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Seventh Semester B.E. Degree Examination, December 2011
Embedded Computing Systems

Time: 3 hrs.

Max. Marks:100

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

PART – A

- 1 a. What is an embedded system? With the aid of a neat functional schematic, explain the components of an embedded system. Also indicate the important characteristics and constraints of the embedded system. (10 Marks)
- b. Write down any ten important software tools, used for designing an embedded system, specifying their applications. (10 Marks)
- 2 a. Briefly explain the three classes of embedded systems. Further, discuss the skills required for an embedded system designer. (10 Marks)
- b. A device port may have multibyte data input buffer(s) and data output buffer(s). What are the advantages of these? Also explain the characteristics that are taken into consideration when interfacing a device port in a system. (10 Marks)
- 3 a. With the aid of a functional diagram, describe how an internet –enabled embedded system is communicating to other systems on the internet. Explain the advantages of internet –enabled systems. (10 Marks)
- b. What do you mean by plug and play devices? What are the bus protocols of buses UART, RS232C, USB, Bluetooth, CAN and PCI that support plug and play devices? Briefly explain. (10 Marks)
- 4 a. Define context, interrupt latency and interrupt service deadline. Why is the context switching in an embedded processor faster than saving the pointers and variables on the stack using a stack pointer? How does the context switching time reduces in processor architectures for embedded systems? Explain. (10 Marks)
- b. With illustrative examples, explain the uses of the following in an interrupt –service mechanism
i) Hardwave – assigned priorities ii) Softwave – assigned priorities. (10 Marks)

PART – B

- 5 a. Why does the program complexity increases with a reduced number of DFGs and increasing decision nodes? Explain. (04 Marks)
- b. How will you schedule the following instructions, on two processors?
i) SIMD ii) MIMD iii) VLIW. (06 Marks)
- c. Briefly discuss the important characteristics of the functions, interrupt service routines (ISRs) and tasks, that are used in an embedded software. (10 Marks)
- 6 a. Explain any five RTOS timer functions and the action taken on calling these functions. (10 Marks)
- b. Discuss the three approaches, used for interrupt routines in RTOS environment and handling of interrupt source calls. (10 Marks)

- 7 a. In brief, discuss the important design principles to be considered, when using an RTOS to design an embedded system. (10 Marks)
- b. Show the use of semaphores for synchronising the tasks as co-operative scheduled tasks in preemptive RTOS. Also show the use of semaphores and times functions for synchronizing the tasks as round robin time – sliced scheduled tasks in a preemptive RTOS. (10 Marks)
- 8 a. What is a target system? How does the target system differ from the final embedded system? What do you mean by application software for a target system? Briefly discuss. (06 Marks)
- b. Why is system performance index defined as the ability to meet required functions and specifications while using the minimum amount resources of memory, power dissipation and devices and minimum design efforts and optimum utilization of each resource? (06 Marks)
- c. What is a simulator? With the aid of a neat block schematic, explain the detailed design development process using the simulator. (08 Marks)

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