victoria university of Bangladesh

Final Assesment

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Ans to the qu:No: 1

(1) (a)

Basic microcomputer and features of Microprocessor :-

* Microcomputer :-

A microcomputer is a small sized, inexpensive and limited capability computer. It has the same blocks that are present in a computer. present-day microcomputers are very small in size. They are of 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 possess them as their personal computers. Because of mass production they are becoming still Cheaper.

Many early microcomputers 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 microcomputers have not only multiply and divide instructions on unsigned and signed numbers but are also capable of performing floating point arithmetic operations. In fact they are more powerful than the mini computers and main computers of yesterday.

* Features of Microprocessor :-

1. Memory.
2. Decision making power based on previously entered values.
3. Repeatability of the reading.
4. Digital read-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. Microprocessors are extremely used where a lot of processing is required.

(1) (b)

Below Draw 8085 pin configuration:-

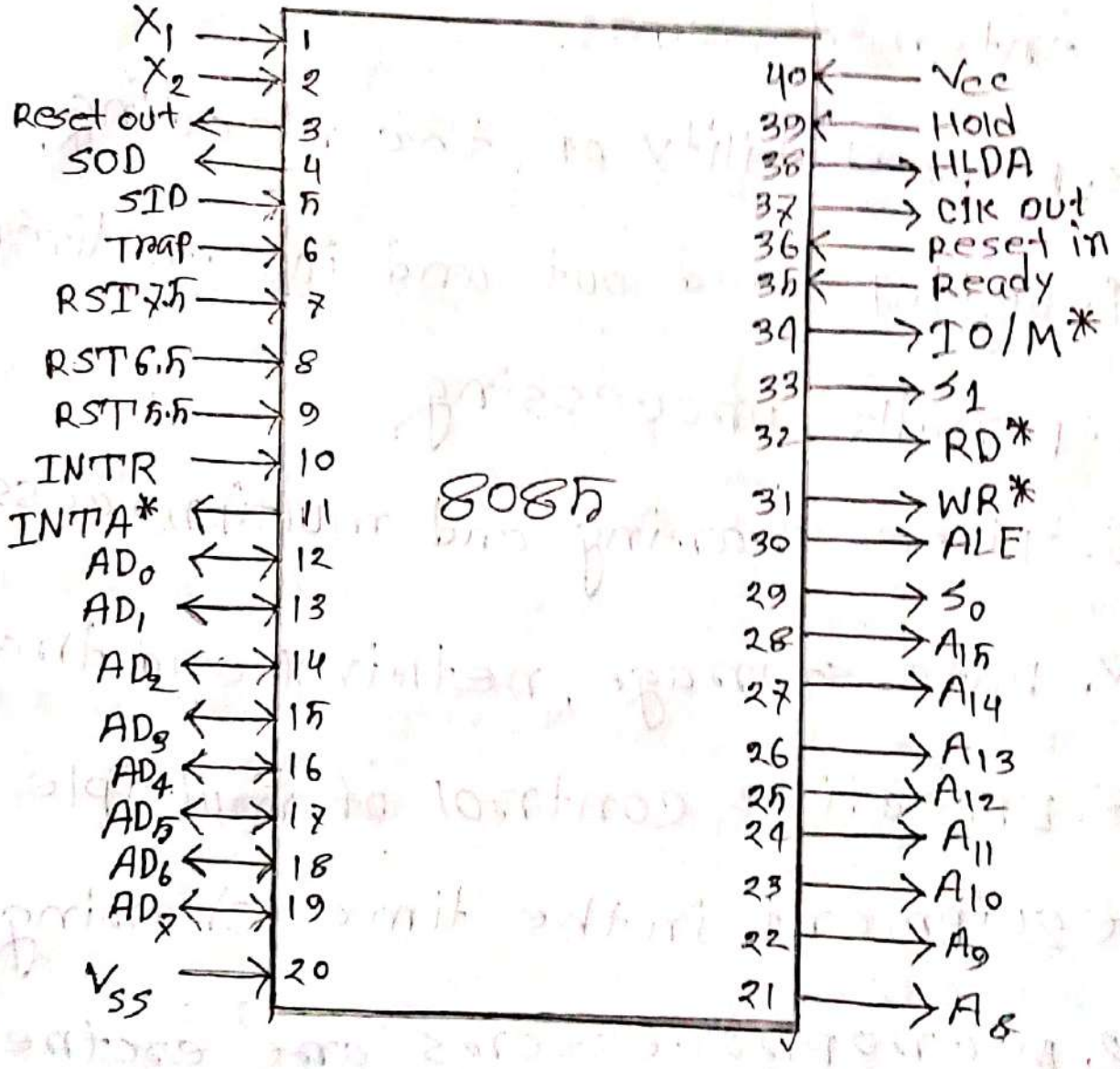


Fig: pin diagram of 8085.

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 V_{SS} pin, which should be connected to ground, and 40 is the V_{CC} pin, which should be connected to +5 V dc supply. A user definitely needs this information, when he is required to wire up a microprocessor 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 microprocessor, 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.

(1) (c)

Define classification of microprocessor :-

A microprocessor is a computer processor where the data processing logic and control is included on a single integrated circuit, or a small number of integrated circuits. The microprocessor contains the arithmetic, logic, and control circuity required to perform the functions of a computer's central processing unit.

The three classification of microprocessor;

Microprocessors are classified into five types, namely : CISC - complex Instruction set microprocessors, RISC — Reduced Instruction set Microprocessor.

ASIC – Application specific Integrated circuit, superscalar processors, DSP's - digital signal microprocessors.

microprocessors any of a type of miniature electronic device that contains the arithmetic, logic, and control circuity necessary to perform the functions of a digital computer's central processing unit.

Ans to the qu:No: 2

(2) (a)

DMA:

DMA stands for Direct Memory Access. It is designed by Intel to transfer datat 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 HLDA 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.

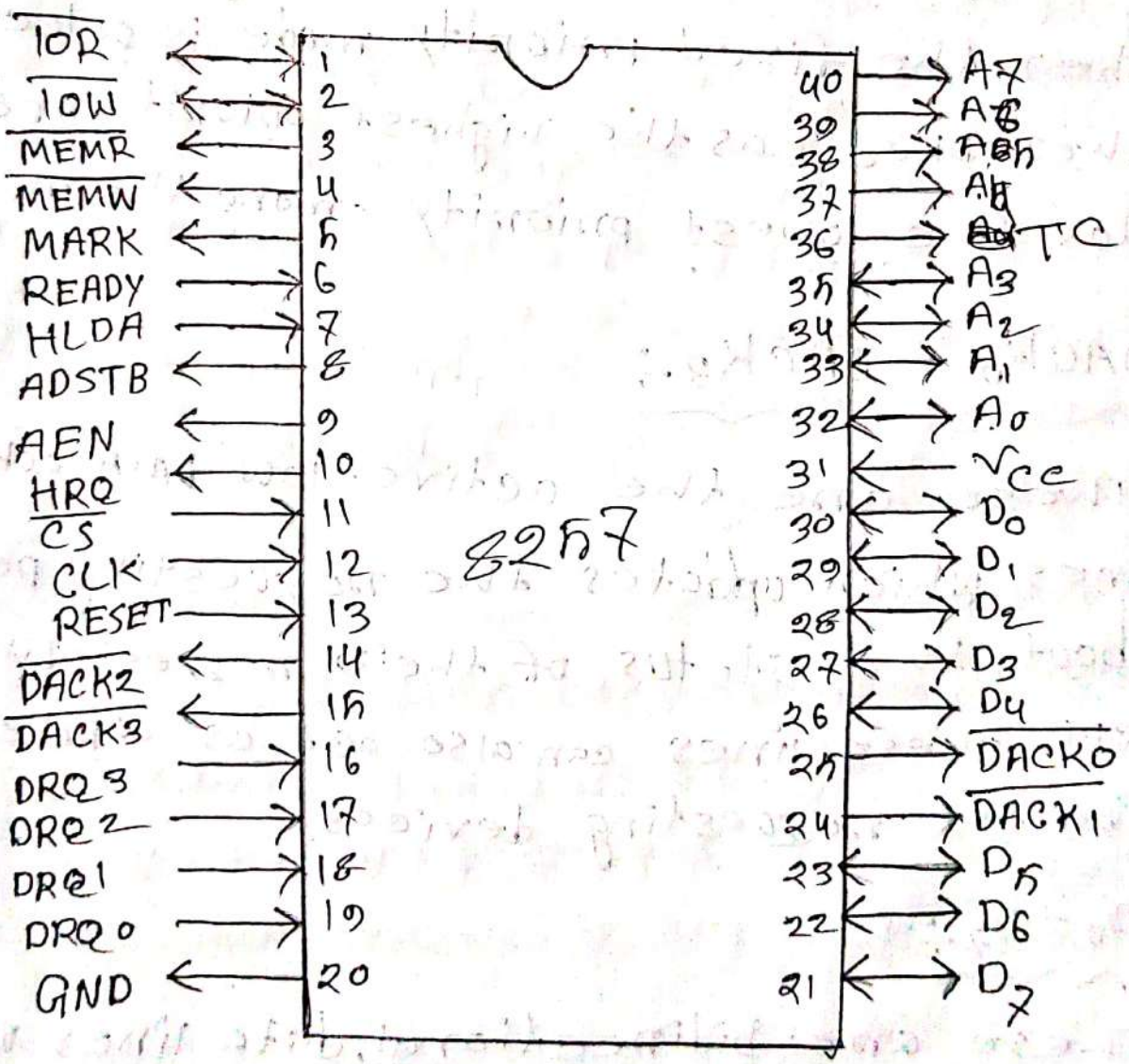
* The DMA controller sends Hold request (HRQ) to the CPU and waits for the CPU to assert the HLDA.

* Then the microprocessor tri-states all the data bus, address bus, and control bus. The CPU leaves the control over bus and acknowledge the HOLD request through HLDA signal.

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

(2) (b)

Below draw 8257 pin description :-



$DRQ_0 - DRQ3$:-

These are the four individual channel DMA request inputs, which are used by the peripheral devices for using DMA services. When the fixed priority mode is selected, then DRQ_0 has the highest priority and DRQ_3 has the lowest priority among them.

$DACK_0 - DACK_3$:-

These 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 registers of 8257 in the slave mode. In the master mode, it is used to read data from the peripheral devices during a memory write cycle.

IOW :-

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

CLK :-

It is a clock frequency signal which 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 least 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 significand memory address output lines generated by 8257.

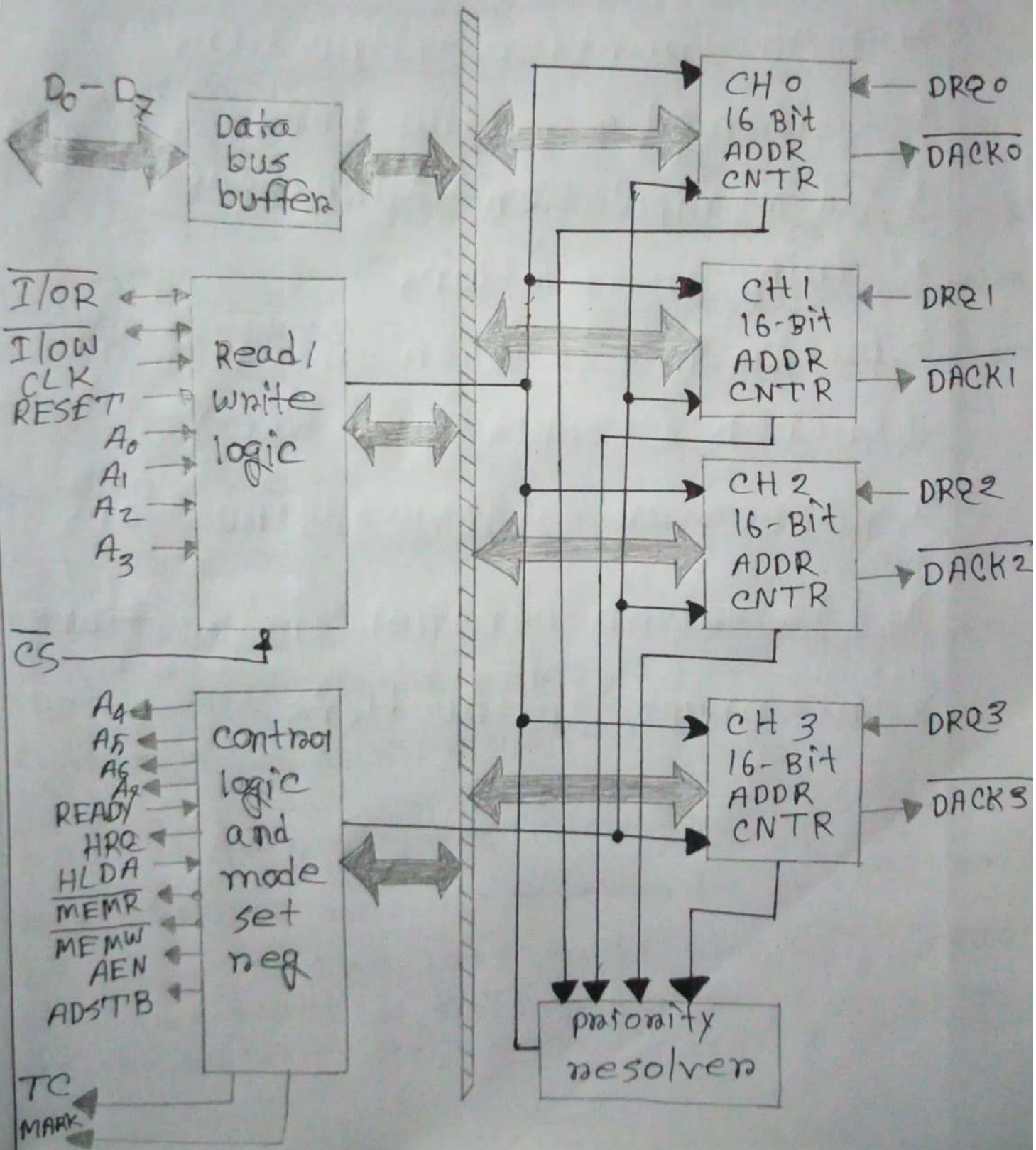
CS :-

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



Ans to the QU:NO:3

(3) (a)

Below describe Rotate, shift, and Branch Instruction set of 8086 :-

Rotate is a logical operation of the 8086 microprocesson. It is a 1-byte instruction. This instruction does not requine any operand after the opcode. It operates the content of the accumulaton and the result is also stored in the accumulaton. The Rotate instruction is used to notate the bits of accumulaton.

shift instructions allow the bits of a registen on memory byte to be shifted one bit place to the left on to the night. There are two types of shift Instructions - logical and anithmetic.

The 8086 microprocessor supports 8 types of instruction:-

* Data transfer Instructions
* Arithmetic Instructions
* Bit Manipulation Instructions
* string Instructions
* program Execution transfer Instructions (Branch & Loop Instructions)
* processor control Instructions
* Iteration control Instructions
* Interrupt Instructions

Data transfer Instructions :-

* MOV - used to copy the byte or word form 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 form the top of the stack to the provided location.

Arithmetic & Instructions :-

* ADD :- used to add the provided byte to byte/word to word.
* ADC :- used to add with canny.
* INC :- used to increment the provided byte / word by 1.
* AAA :- used to adjust ASCII after addition.

Bit Manipulation Instructions :-

*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 with the corresponding bit in another byte/word.

(3) (b)

Memory can be classified into main memory and secondary memory. secondary memory is also frequently termed as auxiliary memory, main memory has the drawback of high-cost and low capacity storage. But its advantage is the high speed of data transfer. The control unit can directly communicate with the main memory but not with the secondary memory. main memory can be broadly 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 reads the program and the data form the input devices. most common input devices are the keyboard and mouse.

output Interfacing :-

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