Rajiv Gandhi Proudyogiki Vishwavidyalaya, Bhopal

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MEVD-105

M.E./M.Tech. (First Semester)

EXAMINATION, Dec 2011

(Grading/Non-Grading)

EMBEDDED MICROCONTROLLERS PROGRAMMING

Time: Three Hours

Maximum Marks: GS:70

Note: Attempt any five questions.

1. (a) Define embedded system. Give classification of embedded systems into three types. What are the essential structural units in embedded processor?
   (b) What are the various features of Application Specific System Processors (ASSPs) used in embedded system? Explain in detail.

2. (a) Explain three stage pipeline and superscalar processing and branch and data dependency penalties.
   (b) On the basis of addressing modes, instruction set, compiler design, instruction decoder etc. Compare CISC and RISC architecture. Now-a-days high performance embedded system use either a RISC processor or processor with RISC core with code optimized CISC instruction set. Why?

3. (a) What is the role of RAM in an embedded system? Why does a program reside in ROM in the embedded system? When will you use SRAM and when DRAM? Explain your replies.
   (b) What are the advantages in Harvard architecture? Why is the case of accessing stack and data table at program memory less in Harvard memory architecture compared to Princeton memory architecture?

4. (a) How does a book block flash differ from a flash memory? How do flash, EEPROM and flash EEPROM differ? When do you use masked ROM for ROM image and when boot flash ROM in embedded system.
   (b) What is the essentiality of using the interrupt service routines in any system and explain the working of interrupt mechanisms in the systems with the help of simple examples? Also list the various possible sources of the software and hardware interrupt.

5. (a) Describe the various operating modes of the timer/counters and associated control registers of 8051.
   (b) For 8051, describe the following:
      i. How data may be pushed and popped using a stack
      ii. To use commands that get data from ROM addresses
      iii. To write simple data movement programs

6. (a) Draw the circuit and explain the interfacing of LED in microcontrollers.
   (b) Describe the important features in C that makes it a popular high level language for an embedded system.

7. (a) Explain in detail ARM architecture and compare ARM 7, ARM 9 and ARM 11.
   (b) Describe ARM programming model and instruction set.

8. Write short notes on any two of the following:
   i. Embedded processors in VLSI circuit
   ii. Give circuit with explation of interfacing the system buses between processor, memory devices and I/O devices
   iii. USART
   iv. CAN bus architecture