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Second Semester M.Tech. Degree Examination, May/June 2010
Embedded Computing Systems

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions.

- 1 a. Explain the following terms related to embedded hardware units :
 - i) Real time clock (08 Marks)
 - ii) Water dog timer
 - iii) IP core
 - iv) FPGA. (04 Marks)
- b. What is a charge pump? How does a charge pump supply power in an embedded system without using the supply lines? (08 Marks)
- c. With a block diagram, explain briefly the different functional units of a microcontroller. (08 Marks)
- 2 a. What are the techniques of power and energy management in an embedded system? Explain in detail. (08 Marks)
- b. What is a system – on – chip? List out the hardware units of a SoC for a mobile phone. (04 Marks)
- c. What do you mean by the following?
Physical device, virtual device, plug and play device, bus self-powered device and device specific processor. (05 Marks)
- d. An automobile cruise control system is to be designed in a project. What will be the skills needed in the team of hardware and software engineers? (03 Marks)
- 3 a. Compare the advantages and disadvantages of data transfers, using serial and parallel port devices. (04 Marks)
- b. What are the handshaking signals used in RS 232C for communicating between a DTE and a DCE? Also explain how serial communication occurs between a DTE and a DCE using UART mode. (06 Marks)
- c. What is a timer? How does a counter perform :
 - i) Timer functions
 - ii) prefixed time initiated events generation
 - iii) time capture functions? (10 Marks)
- 4 a. What are the advantages and disadvantages of busy and wait transfer mode? (02 Marks)
- b. Define context, interrupt latency and interrupt service deadline. Explain the mechanism of context – switching in 8051, 68HC11, ARM7. (10 Marks)
- c. What is DMA? Along with the block diagram, explain the working of a DMAC used in multi byte data transfer. (08 Marks)
- 5 a. Interrupt vector addresses are pre-fixed in the interrupt mechanism for known internal peripherals in a microcontroller. How are the vector addresses assigned for exceptions and user defined interrupts? (06 Marks)
- b. Why does program complexity increase with a reduced number of DFSG and increasing decision nodes? (04 Marks)
- c. Explain with an example, the use of finite state machine model in a program analysis. (10 Marks)

- 6 a. Based on their characteristics distinguish between function, ISR and task. (06 Marks)
b. What is meant by user mode and supervisory mode of operation? (04 Marks)
c. List and explain any five services provided by RTOS. (10 Marks)
- 7 a. Discuss briefly the various design principles of RTOS used in the design of an embedded system. (10 Marks)
b. List the different software modules and tools used in the development of an embedded system. Also explain their usage. (10 Marks)
- 8 Write short notes on :
a. Design metrics in embedded systems
b. Sophisticated features at parallel port devices
c. Data flow graph
d. Intel Hex file format. (20 Marks)

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