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M.Tech. Degree Examination, Dec.2013/Jan.2014
Advanced Microcontrollers

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions.

- 1 a. What is the need for low power embedded system? Explain briefly. (04 Marks)
 b. Briefly explain the different power saving techniques to achieve low power. (06 Marks)
 c. Explain with a neat block diagram, the architecture of MSP430 microcontroller. (10 Marks)
- 2 a. What is meant by emulated instruction as referred to MSP430. Explain at least three emulated instruction with examples and its emulation. (05 Marks)
 b. Write a note on the three internal clocks in MSP430. (03 Marks)
 c. Explain the different addressing modes used in MSP430 microcontroller with suitable examples. (12 Marks)
- 3 a. With reference to MSP430 microcontroller explain the difference between POR and PUC. (05 Marks)
 b. What is resolution, precision and accuracy with respect to ADC? With a neat block diagram, explain the operation of successive approximation ADC of MSP430. (10 Marks)
 c. For the circuit shown in Fig.Q.3(c), write a C program for MSP430 to turn ON an LED if the voltage exceeds $1/2 V_{cc}$. The clock used is internal. (05 Marks)

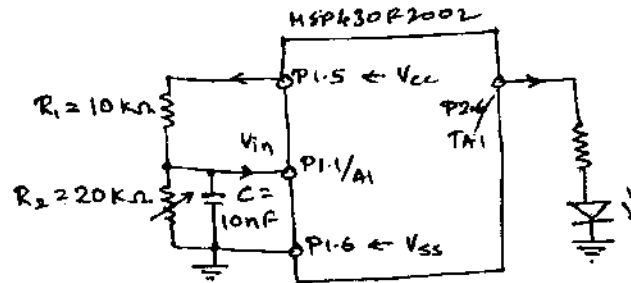


Fig.Q.3(c)

- 4 a. What are the features of Real Time Clock (RTC) of MSP430? With a neat block diagram of RTC explain the operation in counter mode and calendar mode for MSP430. (10 Marks)
 b. With the neat block diagram, explain the non-inverting op amp configuration for MSP430 microcontroller. (10 Marks)
- 5 a. Explain the architecture of CORTEX-M3 processor with a block diagram. (10 Marks)
 b. Write a short note on the following with respect to ARM CORTEX-M3:
 i) Link register; ii) Program status register. (06 Marks)
 c. Explain the memory map of CORTEX-M3 processor. (04 Marks)
- 6 a. Write a note on different types of faults with respect to CORTEX M3. Describe the different methods of handling these faults. (10 Marks)
 b. Describe the context switching with pendable service call. (10 Marks)

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- 7 a. Describe the registers associated with CORTEXM3 processor for interrupt configuration. **(10 Marks)**
b. Give an overview of core sight debug architecture with respect to CORTEXM3. **(10 Marks)**
- 8 a. Explain how PWM can be used to vary the power supplied to a load? Also, explain the PWM generation in MSP430. **(10 Marks)**
b. The CORTEX-M3 processor delivers high performance in microcontroller products. Justify. **(05 Marks)**
c. Write a short note on advanced interrupt handling features of CORTEX-M3. **(05 Marks)**

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