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Paper Id: 1 3 1 6 3 2 Roll No.

B TECH
(SEM VI) THEORY EXAMINATION 2017-18
MICROCONTROLLERS FOR EMBEDDED SYSTEMS

Time: 3 Hours ***Total Marks: 100***

Note: **1.** Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 10 = 20**

a) Differentiate between microcontrollers and microprocessor based systems.
b) Describe embedded systems. How they are related to microcontroller based systems?
c) Explain GPIO control of MSP430 microcontrollers.
d) Describe the register set of MSP430.
e) What is the size of the program counter register? What does the program counter do?
f) Define a PWM and its significance.
g) Briefly describe UART.
h) Where is RS232 protocol used?
i) What are the various network topologies in Bluetooth?
j) Mention some applications of IOT.

SECTION B

2. Attempt any *three* of the following: **10 x 3 = 30**

a) List some important features and architecture considerations of an embedded system.
b) Why do we use pull-up/pull-down registers only at input section? How we can enable them inMSP430F5529?
c) Differentiate between memory mapped and IO mapped peripherals? How many Low power modes are available inMSP430F5529?
d) What is the difference between Asynchronous and Synchronous communication? What are the different serial interfaces?
e) Explain the various elements of a Zigbee wireless network. Describe the applications of Zigbee wireless network.

SECTION C

3. Attempt any *one* part of the following: **10 x 1 = 10**

(a) Write some features of the 8051 microcontroller. Draw and explain the block diagram of 8051 microcontroller.

(b) Timer-0 of 8051 microcontroller is to be programmed in mode-1 for creating a square wave of duty cycle 50% on the port P1.5. Write an algorithm for programming the counter.

4. Attempt any *one* part of the following: **10 x 1 = 10**

(a) How many interrupts are available in MSP430F5529? What is the procedure behind the servicing of interrupt?

(b) What are the various addressing modes of MSP430 microcontroller? Explain with suitable example.

5. Attempt any *one* part of the following: 10 x 1 = 10

(a) What is use of watchdog timer in microcontroller? How can we enable watchdog timer in MSP430F5529?

(b) How many clock sources are present in MSP430F5529? Explain Digitally Controlled Oscillator clock.

6. Attempt any *one* part of the following: 10 x 1 = 10

(a) What is I2C protocol? What is the maximum number of slaves that can be connected to a single master of I2C bus?

(b) What is the SPI protocol? What can be the maximum achievable speed in MSP430F5529?

7. Attempt any *one* part of the following: 10 x 1 = 10

(a) What are WSN (Wireless Sensor Networks)? Name the different wireless technologies. What is the relation between WSN and IOT?

(b) What do you understand by Internet of Things (IOT)? Describe the architecture of IOT. Describe the main components of IOT.