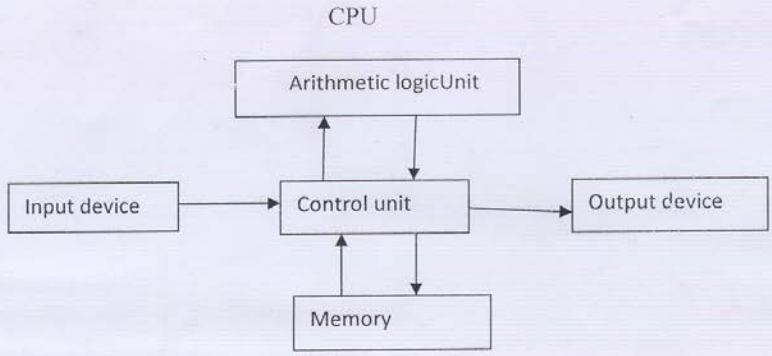
Q.2 a. Discuss and Differentiate between a Microprocessor and a Microcontroller.

Answer:

Ans: **Microprocessor**:- is only CPU of microcomputer.It cannot alone perform any operation.It is a semiconductor device made using LSI techniques.It includes the ALU, register arrays and control circuits on a single chip.

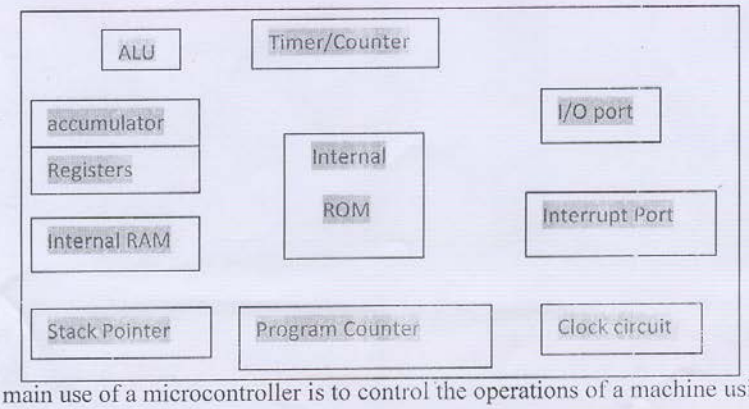
It is a multipurpose,programmable,clock drive,register based electronic device that reads binary instruction from memory,accepts binary data as input and processes them. Example: Intel 8085

The block diagram is given below:-



Micro-controller:-A device that includes microprocessor ,memory, and I/O signal lines on a single chip, fabricated using VLSI technology.

A microcontroller is a true computer on a chip . The features includes microprocessor , PC,SP and registers. It has added other features also to complete computer such as ROM,RAM,parallel I/O,serial I/O,clock circuit and counters.



The main use of a microcontroller is to control the operations of a machine using a fixed program that is stored in ROM and that does not change over the life time of the system. Example Intel 8051

Microcontrollers are of two types:-

(i) Reprogrammable system (ii) Embedded system

b. Convert the following:
(i) $(1011.011)_2$ to decimal form
(ii) $(0.75)_{10}$ to binary form

Answer:

(i) $(1011.011)_2$ to decimal form. **(ii) $(0.75)_{10}$ to binary form**

Ans: (i)

$(1011.011)_2 = 1x\,2^3 + 0 \times 2^2 + 1 \times 2^1 + 1 \times 2^0 + 0 \times 2^{-1} + 1 \times 2^{-2} + 1 \times 2^{-3}$

$= 8 + 0 + 2 + 1 + 0 + 0.25 + 0.125 = 11.375$

$= (11.375)_{10}$

(ii)

$(0.75)_{10}$ = 0. 7 5

	Carry
X 2	
0. 5 0	1
X 2	
0. 0 0	1

Taking remainder from top to bottom give the equivalent binary as $(0.11)_2$

Q.3 a. Discuss the 16 bit registers of 8085 microprocessor with their function.

Answer:

Ans: The Program Counter (PC):- PC acts as a pointer to the next instruction to be executed and always contains the 16 bit address of the memory location of next instruction. The PC is updated by the processor and points to the next instruction after the processor has fetched the complete instruction (the exact number by which the processor updates, depends on the nature of the instruction , for example for one byte instruction it updates the PC by one, for three byte instruction , it updates the PC by three.

The Stack pointer:- The stack is an area of the read-write memory in which temorary information is stored on FILO basis. After initializing , an address is assigned in the RAM area to the first stack entry position afterwards, stack writing instructions fill memory positions in progressively decreasing addresses.

The stack pointer register holds the address of the last byte written on to the stack. This is also called Stack Top. The stack pointer is decremented automatically when data is read out from the stack.

Q.5 a. Specify any four interrupts commonly used by the 8085 microprocessor. Explain functions of each.

Answer:

Ans: The four control signals used by the 8085 microprocessor are $\overline{IORD}$,$\overline{IOWR}$,$\overline{MEMRD}$, and $\overline{MEMWR}$.These signals are generated by combining signals $\overline{RD}$,$\overline{WR}$ and IO/$\overline{M}$.

$\overline{IORD}$ signal: When microprocessor performs read operation on any I/O device, this signal goes low.

$\overline{IOWR}$ signal: This control signal goes low when microprocessor performs write operation on I/O device.

$\overline{MEMRD}$ signal: When microprocessor performs read operation on memory device , this signal goes low.

$\overline{MEMWR}$ signal: This signal goes low when microprocessor performs write operation on memory device.

b. Explain function of the following pins in 8085
(i) ALE (ii) SOD (Serial Data Out)
(iii) READY (iv) HOLD

Answer:

Ans: (i) ALE(address latch enable): Output pin of microprocessor. It goes high during first clock cycle of a machine cycle and enables the lower 8 bits of the address to be latched either in to memory or external latch.

(ii) SOD (serial data out): This is output pin of microprocessor which is used for serial output. The

data can be sent out serially by using SIM instruction.

(iii) READY : This pin is used by the processor to check whether the I/O device is ready to send or receive data. If ready is high peripheral is ready and if it is low microprocessor waits till it goes high.Microprocessor uses this signal for synchronisation with the slow devices.

(iv) HOLD : It is input pin of microprocessor.When active low signal is applied to this pin the microprocessor is reset. The contents of program counter becomes 0000H.It also disable interrupts.

Q.6 a. Explain the control ports of 8255.
Answer: Page Number 329-330 of Text Book

b. Write an 8085 assembly program to evaluate two 4-variables Boolean expression using logic controller interface.
Answer: Page Number 346-347 of Text Book

Q.7 a. Explain the different registers used in 8259.
Answer: Page Number 422-424 of Text Book

b. Explain the pin-description of 8257 controller.
Answer: Page Number 445-446 of Text Book

Q.8 a. Explain 8253 mode-1 operation.
Answer: Page Number 468-469 of Text Book

b. Explain the procedure of identifying the command in control port of 8251.
Answer: Page Number 490-491 of Text Book

Q.9 b. Explain programmer's view of 8051.
Answer: Page Number 556-557 of Text Book

TEXT BOOK

The 8085 Microprocessor; Architecture, Programming and Interfacing, K. Udaya Kumar and B.S. Umashankar, Pearson Education, 2008