Victoria University of Bangladesh

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Answer to the question number : 01

(a)

Basic Micro-computer and features of microprocessor :

Microcomputer :

A basic micro-computer is a small sized inexpensive and limited capability computer. It has the same blocks that are present in a computer. Present day micro-computers are very small in size. They are the size of a notebook. In the days to come they are bound to become still smaller. They are very cheap so that many individuals can process them as their personal computers. Because of mass production they are becomming still cheaper.

Many early micro-computers were not very powerful. For example, they did not have even a simple multiply instruction in their instruction set. Also, they could work only on unsigned integer data. But present day micro-computer have not only multiply and devide instructions on unsigned and signed numbers are also capable of performing floating point arithmetic operations. Infact they are more powerful than the mini-computers and main computers of yesterday.

Features of Micro-computer:

① Memory.

② Decision making power based on previously entered values.

③ Repeatability of the reading.

④ Digital reading-out and interactiveness.

⑤ Parallel processing

⑥ Time sharing and multiprocessing.

⑦ Data storage, retrival and transmission

⑧ Effective control of multiple equipment in the time sharing basis.

⑨ Micro-processors are extremly used where a lot of processing is required.

Answer to the question number : 1 (b)

Below Draw 8085 pin configuration :-

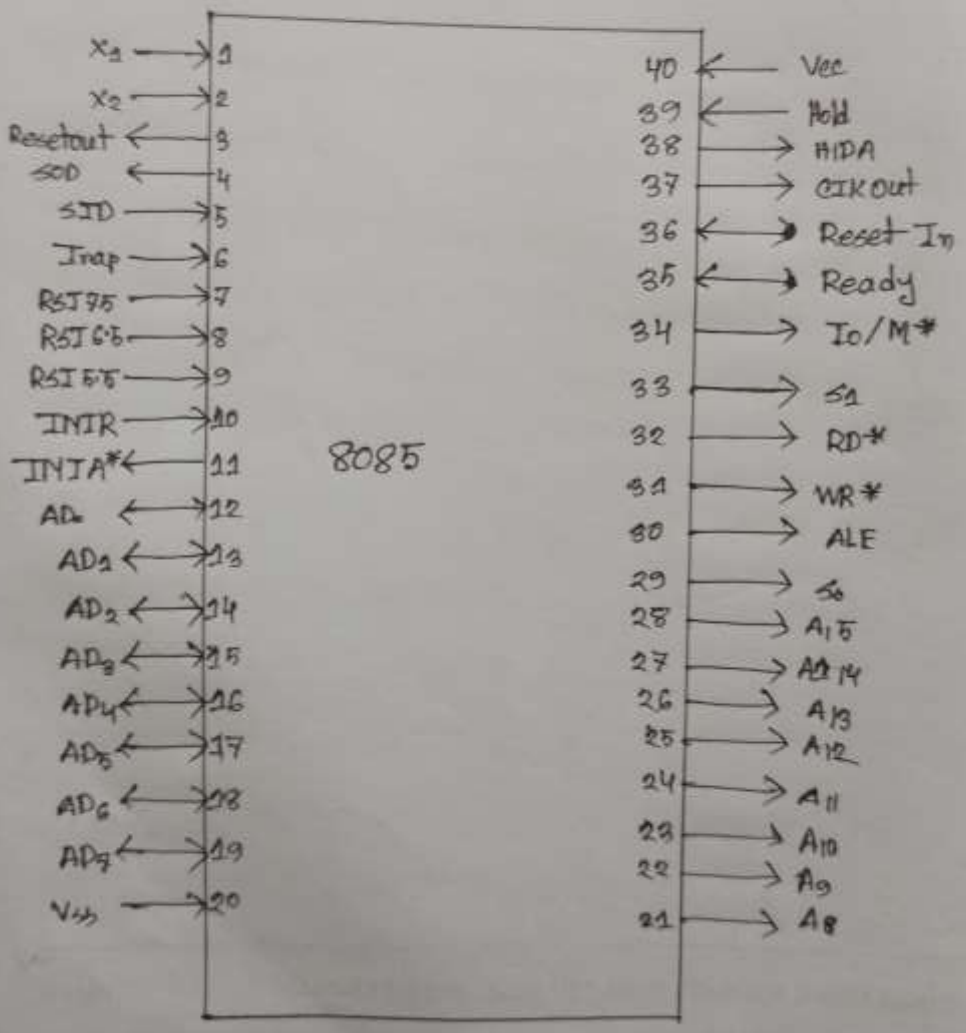


Fig: Pin Diagram of 8085

The pin number and its associated function is indicated for each of the 40 pins. For example, the diagram indicates that, pin number 20 is the Vss Pins. For example, the diagram indicates which should be connected to +5 v dc supply. A user definitely needs this information when he is required to wire up a micro-processor in his circuit. However, for the purpose of understanding the working of the processor, only the function of the various pins need to be known. There is no need to know which pin number performs what function. For example, to understand the working of 8085 micro-processor the user should be aware that, it needs a power supply of +5 v dc and ground. It is not necessary to know. The pin numbers to which +5 v dc and ground are to be connected.

Answer to the question number 8 (a) / (b)

Define classification of Micro-processors:-

A micro-processor is a computer processor where the data processing logic and control is included on a single integrated circuits. The micro-processor contains the arithmatics, logic and control circuitry required to perform the functions of a computers central processing unit. The three classifications are classified into five types, namely: CISC - Complex Instruction set microprocessors RISC - Reduced Instruction set Micro-processor.

ASIC - Application specific Integrated circuit superscalar processing, DP's - Digital signal micro-processors. Microprocessors are of a type of miniature electronic device that contains the arithmatic, logic and circuitry necessary to perform the functions of a digital computers central processing unit.

Answer to the question number : 2.(a)

DMA :

DMA stands for Direct Memory Access. It is designed by Intel to transfer data at the fastest rate. It allows the device to transfer the data directly to/from memory without any interference of the CPU.

Using a DMA controller, the device requests the CPU to hold its data, address and control bus, so the device is free to transfer data directly to/from the memory. The DMA data transfer is initiated only after receiving HDDA signal from the CPU.

Following is the sequence of operations performed by a DMA :-

Initially when any device has to send data between the device and the memory. The device has to send DMA request (DRQ) to DMA controller.

~~# The controller~~

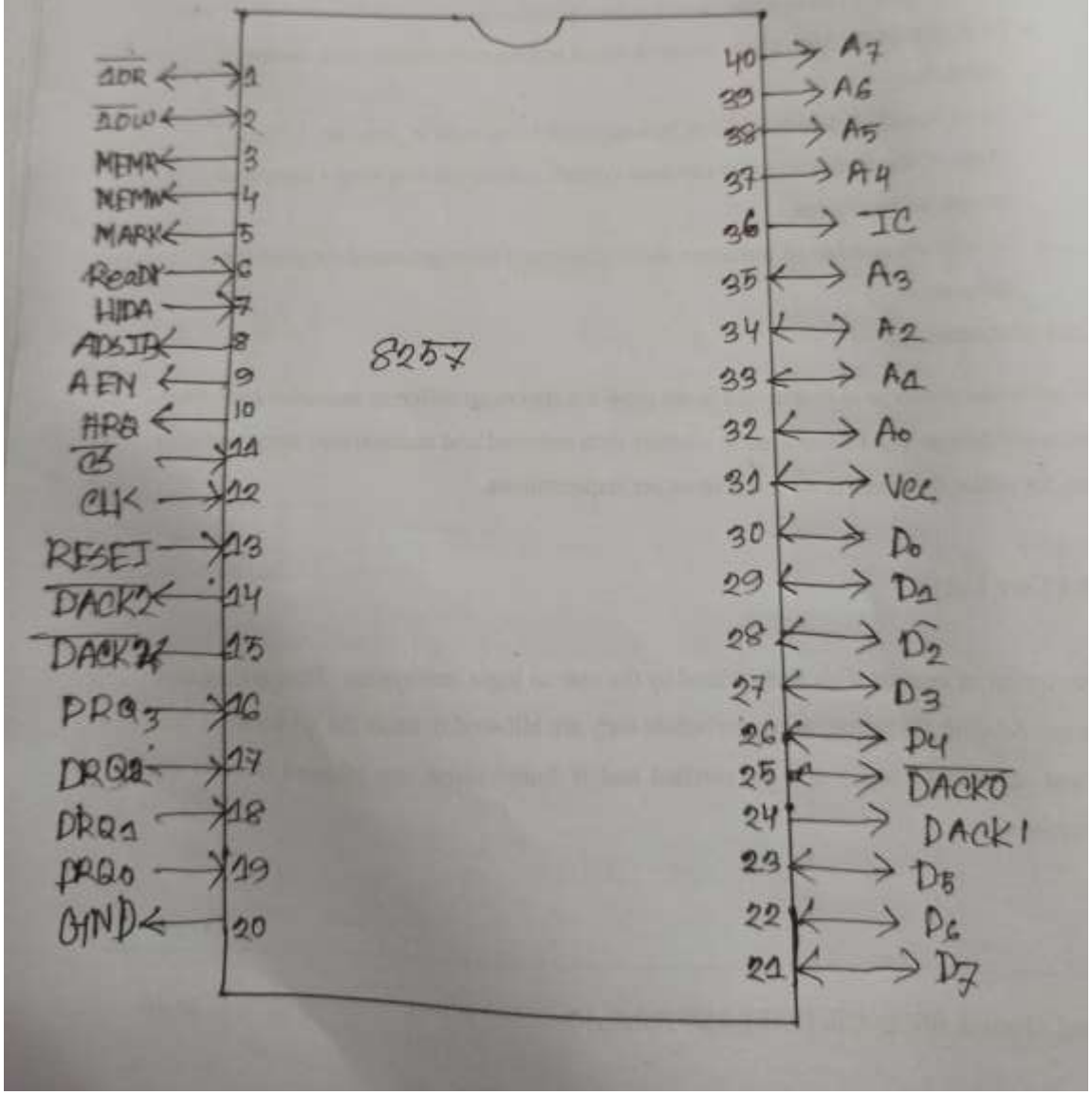
The DMA controller sends hold request (HRQ) to the CPU and waits for the CPU to assert the HLDA.

Then the micro-processor tri-states all data bus, address bus and controll bus. The CPU leaves the control over bus and acknowledge the hold request through HLDA signal.

Now the CPU is in the Hold state and the DMA controller has to manage the operations over buses between the CPU, memory and I/O devices.

Answer to the question number : 2(B)

Below Draw 8257 pin Description :



$DRQ_0 - DRQ_3$: There are the four individual channel DMA request inputs. which are used by the peripheral devices for usinge DMA services. the fixed priority mode is selected, then DRQ_0 has the highest priority and DRQ_3 has the lowest priority among them.

$DACK_0 - DACK_3$: There are the active-low DMA acknowledge lines which updates the requesting peripheral about the ~~status of~~ their request by the CPU. These lines can also act ~~as~~ strobe lines for the requesting devices.

$D_0 - D_7$: These are bidirectional data lines which are used to interface the system bus with the internal data bus of DMA controller. In the master mode, these lines are used to send higher byte of the generated address to the latch.

IOR: It is an active low bidirectional, tri-state input line, which is used by the CPU to read internal register of 8257 in the slave mode. It is used to read data from the peripheral devices during a memory write cycle in master mode.

LOW: It is an active low- bio-direction tri-state line which is used to load the contents of the data bus to the 8 bit mode register. on upper lower byte of a 16 bit DMA address register on terminal court register. In the master mode, it is used to load the data to the peripheral devices during DMA memory read cycle.

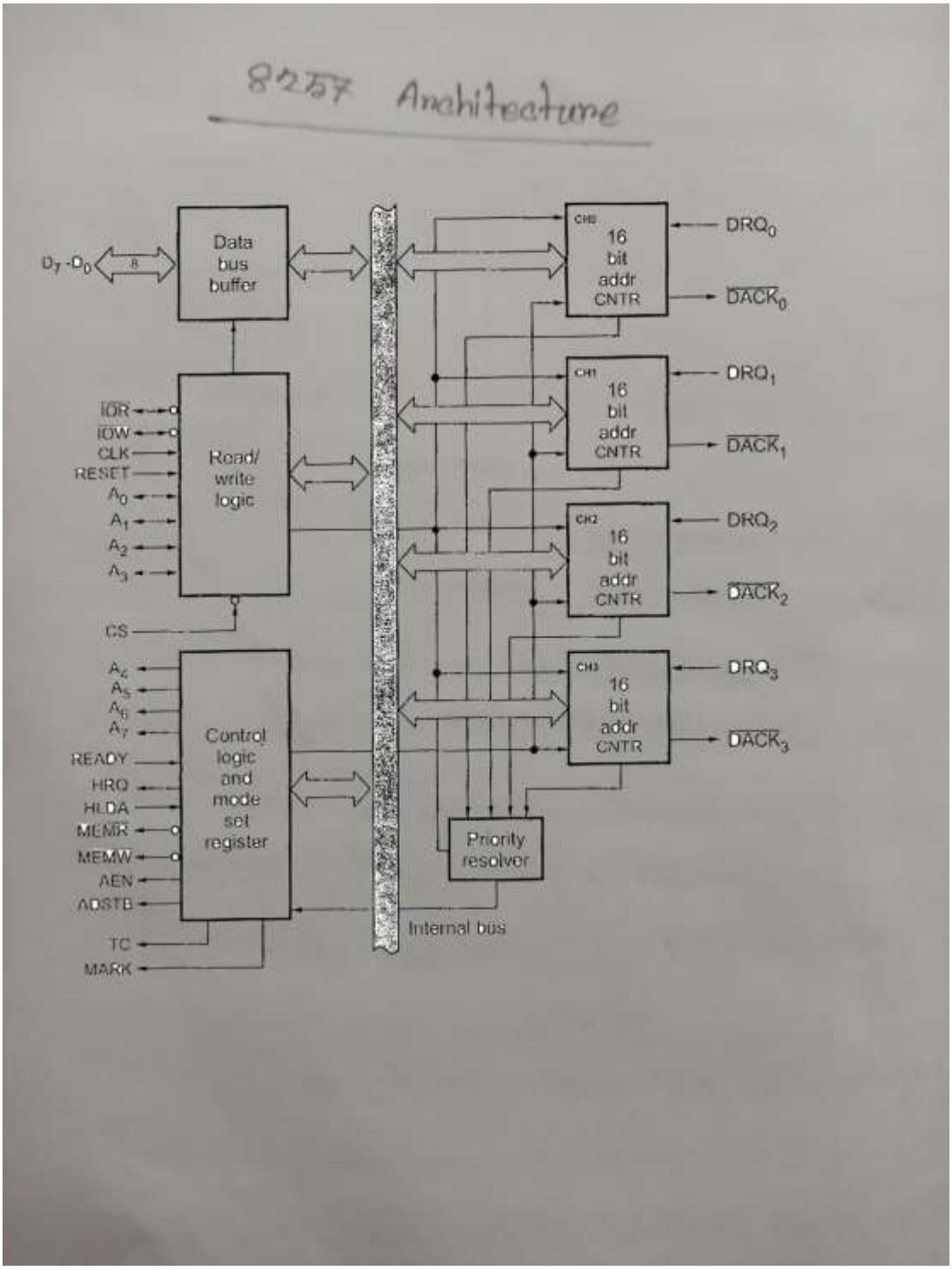
CLC: It is a clock frequency signal whic is required for the internal operation of 8257.

RESET : This signal is used to RESET the DMA controller by disabling all the DMA channels.

$A_0 - A_3$: These are the four latest significant address lines. In the slave mode, they act as an input which selects one of the registers to be read or written. In the master mode, they are the four least significant memory address output lines generated by 8257.

CS : It is an active-low chip selected line. In the slave mode, it enables the read, write operations to/from 8257. In the master mode, it disables the read/write description to/from 8257.

$A_4 - A_7$: These are the higher nibble of the lower byte address generated by DMA in the master mode.


8257 Architecture
Data bus buffer
D_7 -D_0
8
Read/ write logic
IOR
IOW
CLK
RESET
A_0
A_1
A_2
A_3
CS
Control logic and mode set register
A_4
A_5
A_6
A_7
READY
HRQ
HLDA
MEMR
MEMW
AEN
ADSTB
TC
MARK
CH0
16 bit addr CNTR
CH1
16 bit addr CNTR
CH2
16 bit addr CNTR
CH3
16 bit addr CNTR
DRQ_0
$\overline{DACK}_0$
DRQ_1
$\overline{DACK}_1$
DRQ_2
$\overline{DACK}_2$
DRQ_3
$\overline{DACK}_3$
Priority resolver
Internal bus

Answer to the question number: 3(a)

Below describe rotate, shift and Branch

Instruction set of 8086: Rotate is a logical operation of the 8086 microprocessor. It is a ~~instruction~~ 1-byte instruction. This instruction does not require any operation after the opcode. It operates the content of the accumulation and the result is also stored in the accumulator. The rotate instruction is used to rotate the bits of accumulation.

Sift instructions allow the bits of a register or memory byte to be shifted one bit place to the left or to the right. There are two types of shift instructio logical and arithmatic.

The 8086 microprocessor supports 8 types of instruction :

⇒ Data transfer instruction
⇒ Arithmetic Instruction.
⇒ Bit multi manipulation Instruction
⇒ String Instruction
⇒ Program Execution Transfer Instruction (Branch loop Instruction)
⇒ Iteration control Instruction.
⇒ Interrupt Instructions.

Data Transfer Instruction :

⇒ MOV - Used to copy the byte or word from the provided source to the provided destination.

⇒ PPUSH = Used to put a word at the top of the stack.

⇒ POP : Used to get a word from the top of the stack to the provided location.

⇒ Arithmetic Instruction :

⇒ ADD : Used to add the provided byte to byte / word to word.

⇒ ADC : Used to add with carry

⇒ INC : Used to increment the provided byte 1 word by 1.

⇒ AAA : Used to adjust ASCII after addition.

Bit Manipulation Instruction :

NOT : Used to invert each bit of a byte or word.

AND : Used for adding each bit in a byte word with the corresponding bit in another byte word.

OR : Used to multiply each bit in a byte/word with the corresponding bit in another byte / word.

XOR : Used to perform Exclusive-OR operation over each bit in a byte/ word.

Answer to the question number : 3/b

Memory can be classified into main memory and secondary memory. Secondary memory is also frequently termed as auxilliary memory. Main memory has the drawback of high-cost and low capacity storage but it's advantage is the high speed of data transfer. The control unit can directly communicate with the secondary memory - but not with the secondary memory. Main memory can be bradly classified into random access memory (RAM) and read only memory (ROM).

Input Interfacing : The input devices are used for supplying program and data to the memory. In the other words, the computer system needs

the program and the data from the input devices. Most common input devices are the keyboard and mouse.

Output Interfacing :

Output ~~Interfacing~~ devices are used for displaying or recording the results computed by the computer. Most common output devices are the CRT display, printer and plotter.