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17CS44

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: (08 Marks)
 i) CBW ii) CWD iii) IDIV iv) IMUL.
 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. (04 Marks)
 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. (08 Marks)
 b. Explain briefly the control word format of 8255 in I/O mode. Find the control word if PA = out, PB = in, PC₀ – PC₃ = in and PC₄ – PC₇ = 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: (10 Marks)
 i) MOVN ii) LDRB iii) MUL iv) UMULL.
 b. Explain the following, with an example: (10 Marks)
 i) Multiple-Register transfer instructions
 ii) MSR and MRS instructions.

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)
