

B. TECH.
(SEM-VI) THEORY EXAMINATION, 2018-19
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 x10 = 20**
- a. Which 8051 ports need pull-up resistors to function as an I/O port and why?
 - b. What are the merits of MSP430 over 8051?
 - c. Differentiate between RISC and CISC architecture.
 - d. If value in TACCR0 is 3, determine the period if TIMER_A is operated in up/down mode?
 - e. Discuss the full-duplex protocol used in serial communication interface.
 - f. Differentiate between core instructions and emulated instructions in MSP430.
 - g. Discuss bank1 and stack conflict in 8051.
 - h. To interface external memory with 8051 which pin of 8051 will be used and explain the function of that pin?
 - i. Show the contents of PSW register after execution of following instructions.
MOV A,#9C
ADD A,#64H
 - j. Name the 8 bit and 16 bit registers of 8051.

SECTION B

- 2. Attempt any three of the following: 10 x 3 = 30**
- a. Explain in brief with assembly language program about how staircase ramp can be generated with 8051 microcontroller.
 - b. Explain communication module USI in SPI mode.
 - c. Explain watch dog timer operation in interval mode and watch dog mode with its block diagram.
 - d. Explain various addressing modes of MSP430 with example in detail.
 - e. What do you mean by IOT? Explain its architecture and block diagram and enlist its various applications.

SECTION C

- 3. Attempt any one part of the following: 10 x 1 = 10**
- (a) Show the design of an 8031 based system with 8kbytes of program ROM and 16kbytes of data ROM.
 - (b) Discuss the programming of mode1 timer. Write an ALP to generate a square wave of 10KHz on P1.7. Timer 1 is used in 16-bit mode and assume crystal frequency of 22MHz.

- 4. Attempt any *one* part of the following: **10 x 1 = 10****
- (a) Discuss interrupts in MSP430 and WAP using interrupts to flash LED using Timer A in up mode.
 - (b) Discuss the architecture of MSP40 in detail.
- 5. Attempt any *one* part of the following: **10 x 1 = 10****
- (a) Discuss the two modules of SAR analog to digital converter in MSP430.
 - (b) Explain the memory map of MSP430 and CPU with all its registers.
- 6. Attempt any *one* part of the following: **10 x 1 = 10****
- (a) Explain UART and SPI protocol.
 - (b) Discuss the operation of Timer A with timer block and capture/compare channel1.
- 7. Attempt any *one* part of the following: **10 x 1 = 10****
- (a) Explain Bluetooth low energy and wireless sensor network in detail.
 - (b) Explain the operation of comparator in MSP430.