SECTION A **ANSWER ALL 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?

[1]

b) Name the four general purpose registers found in the 80x86 microprocessor, each general purpose register also has special functions, state what they are.

[8]

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

[2]

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

[3]

e) What are the two problems with using semaphores?

[2]

f) Write brief notes, with machine code examples, explaining the following addressing modes in 80x86 CPU's

i) Immediate Addressing.

ii) Direct Addressing.

iii) Registered Addressing.

[9]

g) What is meant by the term Instruction Set Architecture?

[4]

h) In 80x86 assembler. Explain what DUP (?) does.

```
Keys    BYTE  128 DUP (?), 0
```

[1]

[Total 30]

SECTION B **SELECT ANY TWO Questions from this section**

QUESTION 2

a) If register AL contains the value 20H and register CL contains the value 80H.

i) Convert 20H and 80H to Decimal values (Show your workings). [2]

ii) Multiple the two values together and convert the result back to Hexadecimal. (Show your workings) [2]

iii) What register is used to store the result of executing the instruction MUL CL as calculated above?

[1]

b) Register AX contains the value 0A064H. Upon executing the instruction MUL AX a result of 647D2710H is obtained, this is too big to fit in register AX.

i) What other register is used to hold part of the result? [2]

ii) Does the register that you identified hold the upper half or the lower half of the final value? [1]

iii) Show what value is stored in each register. [2]

c) Write brief notes on the 80x86 instructions LOOPE and LOOPZ. How do they differ from the basic LOOP instruction?

[4]

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

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

[7]

e) Outline the code required to perform a “for” loop in 80x86 assembler, using the counter register.

[4]

[Total 25]

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QUESTION 3

a) What does the term RAID stand for?

[1]

b) What does the term little endian mean?

[1]

c) One structure that is created on a disk drive during initialisation is called the BOOT SECTOR. Describe the basic components of this structure.

[10]

d) Outline the structure of a CD ROM.

[4]

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

[9]

[Total 25]

Question 4

a) What is meant by the term, CPU-I/O Burst cycle? How is it related to CPU-bound and I/O-bound processes? [4]

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) In Round-Robin Scheduling, what can happen if the time quantum is set too high?

[1]

e) What is a semaphore? [2]

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

[8]

[Total 25]