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B.TECH
(SEM VI) THEORY EXAMINATION 2018-19
MICROCONTROLLER FOR EMBEDDED SYSTEMS

Time: 3 Hours**Total Marks: 70****Note: 1.** Attempt all Sections. If you require any missing data, choose suitably.**SECTION A****1. Attempt all questions in brief. 2 x 7 = 14**

- a. In accessing external stored program code the PSEN is always activated, explain why?
- b. Which port of 8051 provides A8-A15?
- c. Compare 8051 and MSP430x5xxx main features.
- d. Write down any four GPIO registers of MSP430.
- e. What is RTC?
- f. Differentiate between Synchronous and Asynchronous communication.
- g. What is an Embedded Wi-Fi?

SECTION B**2. Attempt any three of the following: 7 x 3 = 21**

- a. Generate a square wave with an ON time of 2ms and OFF time of 8 ms on all pins of port 0. Assume that the clock frequency supplied is 22 MHz.
- b. Explain in detail about the interrupts of MSP430 microcontroller.
- c. Explain in detail about various operating modes of MSP430 microcontroller.
- d. Explain UART and its various protocols in detail.
- e. Describe wireless sensor networks with design examples.

SECTION C**3. Attempt any one part of the following: 7 x 1 = 7**

- (a) Draw the architecture of 8051 and explain its memory organization.
- (b) Enlist the steps to generate a time delay using the timer's mode 2. Also draw the structure of TMOD register.

4. Attempt any one part of the following: 7 x 1 = 7

- (a) Draw the functional block diagram of MSP430x5x series. Discuss the on-chip peripherals that are provided in MSP430x5x series.
- (b) Describe the Instruction set of MSP430 microcontroller.

5. Attempt any one part of the following: 7 x 1 = 7

- (a) What are the system clocks present in the MSP430 microcontroller? Explain them briefly.
- (b) Discuss the Watch Dog Timer present in MSP430 microcontroller in detail.

6. **Attempt any *one* part of the following:** **7 x 1 = 7**
- (a) Interface MSP430 to an external device using SPI protocol.
 - (b) Write a program using MSP430x5xx to toggle two LED connected at port P1.5 and P1.7 use a pull down switch connected at port P1.2 for toggling these LED.
7. **Attempt any *one* part of the following:** **7 x 1 = 7**
- (a) What is IoT? Draw the architecture of IoT and list its applications.
 - (b) Explain briefly Bluetooth and ZigBee.