Printed Pages: 2 **Sub Code: REC062**

Paper Id: 131295 **Roll No.** | | | | | | | | | | |

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.