ANSWERS

QUESTION 1

a) Low Level [1]

b) DB Define a byte (Allocates memory 8 bits at a time)
DW Define a Word (Allocates memory 16-bits at a time)

[2]

c) MOV AX,1000H moves the actual value 1000H into AX register.

MOV AX,[1000H] moves the value that is stored in memory location 1000H into the AX register.

[2]

d) 31 Decimal = 00011111 Binary

31 Decimal = 1F in Hexadecimal

[4]

e) Order of access speed. Register Memory, L1 cache, L2 Cache, L3 cache, main system memory, disk drive. [3]

The sort of memory found embedded on CPU chip. Register memory and L1 cache [1]

f) Master Boot record always at very beginning of disk 0,0,1 [2]
Boot Sector the first sector in the partition. [2]

g) Process States are: Running, Ready and Blocked (waiting)

[3]

QUESTION 2

a) AX=Accumulator

BX = Base Register

CX= Counter register

DX=Data Register

AX -→ AH and AL

BX → BH and BL

CX → CH and CL

DX → DH and DL

b) 00100111 27H

10111100 BCH

Results

AND 00100100 24H

OR 10111111 BFH

XOR 10011011 9BH

NOT 01000011 43H

c) AX = 3, BX = 4H

	MOV	CX,0	CX = 0
AGAIN	ADD	CX,AX	CX = 3
	DEC	BX	BX =3
	JZ	DONE	
	JMP	AGAIN	Goes round 4 times until BX = 0

Adding 3 each time to CX

At end CX = 0CH 12

AX = 0

BX = 0

Final section You are multiplying Therefore if AX starts with 2 BX with 5 final answer would be 0AH (10)

QUESTION 3

a)

AND

0 0 0

0 1 0

1 0 0

1 1 1

OR

0 0 0

0 1 1

1 0 1

1 1 1

XOR

0 0 0

0 1 1

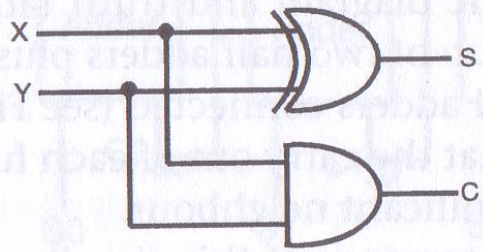
1 0 1

1 1 0

b)

Truth table for adding two binary digits

X	Y	S	C
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1



c)

In logic gates with more than two inputs

If there are more inputs which are **1** than **0**, then output **1**. Otherwise output **0**

d) RISC Reduced Instruction Set Architecture

CISC Complex Instruction Set Architecture

e) Stage1 Fetch an instruction

Stage2 Examine Opcode(decode)

Stage3 Fetch Operands

Stage4 Perform Operation

Stage5 Store result

f) Big endian store data in memory high byte, Low Byte

Question4

a) Memory divided into two sections one for resident operating system and one for user processes.

b) Fixed-partition memory allocation.

Advantage: SIMPLE

Disadvantage:

The degree of microprogramming is constrained. The size of each process is bounded. Suffers from internal fragmentation (memory that is internal to a partition but is not being used)

c) Variable partition memory works by, initially considering all memory as being one large block of memory (A hole). When a process needs memory, a hole large enough for the process is allocated for it. A free-memory list is used to track available memory.

d) The three placement strategies are:

First-Fit (allocate hole large enough)

Best-Fit allocate hole with smallest leftover.

Worst-Fit allocate the largest hole.

e) The basic method of paging is:

Break physical memory into fixed-sized blocks called frames.

Break logical memory into fixed-sized blocks called pages

Page size = frame size

f) Context switching is: is performed by the OS to stop executing a running process and begin

executing a previously ready process.

g) A thread, also called a **lightweight process (LWP)**, is a basic unit of CPU utilization that is under the control of a process. A traditional process (or **heavyweight process (HWP)**) has a single thread of control.A multithreaded process has multiple threads of control and it can do more than one task at a time.

h) The critical section problem is to regulate access to the critical section of a process. It must safisfy the following conditions.

Mutual Exclusion

Progress

Bounded Waiting.

i) The atomic components of a semaphore are: acquire and release