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**Seventh Semester B.E. Degree Examination, May/June 2010**  
**Embedded Computing 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. How does an embedded system differ from a general purpose computer? (04 Marks)
- b. What are the possible devices available to a system designer to use it as a processor in an embedded system? What are the important considerations when selecting a processor? (10 Marks)
- c. What are the challenges faced in designing an embedded system? (06 Marks)
- 2 a. Explain briefly the different software modules and tools for designing an embedded system. (06 Marks)
- b. Describe the internal serial communication ports available in microcontroller 68HC11. (08 Marks)
- c. Draw the functional diagram of a typical parallel port showing the handshaking signals. Describe the communication using it. (06 Marks)
- 3 a. Explain how port-based input/output is different from bus-based input/output. (04 Marks)
- b. Describe the features of CAN bus and its protocol for serial communication. (08 Marks)
- c. What is PCI bus? Explain the features of PCI bus and standards available. (08 Marks)
- 4 a. How are the various interrupt sources classified? (06 Marks)
- b. What is interrupt latency? How the worst case latency can be estimated? (06 Marks)
- c. What are the points that must be known and the information that must be available before writing a software for a device driver in assembly language? (08 Marks)

**PART – B**

- 5 a. Explain the state machine programming model. Draw the state transition diagram to show the finite state machine of a task in a multi-tasking program. (08 Marks)
- b. What are the parameters of a task control block (TCB) of a task? Why should each task have a distinct TCB? (06 Marks)
- c. Differentiate between function, task and ISR. (06 Marks)
- 6 a. What is a process manager? What are the services of process manager? (06 Marks)
- b. How does memory allocation differ in RTOS as compared to conventional OS? Explain what is memory locking. (06 Marks)
- c. Briefly explain the three ways in which RTOS handles the ISRs in a multitasking environment. (08 Marks)
- 7 a. What are the steps by RTOS to meet hard-real time dead lines? (06 Marks)
- b. What are the methods of optimizing memory space in RTOS? (06 Marks)
- c. Describe earliest deadline first (EDF) and rate monotonic schedule (RMS) scheduling models. (08 Marks)
- 8 a. What is a target system? With the help of a block diagram, illustrate the different components of target a system. How does the target system differ from the final embedded system? (08 Marks)
- b. What is locator? What are the features of locator? (06 Marks)
- c. With a neat block schematic, explain how would you get an embedded software into the target system? (06 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
 2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

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**Seventh Semester B.E. Degree Examination, December 2010**  
**Embedded Computing 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. What do you mean by system on chip (SOC)? With a neat block diagram, explain an embedded SOC in a mobile phone. (07 Marks)
  - b. Define design metrics in an embedded system. What are the different competing design metrics? What are the challenges faced in designing an embedded system? (10 Marks)
  - c. What is the role of ROM and RAM in an embedded system? (03 Marks)
- 2
  - a. Compare the advantages and disadvantages of data transfer, using serial and parallel ports/devices. (04 Marks)
  - b. Explain three modes of serial communication using serial devices, with one example each. (08 Marks)
  - c. Describe : i) UART      ii) RS232C      iii) SDIO (08 Marks)
- 3
  - a. Explain : i) Software timer      ii) Watchdog timer      iii) RTC (08 Marks)
  - b. Explain the use of each control bit in I<sup>2</sup>C bus protocol. (05 Marks)
  - c. Mention various wireless and mobile system protocols. Explain any two of them. (07 Marks)
- 4
  - a. Explain context switching, interrupt latency and interrupt service deadline. (10 Marks)
  - b. How do the device driver functions and ISR functions differ? Explain. (05 Marks)
  - c. What do you mean by throwing an exception? Explain. (05 Marks)

**PART – B**

- 5
  - a. What are the different programming models? With an example, explain the FSM model. (08 Marks)
  - b. Explain the modeling of a multi processor system. (07 Marks)
  - c. Define process and tasks. Explain the tasks with their states. (05 Marks)
- 6
  - a. Explain how processes are created and managed. (06 Marks)
  - b. "Memory allocation and management are the most important functions of Kernel". Why? Explain the memory mapping strategy. (08 Marks)
  - c. What is the importance of device management in an OS for an embedded system? (06 Marks)
- 7
  - a. What is RTOS? Explain the basic design of embedded system using RTOS. (06 Marks)
  - b. Mention the various scheduling models. Explain the preemptive scheduling model. (10 Marks)
  - c. What should be the OS security policy? Explain various important security functions. (04 Marks)
- 8
  - a. What is a target system? How is embedded software loaded into the target system?(06 Marks)
  - b. Explain : i) Simulators      ii) ICE. (10 Marks)
  - c. Why do we use an host system for most of the developments? What are the testing steps at host machine? (04 Marks)