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15CS44

Fourth Semester B.E. Degree Examination, Jan./Feb. 2021 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. Explain architecture of 8086, with neat diagram. (08 Marks)
- b. Explain following Assembler directives with example:
ORG, EQU, DUP, DD, SEGMENT & ENDS (05 Marks)
- c. Assume that SP = FF2EH, AX = 3291H, BX = F43CH, CX = 09. Show the contents of stack and SP after execution of the following instructions:
PUSH AX
PUSH BX
PUSH CX (03 Marks)

OR

- 2 a. Identify the addressing modes in the following instructions:
i) MOV [SI], AL
ii) MOV Arr [SI], AX
iii) MOV [BX + 6], AX
iv) MOV [BP] [SI] + 10, BX
v) MOV [3600], AX (05 Marks)
- b. Explain IBM PC memory map, with neat diagram. (05 Marks)
- c. Explain the process of executing assembling ALP with steps and neat diagram. (06 Marks)

Module-2

- 3 a. Write an assembly code to multiply 2378H with 2F79H and store the result in RES. (04 Marks)
- b. Write an assembly program to convert packed BCD to ASCII value. (06 Marks)
- c. Explain rotate instructions with example. (06 Marks)

OR

- 4 a. Write a program to read a string from keyboard and convert it to upper case. (06 Marks)
- b. Explain difference between INT and CALL instructions. (04 Marks)
- c. Write a program to i) Clear screen ii) Set cursor at row-20 column 50 iii) Display message "Microprocessor and Microcontroller". (06 Marks)

Module-3

- 5 a. Explain the following instructions with example:
i) SCASB ii) CMPSB iii) CBW iv) IMUL v) XLAT (08 Marks)
- b. Assume that we have 4 bytes of hexadecimal data: 25H, 62H, 3FH and 52H.
i) Find the check sum byte
ii) Perform the 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)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

OR

- 6 a. Explain control word format of 8255 with neat diagram. (06 Marks)
 b. 8255 is configured as follows: (Refer Fig.Q.6(b))

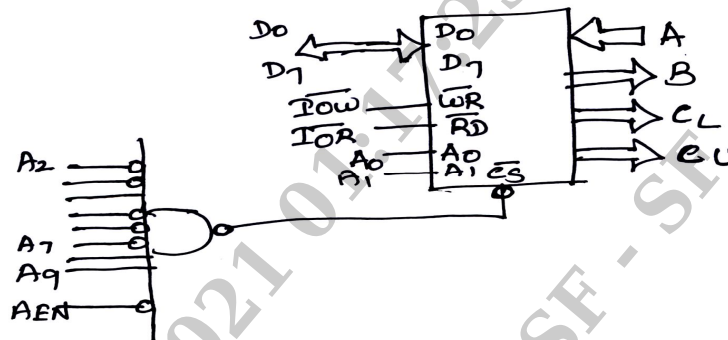


Fig.Q.6(b)

- i) Find control word for port A as input, B as output all bits of port C as output.
 ii) Find the port addresses assigned to A, B, C and control byte for this configuration.
 iii) Program the ports to input data from port A and send it to both ports B and C. (10 Marks)

Module-4

- 7 a. Differentiate between Microcontroller and Microprocessor. (04 Marks)
 b. Explain ARM core data flow model with neat diagram. (06 Marks)
 c. Explain interrupt handling in ARM processor. (04 Marks)

OR

- 8 a. Explain ARM processors execution modes along with complete register set. (08 Marks)
 b. Explain pipelining mechanism of ARM architecture. (04 Marks)
 c. Explain RISC design principle. (04 Marks)

Module-5

- 9 a. Explain the use of barrel shifter in ARM processor with diagram. (06 Marks)
 b. Explain the following instruction with suitable example:
 i) BIC ii) QADD iii) BLX iv) SMULL v) SWI (10 Marks)

OR

- 10 a. Write an ALP to copy a block of data (BLOCK1) to another block (BLOCK2) using ARM instruction. (08 Marks)
 b. What are the salient features of ARM instruction set? (05 Marks)
 c. If $r_5 = 5$, $r_7 = 8$ and using the following instruction, write values of r_5 , r_7 after execution
 MOV $r_7, r_5, LSL \# 2$. (03 Marks)
