17CS44

USN

Fourth Semester B.E. Degree Examination, Feb./Mar. 2022
Microprocessors and Microcontrollers

Time: 3 hrs.   Max. Marks: 100

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

Module-1

1 a. Draw and explain internal block diagram of 8086 CPU in detail with all register set.
                                                                                (10 Marks)

   b. Show the memory dump for the following data section or data segment:
      ·DATA
      ORG 0010H
      DATA1 DB 25
      DATA2 DB 10001001B
      DATA3 DB 12H
      ORG 0020H
      DATA4 DB '2591'
      ORG
      DATA5 DW 9, 2, 7, 0CH, 00100000B, 5
      DATA6 DW 4DUP (00H)   **(05 Marks)**
   c. Explain with an example. Why and how a 20 bit address is generated in 8086.   **(05 Marks)**

OR

2 a. Explain the different addressing modes used in 8086 microprocessor with suitable example.
                                                                                (10 Marks)
   b. If CS = 24F6H and Ip = 634AH, find logical address, offset address, physical address, lower
      range and upper range of code segment.   **(05 Marks)**
   c. Write a program that transfers a 6 bytes of data from memory location with offset of 0010H
      to memory locations with offset of 0028H.   **(05 Marks)**

Module-2

3 a. Write a program to calculate total sum of 5 bytes of data. Each byte represents daily wages
      of a worker; the decimal data is as follows 125, 235, 197, 91 and 48.   **(06 Marks)**
   b. Explain with example, how BCD number 29H is converted to ASCII numbers 32H 39H.
                                                                                (06 Marks)
   c. Explain the four cases of the Division with an example.   **(08 Marks)**

OR

4 a. Write a program to i) Clear screen   ii) Set the video mode to CGA of 640×200 resolution
      and   iii) Draw Horizontal line starting at column = 100, ROW = 50 and ending at
      column = 200, ROW = 50.   **(09 Marks)**
   b. Give five differences between INT and CALL instruction.   **(05 Marks)**
   c. Find the physical and logical address in the interrupt vector table for INT 12H and INT 8.
                                                                                (06 Marks)

Module-3

5 a. Explain the following instructions with an example:
   i) CBW   ii) CWD   iii) IDIV   iv) IMUL.   **(08 Marks)**

 b. Write a program that scans the string "Mr. Gones" and replaces the "G" with letter "J" then displays correct name.   **(06 Marks)**

 c. With an example, explain STOS, LODS and MOVS instructions.   **(06 Marks)**

OR

6 a. Assume that we have 4 bytes of hexadecimal data: 25H, 62H, 3FH, 52H.
   i)   Find checksum byte.
   ii)   Perform checksum operation to ensure data integrity.
   iii)   If the second byte 62H had been changed to 22H, show how checksum detects the error.   **(04 Marks)**

 b. Explain briefly the control word format of 8255 in I/O mode. Find the control word if PA = out, PB = in, $PC_0 - PC_3$ = in and $PC_4 - PC_7$ = out. Use port addresses of 300H – 303H for the 8255 chip. Then get data from port B and send it to port A.   **(08 Marks)**

 c. Write a program to toggle all bits of Port A continuously with some delay, use INT 16H to exit if there is a key press.   **(08 Marks)**

Module-4

7 a. Give differences between CISC and RISC.   **(05 Marks)**

 b. Explain about ARM processor modes and complete registers set with neat diagram.   **(10 Marks)**

 c. With an example explain how processor changes the mode from user mode to interrupt request mode.   **(05 Marks)**

OR

8 a. Explain ARM7 three-stage pipeline with an example.   **(07 Marks)**

 b. Explain Von-Neumann style core and Harvard style core.   **(08 Marks)**

 c. Explain different types of memory management hardware.   **(05 Marks)**

Module-5

9 a. With an example, explain the following instructions with an example:
   i) MOVN   ii) LDRB   iii) MUL   iv) UMULL.   **(10 Marks)**

 b. Explain the following, with an example:
   i)   Multiple-Register transfer instructions
   ii)   MSR and MRS instructions.   **(10 Marks)**

OR

10 a. How stack operations can be carried out using load-store multiple instructions.   **(06 Marks)**

 b. Explain pre-index with write back and post index with an example.   **(08 Marks)**

 c. Explain barrel shifter with suitable example.   **(06 Marks)**

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