### **INTRODUCTION TO EMBEDDED SYSTEMS**

#### **Part – A (2 MARKS)**

1. Define System
2. What is an Embedded system?
3. What are the Classification of embedded system?
4. What are the typical characteristics of an embedded system?
5. What are the advantages of embedded system?
6. What are the disadvantages of embedded system?
7. What are the applications of an embedded system?
8. Give the classification of embedded system?
9. What is a Processor?
10. What is a Microcontroller?
11. What are the hardware units?
12. What are the types of memories?
13. What are I/O related hardware units?
14. List few hardware units
15. What is an assembler?
16. What is a Linker?
17. What is a Loader?
18. What is a Locator?
19. List any five software tools of an embedded system.
20. Give the internal structure of FPGA?
21. Define FPGAs?
22. Define Real Time Operating System.

#### **PART B**

1. List the hardware units that must be present in the embedded systems. (16)
2. Explain the basic processors and hardware units in the embedded system
3. Explain the Exemplary applications of each type of embedded system. (16)
4. Explain the different program layers in the embedded software and also the process of converting a “C” program into the file for ROM image with suitable block diagrams. (16)
5. Explain the Embedded System on Chip (SoC) in VLSI circuit. (16)
6. Explain how software is embedded into a system
7. i) Explain the various form of memories present in a system (8)  
ii) Explain the software tools in designing of an embedded system. (8)

**UNIT-II**  
**DEVICES AND BUSES FOR DEVICES NETWORK**  
**Part – A (2 MARKS)**

1. What are the types of I/O devices?
2. Give examples of Serial output.
3. Define Synchronous communication.
4. List two characteristics of Synchronous communication.
5. Define bus?
6. Give the steps for accomplishing input output data transfer?
7. What do you meant by bus arbitration?
8. What do you meant by high speed device interface?
9. List two characteristics of Asynchronous communication.
10. What is HDLC?
11. Give some application protocols.
12. How many states in a timer?
13. Give any two uses of timer devices
14. What is I2C Bus?
15. What is CAN Bus?
16. What is USB Bus?
17. Give any 3 examples of advanced serial high speed buses.
18. What is ISA Bus?
19. What are the advances of PCI/X buses over PCI buses?

**PART B**

1. Explain the functions of various buses used during transfer?
2. Explain the synchronous and asynchronous communications from serial devices?
3. Explain the various timer and counting devices?
  - i) Explain the parallel port devices.
  - ii) Explain the sophisticated interfacing features in device ports.
4. Explain the timer and counting devices
5. Explain the signal using a transfer of byte when using the I2C bus and also the format of bits at the I2C bus with diagram.
6. Explain the various bus structures used in embedded systems
7. Explain the sophisticated interfacing features in devices /ports
8. Explain the internal serial communication devices.
9. Explain the following parallel communication devices
  - a. ISA bus
  - b. PCI and PCI/X

**UNIT – III**  
**PROGRAMMING CONCEPTS AND EMBEDDING PROGRAMMING IN C,C++**  
**PART – A (2 MARKS)**

1. What is a cross compiler.
2. Give the recursion concept in embedded C
3. Give the debugging strategies.
4. Give the embedded concept in UML
5. What are the advantages of High level language programming?
6. What are the C program elements?
7. What are program elements?
8. List some important data structures.
9. Define Queue.
10. Define Stack.
11. Define one dimensional Array.
12. Define multi-dimensional Array.
13. Define List.
14. Define ordered list.
15. What are the advantages of OOPS?
- 16.12. What are the programming advantages of C++?
- 17.13. What are the disadvantages of C++?
- 18.14. What is a Cross compiler?
- 19.15. What is memory optimization?

**PART B**

1. Explain the concepts of embedded programming
2. Explain the features of assemblers ,comilers and cross comilers used in embedded Systems
3. Explain the various multiple function calls in Embedded C
4. Discuss the scheduling architecture and the algorithms used in embedded software development
5. Give the difference between programming in assembly language (ALP) and high level language
6. Tabulate program elements: Macros and Functions and their uses. (16)
7. Explain the use of pointers, NULL pointers (16)
8. Explain the multiple function calls in the cyclic order in the main. Also write the advantages of building ISR queues.
9. Explain the 'C' program compiler and cross compiler.
10. Explain the optimization of memory codes.
11. Explain the Embedded programming concepts in C++.
12. Explain the function pointers, function queues and ISR queues.

**UNIT – IV**  
**REAL TIME OPERATING SYSTEMS – PART -1**  
**PART – A (2 MARKS)**

1. What is a thread?
2. What are the benefits of multithreaded programming?
3. Compare user threads and kernel threads?
4. Define thread cancellation & target thread?
5. What are the different ways in which a thread can be cancelled?
6. What is preemptive and nonpreemptive scheduling?
7. Define throughput?
8. What is turnaround time?
9. What are the goals of operating system?
10. What are the two structures modes of OS?
11. What are the structural units of an OS?
12. What are the steps involved in process management?
13. Define process manager.
14. What are the steps involved in memory management?
15. Define memory manager.
16. What are the 2 types of devices?
17. What is semaphores?
18. When the error will occur when we use the semaphore?
19. What are conditions under which a deadlock situation may arise?
20. Define device manager.
21. Define file manager.
22. What are the types of Scheduling?
23. What is MOBILE OS?

**PART B**

1. Explain how thread and process are used in embedded system.
2. Explain process management and memory management in embedded system
3. Explain file system organization and implementation
4. Explain round robin scheduling
5. Explain the real time operating systems
6. Explain cyclic scheduling with time slicing
7. Explain how critical section is handled by a pre-emptive scheduler
8. Explain the goals of operating system services.
9. Explain the three alternative systems in RTOS for responding a hardware source call with the diagram.
10. Explain the fifteen point strategy for synchronization between the processes, ISRs, OS functions and tasks for resource management.
11. Explain the scheduler in which RTOS insert into the list and the ready task for sequential execution in a co-operative round robin model.

**UNIT – V**  
**REAL TIME OPERATING SYSTEMS – PART -2**  
**PART – A (2 MARKS)**

1. What is the need for a well tested and debugged RTOS?
2. What are the 2 types of source files?
3. List few RTOS system level functions.
4. List Time delay functions.
5. List few memory allocation related functions.
6. List few semaphore related functions.
7. List few Mailbox related functions.
8. List few queue related functions.
9. What are the uses of VxWORKS?
10. What are the features of VxWORKS?
11. List few inter process communication functions?
12. Define pipe.

**PART B**

1. Draw and explain basic system of an Automatic chocolate vending system
2. Discuss with the diagram task synchronization model for a specific application
3. Explain the case study of an embedded system for a smart card.
4. Explain the features of MUCOS RTOS.
5. Explain the features of VxWorks RTOS.