

# CBCS SCHEME

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17CS44

Fourth Semester B.E. Degree Examination, Dec.2023/Jan.2024

## Microprocessor & Microcontrollers

Time: 3 hrs.

Max. Marks: 100

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

### Module-1

- 1 a. Define Microprocessors. With neat diagram recall the various registers of BIu and EU of 8086. (07 Marks)
- b. With neat diagram, explain how various flag registers are used in 8086. (07 Marks)
- c. Write an Assembly Language Program (ALP) to find the fibonacci series of ten numbers. (06 Marks)

OR

- 2 a. Explain the various addressing modes of 8086 with example. (07 Marks)
- b. Assume DS = 4500, SS = 2000, BX = 2100, SI = 1486, DI = 0850, BP = 7184 and AX = 2512. All values are in hexa decimal. Show the exact physical memory location, where AX is stored in each of the following case :
  - (i) MOV[BX]+20, AX
  - (ii) MOV[Si] + 10, AX
  - (iii) MOV[Di] + 4, AX
  - (iv) MOV[BP]+12, AX(08 Marks)
- c. Recall five differences between com and exe file. (05 Marks)

### Module-2

- 3 a. Explain the following instruction :
  - (i) DAA
  - (ii) RCR
  - (iii) CLC(05 Marks)
- b. Develop an ALP with algorithm to calculate the sum of two bytes of data (13h – 23 h) using sub instruction and store the result at offset address 0020h in ds segment. (07 Marks)
- c. With the help of ADC instruction develop a program to calculate the total sum of 5 bytes of data. The decimal data are 125, 235, 197, 91, 95 and store the result in a memory location. (08 Marks)

OR

- 4 a. Explain the following instructions ;
  - (i) SBB
  - (ii) RCL
  - (iii) SHL(03 Marks)
- b. Write an (ALP) program to :
  - (i) Convert ASCII number '23' to packed BCD.
  - (ii) Add the BCD number 23 with 45.
  - (iii) Convert the result of the above addition to ASCII. (08 Marks)
- c. Write an ALP to :
  - (i) To clear the screen
  - (ii) To set the cursor at center of the screen
  - (iii) To display a string "VTU WEL COMES YOU" on the screen. (09 Marks)

**Module-3**

- 5 a. Explain the following instruction with syntax :
- IMUL
  - CLD
  - STOS
  - SCASB
- (06 Marks)
- b. Write an ALP to check whether given string is a palindrome or not, if so display the respective message. (07 Marks)
- c. Find the control word of 8255 if PA = in PB = out PC0-PC3 = in PC4-PC7 = out and write the program using the above control word, to get the data from port A and send it to port B. Use port adders of 300-303H for 8255 chip. (07 Marks)

**OR**

- 6 a. Explain the following instruction with syntax :
- IDiV
  - STD
  - OUT
  - LoDSB
- (06 Marks)
- b. Write an ALP to check whether two strings STR1 and STR2 equal or not. If equal display "STRINGS ARE EQUAL" else display "STRINGS ARE NOT EQUAL". (07 Marks)
- c. Design a memory interface which uses 8 numbers of 2764 EPROM chip for 64\*8 memory, for the adders range between F0000 to FFFFF. (07 Marks)

**Module-4**

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- 7 a. With neat diagram, explain ARM core data flow model. (07 Marks)
- b. With neat diagram, summarize the complete set of registers of ARM. (07 Marks)
- c. With neat diagram, outline the various functional blocks of embedded system. (06 Marks)

**OR**

- 8 a. Compare the differences between RISC and CISC design phylosophy. (06 Marks)
- b. With neat diagram, explain the various fields of CPSR. (07 Marks)
- c. With neat diagram, show how pipelining mechanism used in RISC processors. (07 Marks)

**Module-5**

- 9 a. Explain with example Branch instructions of ARM. (10 Marks)
- b. Explain with example logical and data processing instruction of ARM. (10 Marks)

**OR**

- 10 a. With neat diagram, explain the function of Barrel shifter in ARM. (10 Marks)
- b. Explain with example, compare and multiply instructions of ARM. (10 Marks)

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