KATHMANDU UNIVERSITY
End Semester Examination
January/February 2024

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

31 JAN 2024

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

SECTION "B"
[4 Q. × 10 = 40 marks]

Attempt *ANY FOUR* questions. Assume any suitable data if necessary.

1.

a. Why demultiplexing the bus $AD_7 - AD_0$ is needed and how it is done in 8085? [4]

b. Draw the timing diagram for MOV instructions. [2]

c. Write a program to generate a Fibonacci series of any given number and store the series in memory location starting from 8000H. [4]

2.

a. The memory map of a 4K byte memory chip begins at the location 2000H. Specify the address of the last location on the chip and the number of pages in the chip? [2]

b. Explain memory-mapped I/O and peripheral mapped I/O technique with example. [2]

c. 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 seven segment LED. [6]

- Given $\overline{WR}$ and $IO/\overline{M}$ signals from the 8085, generate the $\overline{IOW}$ control signal.
- Explain the binary codes required to display 0 to F hex digits at seven segment display.
- Write instructions to display digit 7 at the port.

3.

a. Explain operation of interfacing an 8-bit A/D converter using a status check. [4]

b. Calculate the output current if the input is 82H and the converter is calibrated for a 0 to 2mA current range. (Given $R_f = 5K$, $R = 2.5K$) [3]

c. Write a program to perform the following functions. [3]
   - Clear all the flags
   - Load 00H in the accumulator and demonstrate that the ZERO flag is not affected by the data transfer operation.
   - Logically OR the accumulator with itself to set the Zero Flag and display the flag at PORT1 or store all the flags on the stack.

4.

a. Interface a temperature sensor using an A/D converter and PORT A of the 8255. Interface a fan and a heater using optocouplers and triacs to drive the I/O devices. Write the instruction to read the temperature. If the temperature is less than 10 degree centigrade turn on the heater and if the temperature is higher than 35 degrees turn on the fan. [6]

The following components are specified for interfacing:

- 8255—Port A in Mode 0 and Port C in BSR Mode
- 8-bit A/D Converter —ADC0801
- Temperature sensor — LM135
- Optoisolator —MOC3011 and Triac 2N6071

b. Specify the handshake signals for port A of the 8155 if the port A is connected as an input port in the interrupt mode. Explain the sequence of events and timing in data input. [4]

5.

a. Draw a detailed 8086 internal block diagram and explain various addressing modes with suitable example. [3+3]

b. Write ALP to sort array of ten numbers stored in memory. Using 8086. [4]

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Registration No.:

Date :

SECTION "A"
[20Q. × 0.5 = 10 marks]

Choose and encircle the most appropriate option from each set of choices.

1. Microprocessor speed depends on _____.
   a. Clock
   b. Data Bus Width
   c. Address Bus width
   d. All of these

2. What is the word length of an 8-bit microprocessor?
   a. 8 bits – 64 bits
   b. 4 bits – 32 bits
   c. 8 bits – 16 bits
   d. 8 bits – 32 bits

3. How many opcodes are present in 8 bit microprocessors?
   a. 246
   b. 278
   c. 250
   d. 256

4. Which of the following is not the property of TRAP interrupt?
   a. not a maskable interrupt
   b. highest priority
   c. edge triggered
   d. vectored interrupt

5. SIM stands for_____.
   a. Select Interrupt Mask
   b. Set Interrupt Mask
   c. Sort Interrupt Mask
   d. Sum Interrupt Mask

6. Which of the following flag is used to mask INTR Interrupt?
   a. Zero Flag
   b. Auxiliary carry Flag
   c. Interrupt Flag
   d. Sign Flag

7. Which of the following is a non-vectored input?
   a. TRAP
   b. RST-7.5
   c. RST 6.5
   d. INTR

8. How many flip flops are there in flag register of 8085?
   a. 4
   b. 5
   c. 7
   d. 10

9. Data storage in stack is designed in _____ method.
   a. FIFO
   b. LILO
   c. FILO
   d. LIFO

10. The register AX is formed by grouping _____.
    a. AH&AL
    b. BH&BL
    c. CH&CL
    d. AC&AB

11. What is the vectored address of RST 5.
a. 0010H b. 0032H c. 0028H d. 0030H

12. Which of the following is a 2 byte instruction set?
a. LDA 2500H b. MOV A,B c. OUT 10H d. JMP 2023H

13. Index registers are used to hold _____.
a. Memory register b. offset address c. segment memory d. offset memory

14. The BIU contains FIFO register of size _____ bytes.
a. 8 b. 6 c. 4 d. 12

15. The BIU pre-fetches the instruction from memory and store them in _____.
a. register b. queue c. memory d. stack

16. DAA instruction is used to perform _____.
a. BCD Addition b. Excess-3 addition c. binary addition d. Octal addition

17. 8086 processor has _____ address pins out of which _____ numbers of pins are used as data pins.
a. 16, 8 b. 16, 14 c. 20, 16 d. 20, 8

18. What is stored in HL general purpose register?
a. opcode b. temporary data
c. address of next instruction d. memory address

19. LDA has _____ number of T-states?
a. 7T b. 13T c. 10T d. 16T

20. How many address lines are required to connect 4KB RAM to microprocessor?
a. 10 b. 16 c. 12 d. 20