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**Seventh Semester B.E. Degree Examination, July/August 2022**  
**Embedded System Design**

Time: 3 hrs.

Max. Marks: 100

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

**PART – A**

- 1 a. Explain the major elements of an embedded system design and development process with a suitable schematic. (08 Marks)  
b. Discuss the basic computing engines of an embedded system with suitable diagrams for each. (07 Marks)  
c. Write an explanatory note on finite state machine model. (05 Marks)
- 2 a. Analyze how errors propagate under : (i) Addition process (ii) Multiplication process. (08 Marks)  
b. With the help of diagram, explain  
(i) Index mode data transfer operation. (08 Marks)  
(ii) Program counter relative operation.  
c. With timing diagram, explain (i) Writing to a register (ii) Reading from a register. (04 Marks)
- 3 a. Write the inside and outside diagrams for SRAM along with read and write operations. (08 Marks)  
b. Explain an associative mapping cache implementation. (06 Marks)  
c. Explain dynamic memory allocation with its schemes. (06 Marks)
- 4 a. Briefly explain the common life cycle models of an embedded systems with a suitable diagrams for each. (08 Marks)  
b. Discuss the system design specifications in an embedded systems with an example. (08 Marks)  
c. Enumerate the difference between functional model and architectural model. (04 Marks)

**PART – B**

- 5 a. Explain how memory is managed at,  
(i) System level (ii) Process level. (08 Marks)  
b. Explain operating system architecture with diagram. (08 Marks)  
c. Explain multithreaded OS. (04 Marks)
- 6 a. Define an embedded operating system with specific functions. Also explain Kernel with the various types of services. (08 Marks)  
b. Design a simple operating system Kernel with a suitable code. (08 Marks)  
c. What is a Task control block? What are the major components of the TCB? (04 Marks)
- 7 a. Explain the purpose of the complexity analysis by suggesting a suitable algorithm for that. (07 Marks)  
b. With suitable examples, explain how the comparison of algorithms can be done. (06 Marks)  
c. Discuss the design of a memory map used in memory loading, with an example. (07 Marks)
- 8 a. Explain a typical memory map with diagram and explain the design of memory map with reference to memory loading. (08 Marks)  
b. Explain caches and their performance. (08 Marks)  
c. Write explanatory note on hardware accelerators. (04 Marks)

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