

CBCS SCHEME

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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)
