



M.E DEGREE EXAMINATIONS: DEC 2015

(Regulation 2014)

Third Semester

EMBEDDED SYSTEM TECHNOLOGIES

P14ESTE14: Software Technology for Embedded Systems

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. The Arcom board includes a special in-circuit programmable device which is called as CO1 [K₁]
 - a) Data memory b) Program memory
 - c) Flash memory d) Cache memory

2. Order the following sequences correctly that takes place in hardware/software CO1 [K₁] initialization process.
 - i) start-up code ii) reset code iii) initializing iv) main programming
 - a) i, iii, ii, iv b) ii, iii, i, iv
 - b) iii, ii, i, iv d) ii, iii, iv, i

3. What is the common speed for communications? CO2 [K₁]
 - a) 14,400 bps b) 14,745 bps
 - c) 28,800 bps d) 28,000 bps

4. CO1 [K₁]

List I	List II
A. DRAM	i. UV Eraser
B. SRAM	ii. Hybrid memory
C. NVRAM	iii. Volatile memory
D. EPROM	iv. Fast access time

- | | | | | |
|----|-----|----|-----|----|
| | A | B | C | D |
| a) | ii | iv | iii | i |
| b) | iii | i | ii | iv |
| c) | iii | iv | ii | i |
| d) | iii | iv | i | ii |

5. Assertion (A): Counter can reset itself to its initial value when it expires and then continue to count. CO2 [K₂]
Reason (R): Counter can be the source of a regular, periodic interrupt.
- a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is NOT the correct explanation of A.
- c) A is true but R is false. d) A is false but R is true.
6. In a state mode a logic analyzer can capture _____. CO3 [K_L]
a) instructions b) traces
c) events d) Signals
7. Which of the following are the common semaphore variants? CO2 [K₁]
i) Mutex ii) scheduler iii) binary semaphore iv) counting semaphore
a) i, ii & iii only b) i, iii & iv only
c) iii & iv only d) i & ii only
8. A program that produces the binary instructions that will be understood by the target microprocessor is called CO1 [K₁]
a) native-compiler b) compiler
c) cross-compiler d) cross-assembler
9. What is the only way to end the deadlock in a system? CO2 [K₁]
a) Using overwriting b) Initialize the system
c) Manipulating tasks d) Reboot the entire system
10. Which of the following methods are used for protecting shared-data? CO3 [K₁]
i) Enabling interrupts ii) disabling interrupts iii) taking semaphores
iv) disabling task switches
a) ii, iii & iv only b) i, ii & iii only
c) ii, iv only d) i, iii & iv only

PART B (10 x 2 = 20 Marks)

11. Mention the role of the infinite loop. CO1 [K₁]
12. What are the functions of a flash driver? CO1 [K₁]
13. What is polling? CO2 [K₁]
14. What is priority inversion? CO1 [K₁]
15. Explain about interrupt latency. CO2 [K₁]
16. Discuss the features of PAL languages. CO2 [K₁]

17. Is this function reentrant? CO3 [K₂]
- ```

int cErrors;
void vCountErrors (int cNewErrors)
{
 cErrors += cNewErrors;
}

```
18. Define counting and resource semaphores. CO2 [K<sub>1</sub>]
19. What is meant by address resolution? CO3 [K<sub>1</sub>]
20. How the shared data problems arise? CO2 [K<sub>1</sub>]

**PART C (6 x 5 = 30 Marks)**

21. Write short notes on remote debuggers. CO1 [K<sub>1</sub>]
22. Write and explain the blinking LED program for embedded systems. CO1 [K<sub>2</sub>]
23. Explain the concept of context switching with an example. CO1 [K<sub>1</sub>]
24. Explain the techniques which are used to reduce the execution time of the routines for code efficiency. CO1 [K<sub>1</sub>]
25. Explain with an example, the function-queue-scheduling architecture. CO2 [K<sub>2</sub>]
26. Explain with an example the typical use of a watchdog timer. CO3 [K<sub>2</sub>]

**PART D (4 x 10 = 40 Marks)**

27. Explain in detail about the two rules that must be followed by the interrupt routines in RTOS environments. CO3 [K<sub>2</sub>]
28. A system has two ROM chips and two RAM chips whose sizes and addresses are as shown in the following table. Design the part of the circuit that takes the address lines and produces the chip enable signals for each of these four memory parts. CO2 [K<sub>3</sub>]

|     | Size   | Low Address | High Address |
|-----|--------|-------------|--------------|
| ROM | 128 KB | 00000       | 1FFFF        |
| ROM | 128 KB | 20000       | 3FFFF        |
| RAM | 64 KB  | 80000       | 8FFFF        |
| RAM | 64 KB  | 90000       | 9FFFF        |

29. Explain the differences between locators and native linkers with an example. CO1 [K<sub>2</sub>]

30. For each of the following situations, discuss which of the three shared-data protection mechanisms seems most likely to be best and explain why? CO2 [K<sub>3</sub>]

(a) Task M and Task N share an int array, and each often must update many elements in the array.

(b) Task P shares a single char variable with one of the interrupt routines.

\*\*\*\*\*