USN ☐☐☐☐☐☐☐☐☐☐   **12EC116**

M.Tech. Degree Examination, February 2013
Advanced Microcontroller

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions.*

1   a. Differentiate between :
     i) RISC Vs CISC processors   ii) Von Neumann Vs Harward architectures.   **(06 Marks)**
  b. With a neat diagram, explain the architectural features of MSP 430 microcontroller.
                                                                    (10 Marks)
  c. Draw the bit pattern of MSP430 microcontroller status register and list the individual bits.
                                                                    (04 Marks)

2   a. Explain the following MSP430 microcontroller instructions, with the suitable examples :
     i) decd.w dst   ii) Swpb Src   iii) Jhs label   iv) dadc.w Src, dst.   **(08 Marks)**
  b. Briefly explain the role of constant generators (R_2 and R_3) in MSP430 microcontroller.
                                                                      (04 Marks)
  c. Discuss the interrupts of MSP430 microcontroller and explain the interrupt handling process.   **(08 Marks)**

3   a. What is the need for watch dog timer? Explain the bit pattern of WDTCTL register and write a code to initialize MSP430 watch dog timer.   **(10 Marks)**
  b. Draw the block diagram of timer – A and write MSP 430 program to generate a waveform of 500Hz frequency using timer – A and interrupts.   **(10 Marks)**

4   a. Discuss the general issues of analog to digital conversion and the architecture of ADC10 of MSP430 microcontroler.   **(10 Marks)**
  b. Write a note on i) DAC12   ii) DMA of MSP 430 microcontroller.   **(10 Marks)**

5   a. With a neat diagram, explain the functional units of ARM Cotex – M3 processor architecture.   **(10 Marks)**
  b. Draw the register set map of ARM Cortex – M3 processor and explain about the general purpose registers.   **(10 Marks)**

6   a. Write a note on Nested Vectored Interrupt Controller (NVIC).   **(06 Marks)**
  b. Briefly explain Private Peripheral Bus (PPB) of ARM Cotex – M3 processor.   **(06 Marks)**
  c. Draw and discuss the system address map of ARM Cotex – M3 processor.   **(08 Marks)**

7   a. Discuss the following ARM Cotex – M3 processor instruction, with examples :
     i) MLA Rd, Rn, Rm   ii) UDIV Rd, Rn, Rm   iii) ASR Rd, Rn, # <imm>
     iv) PUSH {< reg list >}.   **(08 Marks)**
  b. Write a brief note on ARM Cortex – M3 : i) Stack pointer   ii) Link register.   **(06 Marks)**
  c. Discuss the lost pattern of ACTLR and CPUID registers.   **(06 Marks)**

8   a. Explain the MSP430 microcontroller onchip PWM feature and how to use it for DC motor speed control application.   **(10 Marks)**
  b. With necessary code / algorithm, explain ARM Cortex – M3 based remote temperature sensing application using GSM modem.   **(10 Marks)**

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