Code : 041879

B.Tech. 8th Semester Exam., 2017

Embedded Systems

Time : 3 hours *Full Marks : 70*

Instructions :

(i) The marks are indicated in the right-hand margin.

*(ii) There are **Nine** questions in this paper.*

*(iii) Attempt **Five** questions in all.*

(iv) Questions No. 1 is compulsory.

1. Answer any seven (7) questions. 2×7=14

i. Processor must accept and process frame before next frame arrives, typically called

(a) Hard real-time systems.

(b) Real-data constraints.

(c) Real-time constraints.

(d) Soft real-time systems.

ii. Two partitions must be insulated to prevent operations on one half from affecting other, such floating-point operations are called

(a) Single-instruction operation.

(b) Paired single operations.

(c) Vector operation.

(d) Fetch operation.

iii. Average time for a particular task is constrained as well as a number of instances when some maximum time is exceeded, stated approach is known as

(a) Hard real-time systems

(b) Real-time constraints

(c) Real-data constraints

(d) Soft real-time systems

iv. Stage that reads program data from memory into instruction buffer queue, is known as

(a) Execution stage.

(b) Decode stage.

(c) *Address stage.*

(d) Fetch stage.

(v) The internal RAM memory of the 8051 is:

(a) 1.32 bytes

(b) 3.128 bytes

(c) 64 bytes

(d) 256 bytes

(vi) MOV A, @R1 will:

(a) copy R1 to the accumulator

(b) copy the accumulator to R1

(c) copy the contents of memory whose address is in R1 to the accumulator

(d) copy the accumulator to the contents of memory whose address is in R1

vii. The I/O port that does not have a dual-purpose role is

(a) 1. port 0

(b) 3. port 2

(c) port 1

(d) port 3

viii. Which of the following instructions will load the value 35H into the high byte of timer 0?

(a) MOV TH0, #35H

(b) MOV TH0, 35H

(c) MOV T0, #35H

(d) MOV T0, 35H

ix. Which of the following are examples of peripherals?

(a) Universal serial bus

(b) Timers

(c) Networks

(d) All of the above

x. Some embedded systems provide a UI remotely with the help of?

(a) RS32

(b) Both 1 and 2

(c) USB

(d) LAN

2. (a) What are the major design issues in a real time system? 7

(b) What are the common misconceptions regarding real time system? Explain in details. 7

3. (a) How is multitasking achieved using (i) Pooled loop, (ii) Synchronized Polled Loop, (iii) Cyclic Executives, (iv) State-Driven Code and (v) coroutine. 7

(b) Explain the process state diagram of real time operating system. 7

4. (a) Explain the fixed priority scheduling algorithm in real time operating system. 7

(b) Discuss some of the advantages of EDF scheduling over RM scheduling and vice versa. 7

5. (a) Show with an example that EDF is no longer an optimal scheduling policy if pre-emption is not allowed. 7

(b) How Ring Buffers are used to achieve inter task communication and synchronization? 7

6. (a) Explain the Priority Inheritance Protocol. 7

(b) Explain Memory Management in the Task-Control-Block Model. 7

7. (a) Express the following Software Requirements Specification for the nuclear monitoring system using formal methods and check it for consistency.

- If interrupt A arrives, then task B stops executing.
- Task A begins executing upon arrival of interrupt A.
- Either Task A is executing and Task B is not, or Task B is executing and Task A is not, or both are not executing. 7

(b) What is Petri net and how can it be used for requirement analysis in real time system? 7

8. a. List and explain the basic software engineering principles. 7

b. How would you handle the situation in which the software Requirements Specification contains numerous, if not excess, design specifications? 7

9. a. Microcoded computers tend to be superior to 1-, 2-, or 3- address computers with respect to overall performance. Why? 7

b. What is the difference between coprocessing and multiprocessing ? What are the advantages and disadvantages of each? 7

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