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Sub Code: REC401
Roll No.

B TECH
(SEM-IV) THEORY EXAMINATION 2018-19
MICROPROCESSORS & MICROCONTROLLERS

Time: 3 Hours ***Total Marks: 70***

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

SECTION A

1. **Attempt *all* questions in brief.** **2 x 7 = 14**

a) Describe how status and Control signal are generated from 8085 pins.
b) Explain the concept of Direct Memory Access.
c) Explain the difference between microprocessor and microcontroller.
d) What are embedded systems? Describe some the applications of embedded systems.
e) Explain the low power modes of MSP430.
f) What is UART?
g) What are software interrupts?

SECTION B

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

a) Explain how Address and Data Bus are multiplexed in 8085 microprocessor and how demultiplexing is done. Describe the advantage of using multiplexed Address and Data Buses. Describe the role of ALE signal in DE multiplexing the buses.
b) Describe the various Interrupts of 8085 microprocessor. Classify the interrupts of 8085 as maskable or non-maskable and vectored or non-vectored.
c) Describe the Programming System registers of MSP430. Explain the concept and the function of Pull-up and Pull-down registers using suitable diagrams.
d) Explain the concept of Interrupts. Compare the polling method with interrupt driven method. Name the interrupts of MSP430 and describe the sources of interrupts.
e) For an MSP430 based embedded system application and using the interface protocols for communication with external devices, design and explain the functioning of A Low-Power Battery less Wireless Temperature and Humidity Sensor with Passive Low Frequency RFID.

SECTION C

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

(a) Define the term instruction set. Explain the Classification of instructions on the basis of their functions. Give some examples of each type.

(b) Describe the significance of the term addressing modes. Explain the various addressing modes of 8085 with suitable examples.

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

(a) Draw the block diagram of 8259A programmable Interrupt Controller and explain the function of each block. Explain how priority of different interrupts is decided in programmable Interrupt Controller.

(b) Draw the block diagram of 8255A programmable Parallel interface. Write the different modes of 8255 and explain how the ports of IC8255 can be used in different modes. Explain the control word of BSR and I/O modes.

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

(a) Differentiate between the following:

i. Von Neumann (Princeton) and Harvard architecture
ii. RISC and CISC machines

(b) In relation to the low power aspects of MSP430, Explain the Active current consumption and Standby current consumption.

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

(a) Describe the system clock structure of MSP430. Explain the concepts and function of Watchdog timer and Real Time Clock (RTC) of MSP430.
(b) Describe the Analog to digital Conversion Mechanism in MSP430. Explain Direct Memory Access (DMA) in MSP430.

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

(a) Describe the various serial communication interfaces used in MSP430. Give a comparison of the different serial communication interfaces.

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