CBCS SCHEME

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15CS44

Fourth Semester B.E. Degree Examination, Jan./Feb. 2023
Microprocessors and Microcontrollers

Time: 3 hrs. Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. What is pipelining and how does it make the CPU execute faster? Clearly explain Pipelined versus Non-pipelined execution with suitable diagram. **(04 Marks)**

b. With the help of 8086 microprocessor internal architecture block diagram, explain in detail BIU (Bus Interface Unit). **(06 Marks)**

c. For the following Assembly Language instructions, tabulate the answers for size, operation and to which addressing mode it belongs to

(i) MOV DI, ABC[BX]
(ii) MOV [DI], BH
(iii) MOV CH, DS : [1000H]
(iv) MOV CS, AX
(v) PUSH WORD PTR[BX]
(vi) MOV AX, 44 **(06 Marks)**

OR

2 a. What is a flag and flag register? Explain the format of flag register, with suitable example. Show how various flag register bits are affected by the following code:

```
MOV AX, 94C2H
MOV BX, 323EH
ADD AX, BX
MOV DX, AX
MOV CX, DX
```

Clearly list the results obtained after execution. **(08 Marks)**

b. What are Assembler Directives? Why they are also called as pseudo instructions? Explain the following with example:

(i) PROC and ENDP
(ii) SEGMENT and ENDS
(iii) MACRO and ENDM **(08 Marks)**

Module-2

3 a. For the following instructions, write its respective syntax, description, flags affected and examples:

(i) JCXZ (ii) NOP (iii) NEG (iv) IN (v) LEA **(10 Marks)**

b. Write a program that finds the number of 1's in a byte with necessary comments in the program. **(06 Marks)**

OR

4 a. List and explain first five software interrupts. **(10 Marks)**

b. Write a program to count the number of 1's in a word. Provide the count in BCD. Write necessary comments in the program. **(06 Marks)**

Module-3

5 a. Explain in detail the Data Integrity in RAM and ROM. **(08 Marks)**

b. Write a program to read a string convert to uppercase and store in array and display on monitor. **(08 Marks)**

OR

6 a. Interface an 8255 with 8086 microprocessor to work as I/O port. Initialize PORT A as output port, PORT B as input port and PORT C as output port. The address of PORT A is 0740H. Write a program to sense switch positions SW0 to SW7 connected at PORT B. The sensed pattern is to be displayed on PORT A to which 8 LED's are connected, while PORT C lower displays number of ON switches out of the total 8 switches. **(08 Marks)**

b. Explain the various string instructions. **(08 Marks)**

Module-4

7 a. Explain in detail the various registers of ARM processor present in programmers model. **(08 Marks)**

b. Write a note on Exception/Interrupt and the vector table. **(08 Marks)**

OR

8 a. Explain the various units present in ARM core data flow model block diagram. **(08 Marks)**

b. With relevant block diagram, explain the various stages of pipeline present in ARM organization. **(08 Marks)**

Module-5

9 a. List down and explain the salient features of ARM instruction set. **(08 Marks)**

b. Write a program to display string stored in source to monitor via destination address, with necessary comments to the program. **(08 Marks)**

OR

10 a. Explain with syntax and examples, the different types of Data Processing instructions present in ARM. **(08 Marks)**

b. Write a program to print r1 in hexadecimal with necessary comments to the program. **(08 Marks)**

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