



B.E DEGREE EXAMINATIONS: MAY 2015

(Regulation 2009)

Sixth Semester

ELECTRONICS AND INSTRUMENTATION ENGINEERING

EIE113: Real Time Embedded System

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Which of the following memory needs refresh?
 - a) SRAM
 - b) DRAM
 - c) ROM
 - d) PROM
2. The highest-priority interrupt is normally called
 - a) non-maskable interrupt
 - b) maskable interrupt
 - c) software interrupt
 - d) hardware interrupt.
3. Memory utilization factor shall be computed as follows
 - a) memory in use/allocated memory
 - b) memory in use/total memory connected
 - c) memory allocated/free existing
 - d) memory committed/total memory available memory
4. In DMA transfers, the required signals and addresses are given by the
 - a) Processor
 - b) Device drivers
 - c) DMA controllers
 - d) The program itself
5. The devices connected to USB is assigned an ____ address
 - a) 9 bit
 - b) 16 bit
 - c) 4 bit
 - d) 7 bit
6. _____ to increase the flexibility of the serial ports.
 - a) The wires used for ports is changed
 - b) The ports are made to allow different clock signals for input and output
 - c) The drivers are modified
 - d) Extending the buffer capacity

7. Round robin scheduling is essentially the preemptive version of _____.
 - a) FIFO
 - b) Shortestjobfirst
 - c) Shortest remaining
 - d) Longest time first
8. _____ is a high level abstraction over Semaphore.
 - a) shared memory
 - b) Message passing
 - c) Monitor
 - d) Mutual exclusion
9. In real time operating system
 - a) all processes have the same priority
 - b) a task must be serviced by its deadline period
 - c) process scheduling can be done only once
 - d) kernel is not required
10. A _____ is software that manages the time of a microprocessor to ensure that all time critical events are processed as efficiently as possible. This software allows the system activities to be divided into multiple independent elements called tasks.
 - a) Kernel
 - b) Shell
 - c) Processor
 - d) Device Driver

PART B (10 x 2 = 20 Marks)

11. List the factors to be considered while evaluating the processor for embedded system
12. Is it necessary to have a hardware timer device in a system? How does it work?
13. Give Memory allocation Schemes in a system
14. Name the different mode of operations in DMA Controller.
15. Mention the types of data Transfer in USB Bus
16. Specify the purpose of device drivers in a system.
17. What necessary conditions can lead to a deadlock situation in a system?
18. Which timer is used to restart the system if two programs are in conflict? Write the operation of the timer?
19. Why debugging is a challenge in real time systems?
20. How the interrupts are handled for multiple tasks?

PART C (5 x 14 = 70 Marks)

21. a) With neat Sketch, Explain the functional building blocks of embedded system

(OR)

- b) (i) Discuss the working of an Interrupt Controller with a neat block diagram. (10)
- (ii) When SRAM and DRAM was used? Justify your answer. (4)

22. a) Explain the structural units in processors for Real-time Robot Control System.

(OR)

b) (i) What is DMA? Elaborate the working of a DMA Controller with a neat block diagram. (8)

(ii) Write a note on Cache memory. (6)

23. a) (i) Elucidate how serial communication is done using the I²C bus. (8)

(ii) How does the USB Protocol provide for the device attachment, configuration, reset, bandwidth sharing with other devices, device detachment? (6)

(OR)

b) (i) Describe how the parallel port interfacing with LCD controller. (6)

(ii) Illustrate the parallel communication using PCI bus in detail. (8)

24. a) (i) With Suitable Example, Show how to calculate the context switching time period in Embedded System? (8)

(ii) Give an example of a deadlock situation during multiprocessing execution and Describe in detail. (6)

(OR)

b) (i) What are the situations which lead to interrupt overrun? How does an OS solve this problem? (6)

(ii) How shared data problem can be eliminated? Discuss in detail. (8)

25. a) (i) How RTOS differs from Real time in the Embedded system (4)

(ii) Illustrate the RTOS Task scheduling models used by the schedulers with suitable example. (10)

(OR)

b) Explain in detail about Interrupt Routines in RTOS Environment and Handling of source calls on Interrupts.
