CBCS SCHEME

USN | | | | | | | | | | |

15EC555

Fifth Semester B.E. Degree Examination, Dec.2017/Jan.2018
MSP430 Microcontroller

Time: 3 hrs. Max. Marks: 80

Note: Answer any FIVE full questions, choosing one full question from each module.

Module-1

1 a. Draw the functional block diagram of MSP430F2003 microcontroller and explain the function of each block. **(10 Marks)**

b. List the registers in the CPU of MSP430 and explain their functions. **(06 Marks)**

OR

2 a. Explain the Harvard and Von Neumann architecture for memory of a system. **(08 Marks)**

b. List the features of MSP430 that makes it suitable for low-power and portable applications. **(08 Marks)**

Module-2

3 a. Explain all the addressing modes of MSP430 with an example for each addressing mode. **(08 Marks)**

b. List all the instruction of MSP430 on Bits in status register and explain their operations. **(08 Marks)**

OR

4 a. Explain the two operands instructions format when destination is register and destination is indexed. **(08 Marks)**

b. Explain how the double operand instruction format bits are divided for generating machine code. Explain each field of the format. **(08 Marks)**

Module-3

5 a. Draw the block diagram of the clock module of the MSP430 and explain the operation of each functional block. **(08 Marks)**

b. Explain the number steps when an interrupts is requested. **(08 Marks)**

OR

6 a. What is the main purpose of WDT? Explain the lower byte of the WDT control register WDTCL. **(08 Marks)**

b. Draw the simplified block diagram of Basic Timer1 and explain its operation. Also explain the Basic Timer1 control register BTCTL. **(08 Marks)**

Module-4

7 a. Draw the simplified block diagram of comparator A+ and explain the working principle. **(08 Marks)**

b. Draw the simplified block diagram of ADC10 and explain its operation. **(08 Marks)**

OR

8 a. Draw the block diagram of a sigma-delta ADC and explain the working principle. **(08 Marks)**

b. Explain the concept of edge-aligned PWM slowing three average powers. **(08 Marks)**

Module-5

9 a. Draw the connection diagram of an LED with microcontroller in active low mode and write C program to light the LED. **(04 Marks)**

b. Draw the circuit diagram to read input from a switch for active low pulse with an external and internal pull-up resistor. **(04 Marks)**

c. Explain the following serial communication interfaces:
(i) USI (ii) USCI (iii) USCI_A **(08 Marks)**

OR

10 a. Draw the diagram of serial peripheral interface (SPI) between a master and single slave, and explain the working principle. **(08 Marks)**

b. Explain the format of data for asynchronous transmission. Draw the waveform for two asynchronous bytes that carry the data OX55 and OXFF. **(08 Marks)**

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