7. (a) Explain Register File Structure in PIC microcontroller. What are CPU registers? Explain. (7.5)

(b) What are the different addressing modes supported by the 8051? Explain with examples. Enlist all the instructions that use stack memory and program memory. (7.5)

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008403

May 2023

B.Tech. (ECE) IV SEMESTER

Microprocessors and Microcontrollers (ECC-03)

Time : 3 Hours] [Max. Marks : 75

Instructions :

1. *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*
2. *Answer any four questions from Part-B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*
4. *Assume data/information wherever required.*

PART–A

1. (a) After the execution of the instruction XOR AX, AX what will be the contents of Accumulator, carry, and zero flags? (1.5)

(b) What is Segmentation? Why is it required? List all possible segments of 8086. (1.5)

(c) The memory address of last location of a 4 K byte memory chip is FFFFH. Find the starting address. (1.5)

(d) Justify the need and method to demultiplex the bus AD0-AD16. (1.5)

(e) What is Interrupt service routine? How does it help in servicing the interrupts? (1.5)

(f) In the 8051 microcontrollers, what is the register bank address range if RSO = 1 and RSI = 0? (1.5)

(g) Enlist differences in RISC and CISC processors with appropriate examples. (1.5)

(h) How many times the instruction CPL A is executed in the following program of an 8051?

```
        MOV A, #F0H
        MOV R1, #60
NEXT:   MOV R6, #10H
AGAIN:  CPL A
        DJNZ R6, AGAIN
        DJNZ Rl, NEXT
```

(1.5)

(i) Discuss how instruction pipelining is implemented in PIC microcontroller ? (1.5)

(j) Enlist the steps the microprocessor goes through when a call instruction is executed. (1.5)

PART–B

2. (a) What is virtual memory, and how does virtual memory differ from physical memory, and why is it necessary? What are the benefits and drawbacks of using virtual memory? (7.5)

(b) What is the role of timers and counters in the 8051 microcontroller? List and explain all the special function registers associated with the configuration of the timer module. (7.5)

3. (a) What are the key components of an ARM, and how do they work together to execute code? (7.5)

(b) What is a programmable interrupt controller? List its various features and discuss all the control words required for its configuration. (7.5)

4. (a) What do you mean by pipelined architecture? How is it implemented in 8086? Draw and discuss the internal block diagram of the 8086 microprocessor. (7.5)

(b) How does the cache hierarchy work, and what are the different levels of cache memory? What are the benefits of using cache memory in a computer system? (7.5)

5. (a) What is the difference between the JMP and CALL instructions in the 8086 microprocessor, and when would you use each one? How does the LOOP instruction work in the 8086 microprocessor? Explain with suitable examples. (7.5)

(b) Interface an 8255 with 8086 to have port A address 00, port B address 01, port C address 02, and CWR address 03. Explain the different modes of operation of 8255. (7.5)

6. (a) Write a program to find the number of even and odd numbers from an array of twenty 8-bit numbers. The array starts from a 15000H memory location. Use instructions of 8086. (7.5)

(b) Draw the schematic diagram to interface a switch and LED with a microprocessor or microcontroller. Write a program to display the value of the switch to LED continuously. (7.5)