



10MT64

**Sixth Semester B.E. Degree Examination, June/July 2019**  
**Embedded Systems**

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions, selecting at least TWO questions from each part.**

**PART – A**

- 1 a. Briefly describe the major elements of an embedded system development life cycle. (08 Marks)
- b. Explain :
  - (i) Watch dot Timer
  - (ii) Hard real time system
  - (iii) Soft real time System. (06 Marks)
- c. Briefly describe the major functional blocks that comprise the computing core. (06 Marks)
- 2 a. With the help of an example, explain truncation error and rounding error. (06 Marks)
- b. Explain direct and register indirect addressing modes with diagram. Also draw the timing diagram for serial write operation with an 8 bit register. (07 Marks)
- c. With the help of diagram explain state variable state diagram and Finite state machine. (07 Marks)
- 3 a. With the help of neat diagram, explain direct mapped cache implementation in detail. (10 Marks)
- b. Write the inside and outside diagram of SRAM and DRAM. Explain the read operation of DRAM and draw the timing diagram for the same. (10 Marks)
- 4 a. Write the flow diagram for V-cycle model and explain. (05 Marks)
- b. Explain coupling and cohesion with expert to partitioning. (08 Marks)
- c. Write a hardware architecture data and control flow diagram of a counter system and explain. (07 Marks)

**PART – B**

- 5 a. What is a Task Control Blocks (TCB)? Explain the major components of TCB. (06 Marks)
- b. What are the major components of an operating system? briefly describe the responsibilities of each component. (08 Marks)
- c. Write the algorithm for a simple OS kernel using C language for 3 asynchronous tasks using TCB only. The three tasks should use common data buffer for read, increment and display operations. (06 Marks)
- 6 a. Briefly explain several different kinds of stack that one might find in an embedded application. (08 Marks)
- b. Explain the following :
  - i) Reentrant codes
  - ii) Foreground and background systems
  - iii) Single and multiple Threads
  - iv) Context switching. (12 Marks)

- 7 a. What is meant by complexity analysis? What is purpose of performing a complexity analysis on a software algorithm, explain with example. What are the basic steps that make up a complexity analysis? (10 Marks)
- b. Explain :
- i) Hardware accelerator
  - ii) Power optimization. (10 Marks)
- 8 a. Discuss the different ways in which response time and time loading can be reduced. (08 Marks)
- b. With the help of a neat diagram, an example and equation example memory loading. (05 Marks)
- c. The operation to be performed is (i)  $c = a + b$  (ii)  $c = d + e$  if  $a == b$  else  $c = d - e$ . Write the c language construct and assembly language statements for the above two cases separately and calculate the total time required if PUSH/POP takes 600nsec arithmetic operation/ load/ store/compare taken 400nsec and conditional/unconditional branch takes 800 nanoseconds. (07 Marks)

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