

TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2083 Baishakh

Exam.	Back (New Course)		
Level	BE	Full Marks	60
Programme	BEL	Pass Marks	24
Year / Part	II / II	Time	3 hrs.

Subject: - Microprocessor and Microcontrollers (ENEX 251)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt **All** questions.
- ✓ The figures in the margin indicate **Full Marks**.
- ✓ Assume suitable data if necessary.

1. Compare the Hardwired Control Unit and the Microprogrammed Control Unit, highlighting their advantages and limitations. [4]
2. a) Describe the different types of branching instructions supported by the 8085 microprocessor. Explain each with suitable examples. [6]
b) Write an 8085 program to calculate the sum of numbers from 1 to n, where n is a byte stored in memory address 8050H. Display the sum at output port 41H. [6]
3. a) Describe the functions and components of the Bus Interface Unit (BIU) and Execution Unit (EU) in the 8086 microprocessor [6]
b) Write an assembly language program for the 8086 microprocessor to read a string, display each word of the string on a separate line, count the number of words present in the string, and display the word count. [6]
4. a) Differentiate between synchronous bus and asynchronous bus. Design an address decoding circuit to interface: 4 KB ROM and 2 KB RAM. The starting address is 4000H. Use a suitable decoder. [2+4]
b) Show the machine cycles involved during execution of the instruction IN 80H. Calculate the time required to execute the instruction if the microprocessor is operating at a 4 MHz clock frequency. [5+1]
5. a) Draw the internal architecture of the 8051 microcontroller and explain briefly its internal RAM organization. [2+4]
b) Write an assembly language program on 8051 to add ten bytes stored in the internal RAM. Assume that the starting location of the data block is 40H, the sum is a 16-bit result, and the final result is stored in registers R2 and R3 of register bank 0, with the LSB in R2 and the MSB in R3. [6]
6. Write short notes on: (Any Two) (2×4)
 - a) Microprocessor vs Microcontroller
 - b) Addressing modes of 8085
 - c) Flag register of 8086 microprocessor

TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2082 Bhadra

Exam.	Regular (New Course)		
Level	BE	Full Marks	60
Programme	BEL	Pass Marks	24
Year / Part	II / II	Time	3 hrs.

Subject: - Microprocessors and Microcontroller (ENEX 251)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

1. Draw a block diagram of Harvard architecture. What are the major differences between Harvard architecture and Von Neumann's architecture? [2+2]
2. a) Define instruction and instruction cycle. Explain different types of instruction used in 8085 microprocessors based on byte size. [2+4]

b) Write an assembly language of 8085 microprocessor to transfer ten 8-bit data stored in memory address starting at 8050H to memory table starting from 9050H if the data is less than 70H, else store 00H. [6]
3. a) What do you mean by instruction pipelining? Explain segment registers and general-purpose registers of 8086 microprocessor. [1+5]

b) Write an assembly language of 8086 microprocessor to input a string from keyboard, convert all characters into upper case and display each word in separate lines on a blank screen. [6]
4. a) Design an address decoding circuit to interface one 4 KB RAM chip and one 2KB ROM chip with 8085 microprocessors consecutively starting from the memory location A000H. [6]

b) Show machine cycles involved during the execution of instruction OUT 80H. Calculate the time required to execute such instruction, if microprocessor is operating at 2 MHz clock frequency. [5+1]
5. a) Draw internal architecture of 8051 microcontroller and explain briefly about its internal RAM organization. [2+4]

b) In 8051, what do you mean by special function registers? Write an assembly language on 8051 to read an 8-bit temperature in Celsius from port 1 and to output the Fahrenheit temperature equivalent onto port 2. [2+4]
6. Write short notes on: (Any Two) [2×4]
 - a) Interrupt processing in 8085
 - b) Assembling, linking and execution of 8086 microprocessor
 - c) Addressing modes of 8051 microcontroller
