

Exam. Level	BB	Back	
Programme	BEL, BEX, BCT	Full Marks	80
Year / Part	II / II	Pass Marks	32
		Time	3 hrs.

Subject: - Microprocessor (EX551)

- ✓ 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. a) Compare and contrast between hardwired and microprogrammed CU. [4]
- b) Write the RTL for instruction **LXI H, 75H** in 8085 microprocessor. [4]
2. a) Draw the programming model of 8085 and explain each unit. [2+4]
- b) Explain the operations and uses of **RST** instructions in 8085. [4]
- c) Write an ALP in 8085 to transfer 20 bytes of data in a table to another table by interchanging **D₁** and **D₄** bits of each byte. [6]
3. a) Explain the different types of addressing modes available in 8086 microprocessor with examples. [8]
- b) Write an ALP in 8086 to read a word and display all the alphabets in alternate case (first alphabet in lowercase, second in uppercase, third in lowercase and so on) in a clear window. [8]
4. a) Design the address decoding interface of an output port consisting of 8 LEDs with port address **ABH**. [5]
- b) Explain different modes of operation in 8255. [6]
- c) Explain the execution of instruction **ANI 4BH** in 8085 with the help of timing diagram. [5]
5. a) Describe the operation of interrupt instruction **RIM** in 8085 microprocessor. [4]
- b) Explain the Interrupt processing in 8086 microprocessor. [4]
6. a) Write the characteristics of RISC.. [4]
- b) Explain six stage pipeline technique with an example. [4]
7. Write short notes on any two: [2X4]
 - a) One pass and two pass assembler
 - b) DMA Controller
 - c) OS and Its features

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1. Explain fetch and execution cycle of an instruction of a stored program computer. Illustrate with the help of RTL specification. [5+3]
2. What is the use of Program Counter and Stack Pointer registers of 8085 microprocessor? How these registers get affected during CALL, RET, PUSH and POP instructions explain with suitable examples. [4+4]
3. There are two tables holding twenty data whose starting address is 9000H and 9020H respectively. Write a program to add the content of first table with the content of second table having same array index. Store sum and carry into the third and fourth table indexing from 9040H and 9060H respectively. [8]
4. Describe how 8086 microprocessor is faster than 8-bit microprocessors in terms of its instruction processing. Write in brief about the uses of major registers of 8086 microprocessor. [3+5]
5. Write an assembly language program for 8086 to calculate the addition of 100 natural even numbers and display the result in screen, in decimal format. [8]
6. Explain single handshaking and double handshaking technique used in parallel interfacing with a microprocessor? Design an address decoding circuit to interface two 8k*8 ROM chips at address starting at 4000H. [3+5]
7. What do you mean by Machine cycle and T-states? Draw a bus timing diagram for an instruction ANI 55H of 8085 microprocessor. Calculate the time required to execute such instruction, if microprocessor is operating at 2MHz clock frequency. [2+5+1]
8. What are the software interrupts of 8085? Discuss the different hardware interrupts available in 8086. Write down the steps, sequentially carried out by the systems when an interrupt occurs. [3+3+2]
9. What do you mean by accumulator based microprocessor? Compare RISC and CISC architecture. [2+6]
10. Write short notes on any two:
 - a) Flags in 8086 Microprocessor
 - b) DMA Controller
 - c) Deadlock and its Remedies

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(45)

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1. Differentiate between Microprocessor and Microcontrollers. Explain how the microprocessor is organized in microprocessor based systems. [4+4]
2. What is flag? Discuss about 8085 associated flags. Along with suitable example show how these flags are affected by arithmetic and logical group of instructions. [1+2+5]
3. Write an assembly language program for 8085 to find the square of ten 8-bit numbers which are \leq 0FH, stored from memory location C090H. Store the result from the end of the source table. [8]
4. Discuss and differentiate between Bus Interface Unit (BIU) and Execution Unit (EU) of 8086 Microprocessor. List out the operators used in 8086 Assembly Language Programming. [4+4]
5. Two tables contain ten 16-bit data each. Write an assembly language program to generate the 3rd table which contains 1FFFh if the corresponding data in the 1st table is less than that of 2nd table, else store 0000h. [8]
6. Draw and explain the timing diagram of LXI D, 2465 H. Calculate the time required to execute this instruction if the crystal frequency is 6MHZ. [6+2]
7. With a neat diagram explain the interfacing circuit using a 3:8 decoder (74LS138) needed to connect the following memory units to the 8085 microprocessor consecutively starting from memory location AOOOH. [8]
 - 2K \times 8 ROM chip
 - 2K \times 8 RAM chip
 - 4K \times 8 EPROM chip
8. Explain the purpose of the EI, DI, SIM and RIM instructions of the 8085 processor while using interrupts. Describe how the 8085 obtains the starting address of the interrupt service routine for each of the hardware interrupts. [8]
9. Discuss about Flynn's Classification. What are the key features having with a typical Operating system? [4+4]
10. Write short notes on:
 - i) RS232
 - ii) PPI
[4 \times 2]

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31 TRIBHUVAN UNIVERSITY
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1. Explain RTL based on any 8085 instruction. Define Stored program concept. [4+4]
2. What are the characteristics of 8085 microprocessor? Discuss all the input and output signals that are originated from microprocessor. [2+6]
3. How are the flags of 8085 processor affected during the usage of arithmetic and logic instructions? Explain with examples. Explain the following instructions with example program (i) DAA (ii) SPHL (iii) XTHL (iv) PCHL [4+4]
4. Draw the internal architecture of 8086 microprocessor. Explain each block in detail. [8]
5. Write an assembly language program for 8086 to find the largest and smallest numbers of an array having 10 numbers. Display the found numbers in the clear screen. [8]
6. Explain bus timing diagram. Draw and explain the timing diagram of the 8085 instruction STA 8050 H. [2+6]
7. Design an interfacing circuit for following problem. [8]
 - i) 74LS138:3 to 8 Decoder
 - ii) 2732 (4K*8): EP-ROM address range should begin at 0000H and additional 4K memory space should be available for future explanation
 - iii) 6116(2K*8):CMOS R/W memory
8. Differentiate between maskable and non-maskable interrupts. Explain how different interrupt pins of 8085 are used. [2+6]
9. What is interprocess communication? How does dead lock occur? How can it be solved? [2+3+3]
10. Write short notes on: [4×2]
 - i) USART
 - ii) RISC

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1. What is Bus? Explain Bus organization of microprocessor with diagram? Calculate the memory handling capacity of the processor having address bus of 24 lines and data bus of 16 lines. [1+5+2]
2. Explain the instruction format and data format of 8085 microprocessor. Explain different addressing modes of 8085 microprocessor. [3+5]
3. Write a program in 8085 to calculate the number of ones in the upper nibble of ten 8-bit numbers stored in a table. Store the count of ones in a location just after the table. [8]
4. What is statement in an assembly language program? Explain frequently used directives with suitable example. [2+6]
5. Write an assembly program to read a string from the user and display vowels and consonants separately. [8]
6. What do you understand by address decoding? Explain with example how PROM decoder is used in memory address decoding. [2+6]
7. Explain different modes of parallel data transfer. Explain briefly, what is PPI. [4+4]
8. What is interrupt? What is its importance in microprocessor? How interrupts from different peripherals can be handled with single INTR pin in 8086 microprocessor? Explain. [1+2+5]
9. What is register based and accumulator based architecture? Differentiate between CISC and RISC architecture? [2+6]
10. Write short notes on:
 - a) DMA
 - b) INX, XTHL, MUL, JG

Examination Control Division
2072 Magh

Exam.	New Back (2066 & Later Batch)		
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1. Draw and explain the block diagram of a computer. Explain stored program concept. [4+4]
2. What is flag? Discuss about 8085 associated flags. Along with suitable examples show how these flags are affected by arithmetic and logical group of instructions. [1+2+5]
3. Write a program for 8085 to generate multiplication table of a number stored at 8230H and store the generated table starting at 8231H. For example, if location 8230H has number 05H then store 05H at 8231 H, OAH at 8232H and so on. [8]
4. Draw the internal architecture of 8086 microprocessor. Explain the function of each register accessible to programmer. [8]
5. Write a program in 8086 to read a string and display each word in a separate line in the center of the screen. [8]
6. Draw the timing diagram of STA instruction? Calculate the time taken to execute the following program if T = 1 micro second. [5+3]

MVI A,05H
ADI 20H
OUT 80H
HLT
7. Design an interfacing circuit to interface one 4 KB EPROM and two 2 KB R/W memory for 8085 microprocessor. [8]
8. What is IVT? How is it used to handle software and hardware interrupts? Explain. [2+6]
9. What is deadlock? What are the conditions for deadlock to occur? Write down the features of DSP chip. [1+3+4]
10. Write short notes on:
 - a) RS 232
 - b) Two pass assembler

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1. Explain the microprocessor based system showing the bus organization. Explain the processing cycle of a stored program computer. [4+4]
2. Explain briefly the programmer's model of 8085 microprocessor. [8]
3. Write a program for 8085 to add the upper and lower nibble of ten 8 bit words stored in a table, that starts from location 8B20H. Store the separate results in locations just after the table. [8]
4. What do you mean by addressing mode? Explain the addressing modes of 8086 with example. [3+5]
5. Write an assembly language program to read a text from keyboard, convert the text into uppercase and display on the cleared screen. [8]
6. Draw and explain the bus timing for OUT 42H instruction of 8085 microprocessor. [8]
7. Draw the address decoding circuit to interface two RAM memory block each of 8 KB at address COOOH. [8]
8. Explain how hardware interrupt is processed in 8086 microprocessor. [8]
9. What do you mean by parallelism? Write and explain the features of a typical operating system. [8]
10. Write short notes on:
 - a) RS 232 Standard
 - b) Programmable Peripheral Interface

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1. Define instruction cycle and machine cycle. Explain briefly the instruction processing cycle of Von Neumann machine. [4+4]
2. Draw the internal architecture of 8085 microprocessor and explain each part. [8]
3. Write an assembly language program for 8085. Table1 contains 16 no. of 8 bit data, transfer data which have number of 1s greater than 3, from table1 to table2, otherwise store FFH in table2. [8]
4. What is statement in assembly language programming? Explain commonly used directives with examples. [8]
5. Write a program to read a string and display only the alphabetic characters from the string in a clear screen. [8]
6. Draw timing diagram of instruction LDA 2080H. Calculate the time required to execute this instruction if the crystal frequency is 6 MHZ. [6+2]
7. Determine the capacity of devices in the following memory range. [2+6]

Range	Device
0000-FFFF	ROM
2000-3FFF	RAM1

Design an interfacing circuit to interface above memory devices with 8085 microprocessor.

8. Define Interrupt Service Routine (ISR) and Interrupt Vector Table (IVT). Explain type 0 to type 4 interrupt of 8086. [2+6]
9. What are the features of digital signal processors? Describe instruction level, thread level and process level parallelism. [2+6]
10. Write short notes on:
 - a) I/O mapped and memory mapped I/O
 - b) DMA

21 TRIBHUVAN UNIVERSITY
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 2070 Bhadra

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Subject: - Microprocessor (EX551)

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1. Define bus? Explain different types of bus. Define RTL. Write down the RTL for MOV r_1, r_2 in 8085 microprocessor. [4+4]
2. In how many ways 8085 instructions can be classified? Explain with examples. What is the purpose of the branching instructions? [6+2]
3. Write an assembly language program for 8085 to exchange the bits D6 and D2 of every byte of a program. Suppose there are 200 bytes in the program starting from memory location 8090H. [8]
4. Draw internal block diagram of 8086. Explain Bus Interface Unit. [5+3]
5. Write an assembly language program for 8086 to a read string. Display each word in separate lines in a cleared screen, count how many words are there and display the count. [8]
6. Write the various machine cycle involved in LDA C030 stored at C050. Write the use of following pins of 8085 microprocessor. ALE, IO/M, READY, RD, AD₀-AD₇. [3+5]
7. Explain the execution of instruction LDA 8B7FH with the help of timing diagram. [8]
8. How interrupt vector table is used in microprocessors to manage the interrupt? Explain how software and hardware interrupts are used in 8086 microprocessor in detail. [3+5]
9. Write the conditions that may cause deadlock to arise. Explain Flynn's classification. [4+4]
10. Write short notes on:
 - a) Hardwired and micro program control unit
 - b) EXE and COM programs

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1. Differentiate between Hardwired and Microprogrammed Control Unit used in microprocessors? Write the fetch and execution cycle for LXI D,9050H instruction in RTL specifications. Explain each step. [4+4]
2. Write any three features of 8085 microprocessor. Explain the addressing modes of 8085 with example. [3+5]
3. Write an assembly language program in 8085 to divide a byte stored in memory location 9070 H by byte stored in 9071 H and store the remainder and quotient at 9072 H and 9073 H respectively. [8]
4. Draw the functional block diagram of 8086 microprocessor and explain each block. [8]
5. Write a program for 8086 to find the largest and smallest value from a list of ten 16 bit data and store the result in maxval and minval variables. [8]
6. What do you mean by serial interface? Differentiate between synchronous and asynchronous serial interfacing. Describe how we can use RS-232 standard to transfer data from DTE to DCE and vice versa? [1+3+4]
7. Design the address decoding interface of an input port and output port for 8085 at 81 H and 82 H address. Use block decoder. [8]
8. Differentiate Maskable and Non-Maskable interrupt. Write the general sequence to be followed when interrupt occurs. [2+6]
9. Write down the difference of RISC and CISC computers. [8]
10. Write short notes on:
 - a) Serial and parallel interface
 - b) Programmable peripheral interface

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1. Define microprocessor based system. Explain the various components of a microprocessor based system including the bus structure. [2+6]
2. Compare CALL and RET instructions with PUSH and POP instructions for 8085. Illustrate their usages with appropriate examples. [4+4]
3. Write a program to convert ten BCD numbers stored at 4350H to binary and store the result at 4360H. [8]
4. Draw the internal architecture of the 8086 microprocessor. Differentiate between EXE and COM programs. [4+4]
5. Write a program in 8086 to convert the vowels to uppercase from a string entered by the user and display the converted string in a new line. Also count the number of uppercase letters in the converted string and display the count in a new line. [8]
6. Define synchronous and asynchronous bus. Draw and explain the timing diagram of LXI B 1234H. [3+5]
7. Interface two 4K*8 ROM with 3:8 decoder at the address of your choice. Show the address map for each ROM and explain your circuit. [8]
8. Explain how the interrupt vector table is used in 8086 microprocessor. Show the complete instruction execution sequence when interrupt service routine is called. [3+5]
9. What do you mean by parallelism? Explain the case of deadlock that may arise during inter process communication. What role does the operating system play in handling such deadlocks? [2+3+3]
10. Write short notes on: (any two)
 - a) Flags in 8086 microprocessor
 - b) Programmable interrupt controller (PIC)
 - c) Instruction and machine cycles

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1. Define stored program concept. Von-Neumann machine principle is the pioneer of the now days digital computer. Justify the above statement. [8]
2. Draw the internal block diagram of 8085 microprocessor and explain each block. [8]
3. Write a program in 8085 to transfer bytes of data with odd parity from location 9205H to A200H, else transfer the data by clearing bit D₅ and setting bit D₃. The end of the data bytes is indicated by 51H in the data. [8]
4. What do you mean by statements? Write and explain commonly used directives in assembly language programming. [2+6]
5. Write an assembly language program for 8086 to read a string, count number of vowels in the string and display the string and its vowels count in a clear screen. [8]
6. What are the various machine cycles involved in LDA 8050H instruction stored at memory location 8020H? Design an address decoding circuit for an input port interfaced at address 8050H such that LDA 8050 instruction can be used to read from that port. [3+5]
7. Distinguish between synchronous and asynchronous serial data transmission. Explain the signals and connections in RS232C serial interface standard. [4+4]
8. Differentiate between hardware and software interrupts. Explain the complete interrupt processing for hardware interrupt in 8086. [2+6]
9. Define parallel processing and show that pipeline can speed up the processing. Explain Flynn's classification. [4+4]
10. Write short notes on: (any two) [4×2]
 - a) Programmable Peripheral Interface (PPI)
 - b) Register transfer Language (RTL)
 - c) Operators in 8086 assembly language programming
 - d) Feature of a typical operating system

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1. What do you mean by stored program concept? Explain the processing cycle of stored program computer. [2+6]
2. Draw the block diagram of 8085 microprocessor and explain each part briefly. [8]
3. Write a program in 8085 to transfer 8-bit number from one table to other by setting bit D₅ if the number is less than 80H else transfer the number by resetting bit D₆. [8]
4. What do you mean by directives and instructions? Explain the frequently used directives in assembly language programming. [2+6]
5. Write a program in 8086 to read a string and count the number of vowels, consonants, numerals and other characters and display the count. [8]
6. What do you mean by synchronous and asynchronous bus? Draw the bus timing diagram for LXI B, 7492H which is stored in stored in memory location 8200H. [2+6]
7. What do you mean by unique and non-unique address decoding? Explain memory mapped I/O along with an example. [2+6]
8. How is interrupt processing different than polling? Explain how interrupt processing is done with 8085. [2+6]
9. What do you mean by real and pseudo-parallelism? Explain Flynn's classification. [3+5]
10. Write short notes on [4×2=8]
 - a) Stack memory
 - b) USART

21 TRIBHUVAN UNIVERSITY
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 2068 Magh

Exam.	S.Y.N.C.T.B.Tech (2068) / 2069		
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Subject: - Microprocessor

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1. Draw the block diagram of a microprocessor based system. Explain each part in detail. [8]
2. Explain the instruction format and data format of 8085 microprocessor. Write down the addressing modes of 8085 microprocessor. [3+5]
3. Ten no. of 8-bit data is started in memory at A000H. Write a program for 8085 microprocessor to copy the data to next table at A030H if the data is less than 70H and greater than 24H. [8]
4. How are .COM and .EXE programs different? Explain assembling, linking and executing process. [8]
5. Write a program in 8086 to read a number and display the multiplication table of that number. [3+5]
6. Explain the important pin signals of 8085 microprocessor. [8]
7. Define synchronous and asynchronous serial communication. Explain different handshaking signals used in RS232. [8]
8. What is interrupt service routine? Explain the use of interrupt vector table in interrupt processing. [3+5]
9. Compare and contrast RISC and CISC architecture. [2+6]
10. Write short notes on:
 - a) Assembly language operators
 - b) PPI
[4x2]
