SECTION A ANSWER **<u>ALL</u>** Questions in this section

QUESTION 1

a) What kind of problem arises if two devices attempt to use the system bus at the same time?

[4]

b) Name the four general purpose registers found in the 8086 microprocessor, each general purpose register also has special functions. State what they are.

[8]

c) If the CS (Code Segment) register contains the value 03E0H and the IP (Instruction Pointer) register contains the value 1F20H, from what address is the next instruction fetched?

[2]

d) What do the square brackets mean when they appear in an operand (e.g. MOV AX,[3000]?

[1]

e) What are the three conditions that need to be satisfied in the critical section problem of process synchronization.

[3]

f) What are the two problems with using semaphores?

[2]

[Total 20]

SECTION B   SELECT <u>ANY</u> TWO Questions from this section

QUESTION 2

    a)   In the 8086 processor, if register AL contains the value 20H and register CL contains the value 80H.

           Convert 20H and 80H to Decimal values.

           Multiple the two values together and convert the result back to Hexadecimal.

           What register is used to store is the result of executing the instruction MUL CL using the values for AL and CL above?

           [8]

    b)   Register AX contains the value A064H.   Upon executing the instruction MUL AX a result of 647D2710H is obtained. This is too big to fit in register AX. What additional register is used? Does this register hold the upper half of the final value? Show what value is stored in each register.

           [4]

    c)   Convert the following values to Binary, show all your workings:

           55AA Hexadecimal

           1234   Decimal

           [2]

    d)   Identify the addressing modes in each of these instructions.
           i)   MOV   AX,BX
           ii)   MOV   AH,7
           iii)   MOV   [DI],AL
           iv)   MOV   AL[SI+6]

           [4]

    e)   How many times does the NOP instruction execute in the following sequence? Explain your answer.

```
      MOV  CX,20H
XYX:  PUSH  CX
      MOV  CX,9
ABC:  NOP
      LOOP  ABC
      POP   CX
      LOOP XYZ
```

           [7]

           [Total 25]

QUESTION 3

a) What does the term RAID stand for?

[2]

b) There are 5 different ways of create RAID systems. Describe 2 that you are familiar with.

[10]

c) Outline the structure of a CD ROM.

[4]

d) There are 5 major components that make up the Von Neumann architecture. List what the components are and draw an outline diagram

[9]

[Total 25]

Question 4

a) Write short notes on the following hard disk structures:
   CLUSTER
   SECTOR
   MASTER BOOT RECORD

[6]

b) What are the advantages and disadvantages of FIXED_PARTITION MEMORY MANAGEMENT?

[4]

c) When dealing with variable partition memory management, what are the three placement strategies that can be employed. ?

[6]

d) What is meant by the term little endian?

[1]

e) What is the difference between Preemptive vs. Non-preemptive Scheduling?

[8]

[Total 25]