KATHMANDU UNIVERSITY
End Semester Examination [C]
June/July 2024

Level : B.E.
Year : III
Time : 2 hrs. 30 mins.

09 JUL 2024

Course : EEEG 314
Semester : I
F.M. : 40

SECTION "B"
[4Q. × 10 = 40 marks]

Attempt *ANY FOUR* questions.

1.
a. Write the difference between a microprocessor and a microcontroller. [2]
b. Illustrate the steps and the timing of data flow of instruction OUT 07H. [3]
c. Write the program to differentiate between even and prime numbers. [5]

2.
a. Calculate the number of memory chips needed to design 8K-byte memory if the memory chip size is 1024 x 1. [2]
b. Explain PUSH and POP operation with example. [3]
c. Draw a detailed functional block diagram of 8085 architecture. [5]

3.
a. The memory address of the last location of a 1K byte memory chip is given as FBFFH. Specify the starting address. [2]
b. A 12 bit D/A converter is calibrated over the range 0 to 10V calculate the outputs if the inputs is 01H and 82H. [3]
c. Explain the various addressing modes present in 8086? [5]

4.
a. Design a seven segment LED output port with the device address F5H, using a 74LS138 3-to-8 decoder, a 74LS20 4-input NAND gate, a 74LS02 NOR gate and a common anode segment LED.
   i. Given $\overline{WR}$ and IO/ $\overline{M}$ signals from the 8085, generate the $\overline{IOW}$ control signal.
   ii. Explain the binary code required to display 0 to F Hex digits at seven segment display.
   iii. Write instructions to display digit 8 at port. [5+3]
b. Why the address bus is unidirectional? [2]

5.
a. How does 8085 process interrupt? Explain its operation in points. [5]
b. Write an assembly language program to find the 2nd largest number in a block of the given data values (23, 81, 99, 65, 23, 54, 89, 10, 96, and 76) labeled as NO_LIST. Store the 2nd maximum value in the location labeled SEC_MAX. [5]

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SECTION "A"
[20 Q. × 0.5 = 10 marks]

Choose and encircle the most appropriate answer.

1. _____ is the basic steps of execution of an instruction.
   a. Fetch→ Decode → Execute
   b. Decode→ Fetch→ Execute
   c. Fetch → Execute→ Decode
   d. Execute→ Fetch → Decode

2. Which among these is a 4-bit microprocessor.
   a. 8085 b. 8086 c. 8088 d. 4004

3. The main purpose of accumulator register of 8085 is _____.
   a. temporary data storage
   b. selection of peripheral
   c. storing instructions
   d. used as primary pointer

4. The status flag that is available in microprocessor 8085, but not available in microcontroller 8051 is _____.
   a. Carry flag
   b. Overflow flag
   c. Auxiliary flag
   d. Zero flag

5. Which one of the following is not a vectored interrupt?
   a. TRAP b. INTR c. RST 7.5 d. All of these

6. In 8085 microprocessors, MVI A, 25H is an example of which addressing mode?
   a. Register addressing
   b. Immediate addressing
   c. Direct addressing
   d. Indirect addressing

7. Consider the situation where a microprocessor gives an output of an 8-bit word. This is fed through an 8-bit digital-to-analog converter to a control valve. The control valve requires 6.0 V being fully open. If the fully open state is indicated by 11111111, the output to the valve for a change of 1-bit will be_____.
   a. 0.061 V b. 0.042 V c. 0.023 V d. 0.014 V

8. In 8086 microprocessor the following has the highest priority among all type interrupts?
   a. NMI b. DIV 0 c. TYPE 255 d. OVER FLOW

9. Which of the following is not an arithmetic instructions?
   a. INC b. CMP c. DEC d. ROL

10. Which group of instructions do not affect the flags?
a. Arithmetic operations
b. Logic operations
c. Data transfer operations
d. Branch operations

11. In which register instruction is decoded, prepared and ultimately executed_____.
a. Instruction Register
b. Current Register
c. Both a and b
d. None of these

12. _____ Instruction is used to call a procedure.
a. CALL
b. RET
c. PROC
d. NEAR

13. _____ is the instruction that avoids unnecessary Jumps to terminate the program.
a. HLT
b. NOP
c. RET
d. EI

14. What is the size of the instruction MVI C, FFH?
a. 1 byte
b. 2 byte
c. 3 byte
d. 4 byte

15. What is the BCD value of the binary number $(10000101)_2$?
a. 85
b. 133
c. 205
d. 58

16. The CPU sends out a _____ signal to indicate that valid data is available on the data bus.
a. Read
b. Write
c. Both a and b
d. None of these

17. The pin configuration of 8086 is available in the _____.
a. 40 pin
b. 50 pin
c. 30 pin
d. 20 pin

18. _____ is usually the first level of memory access by the microprocessor.
a. Cache memory
b. Data memory
c. Main memory
d. All of these

19. One of the main feature that distinguish microprocessors from micro-computers is _____
a. Words are usually larger in microprocessors
b. Words are shorter in microprocessors
c. Microprocessor does not contain I/O devices
d. Exactly the same as the machine cycle time

20. How many T-states are required to execute the following instruction? MVI A,16H
a. 4 T-states
b.7 T-states
c.10 T-states
d.14 T-states