

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.