1) Describe the basic components that make up a complete computer system.

2) By using adequate block diagrams, describe a model for the 8086 processor.

3) A microcomputer system has a three bus system, discuss the function of each system with reference to the 8086/8088.

4) The 8086 has a multiplexed address/data bus, outline the requirements of the system and the timing required.

5) Discuss the 8086 CPU.

6) The fetch and execute cycle of the 8086 overlap, explain how this is performed and compare them to a non pipelined architecture.

7) The 8086 has two modes of operation (MIN and MAX), discuss.

8) The 8086/8088 CPU has several general purpose registers and pointers. List these registers and indicate their main functions.

9) The flags register is a special type of register. Draw a diagram of this register and describe the main function of the used bits.

10) A) If register AL contains 4Fh and the instruction ADD AL, 15h is executed, what will AL and the Flags registers contain?

    B) If register AX contains 7FFFh and the instruction ADD AX, 1h is executed, what will AX and the Flags registers contain?

11) Explain how the 1M memory of the 8086 is divided. What will happen if a word starting at an odd address must be read?

12) By using a block diagram, describe the principle of segmented memory.

13) Discuss the requirement of segment registers and outline the function of the four segments used by a program.

14) What is the difference between a physical address and a logical address? Explain how the physical address is obtained from a logical address.

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15) Calculate the physical address of the following

   a. Segment base value B124h, offset 0026h
   b. Segment base value 1564h, offset 0148h

16) Every instruction that references memory has a default segment register. A table is programmed in the BIU that points to these default locations. Give an example of such a table.

17) What are the advantages and disadvantages of segmented memory?

18) Describe the function of the stack.

19) Given that the stack segment register is pointing to location 1105h, the stack pointer register contains 001Ah, AX = 2456h, BX = 4562h, indicate the address of the bottom of the stack, and the address of the top of the stack. If the instruction PUSH AX followed by instruction PUSH BX are performed, calculate the new value of SP and indicate how the values of AX and BX are stored in memory.

20) Given that the stack segment register is pointing to location 2408h, the stack pointer register contains 000Ah, location 2408Ah contains 8934h and location 2408Ch contains 1243h, indicate the address of the bottom of the stack, and the address of the top of the stack. If the instruction POP AX followed by instruction POP BX are performed, calculate the new value of SP and the values of AX and BX.

21) Describe the I/O read cycle timing from a parallel port.

22) Describe the I/O write cycle timing to a parallel port.

23) Describe the hardware required for a parallel output port.

24) Describe the hardware required for a parallel input port.

25) Explain the technique for asynchronous serial communication.

26) Describe the requirement of a UART.

27) Compare the asynchronous to synchronous serial communications.

28) Synchronous serial communications can use two protocols, discuss.

29) Considering a parallel printer outline the requirement of programmed I/O and explain how this is implemented.

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30) Describe interrupt driven I/O.

31) Discuss the Direct Memory Access Protocols.

32) By the use of block diagrams, describe the function of the 8255 PPI chip.

33) The 8255 has to be programmed for the desired operating mode and I/O configuration, indicate how the different control words will program this chip.

34) What are the functions of the 8255 programmed in Mode 0.

35) What are the functions of the 8255 programmed in Mode 1, indicating also the timing required.

36) What are the functions of the 8255 programmed in Mode 2.

37) By the use of block diagrams, describe the function of the 8259 PIC chip.

38) Describe the four 8259 initialization control words.

39) Describe the three 8259 operation control words.