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12EC116

M.Tech. Degree Examination, June / July 2013
Advanced Microcontrollers

Time: 3 hrs.

Max. Marks:100

Note: *Answer any FIVE full questions.*

1 a. Compare RISC and CISC architecture of the µC, with an example for each class of architecture. **(07 Marks)**
   b. What are the features required in a µC to operate in low power modes? Explain. **(07 Marks)**
   c. Describe the use of Watch Dog Timer in modern micro controller. **(06 Marks)**

2 a. Give the description of each bit in the MSP430 status register. **(06 Marks)**
   b. Explain the features of MSP 430 micro controller, with the help of a block diagram. **(10 Marks)**
   c. List the instructions that will generate the constants 0, 1, 2 and 4 and store it in R 5 register. **(04 Marks)**

3 a. With the help of a tree – diagram, describe the clock structure in MSP 430 microcontroller. **(07 Marks)**
   b. What are the conditions of the MSP430 registers after it is subjected to POR / PUC? Explain. **(06 Marks)**
   c. Write the circuit diagram and explain the register settings required to interface an 12-key telephone key – pad through GPIO part 1 of MSP430 microcontroller. **(07 Marks)**

4 a. Explain the architecture and operation of comparator – A+ module in MSP430 microcontroller. **(08 Marks)**
   b. Explain a method to control 6 LEDs independently (using only three post pins of MSP 430 micro controller). **(06 Marks)**
   c. In a MSP430 microcontroller program, what are the methods to pass parameters to and from a subroutine? Briefly explain. **(06 Marks)**

5 a. With the help of a block diagram, explain the operation of Basic Timer 1 module in MSP430 microcontroller. **(07 Marks)**
   b. It is required to produce a 440Hz, 50% duty cycle signal through TAI pin of timer_A, independent of any software control. What are the settings required in various registers of Timer_A module to generate this signal? Explain with relevant waveforms. **(06 Marks)**
   c. Explain the operating modes and associated output modes that can be configured in timer_A module of MSP430 micro controller. **(07 Marks)**

6 a. Explain the special registers in ARM CORTEX-M3. **(08 Marks)**
   b. Briefly explain the operating modes of ARM CORTEX – M3 processor. **(06 Marks)**
   c. Explain how "stack" operates in ARM CORTEX M3 processor. **(06 Marks)**

7 a. Explain Nested Vectored Interrupt Controller (NVIC) module in ARM CORTEX – M3 processor. **(10 Marks)**
   b. Explain bit – band operation support provided by ARM CORTEX – M3 processor. What are the advantages of bit – band operations? **(10 Marks)**

8 Write short notes on any TWO :
   a. CORTEX Microcontroller Software Interface Standard.
   b. Wireless sensor networking with MSP430.
   c. Handling fault exceptions in CORTEX M3 processor.
   d. Memory protection unit of CORTEX – M3 processor. **(20 Marks)**

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