



Victoria University of Bangladesh

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Microprocessor

CSE-413

Mid-Term

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Submission Date: 14 December 2022

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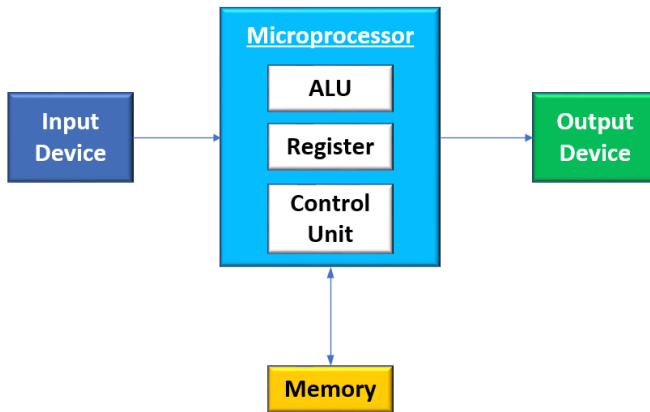
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Answer to the Question No- 1 (a)

Block Diagram of a basic Microcomputer:



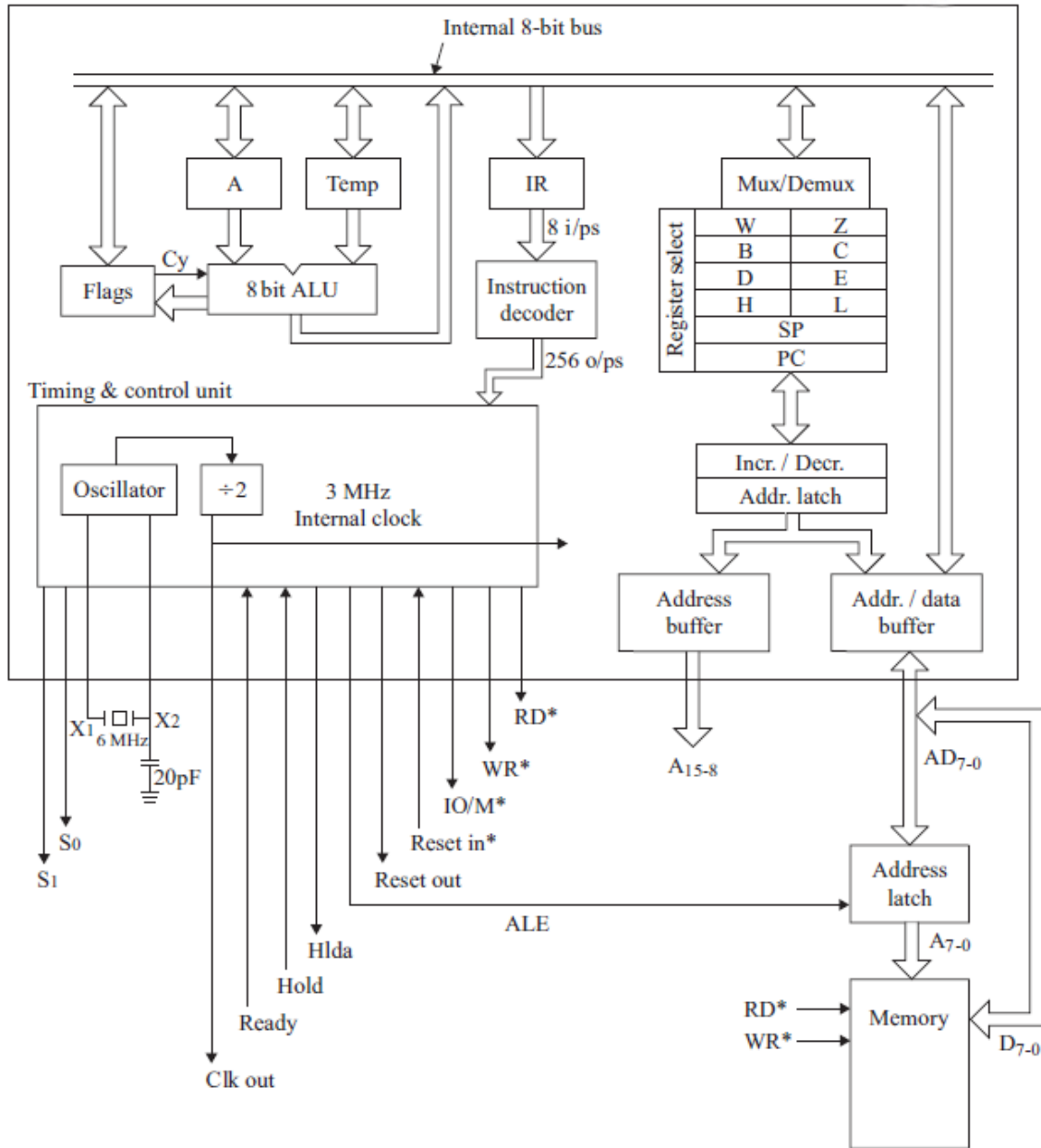
Block diagram of Micro Computer shows here. Microcomputer was once a frequent word for personal computers, specifically for a class of compact digital computers using a single integrated semiconductor chip as the CPU.

Features of Microprocessor: Microprocessor is used in a variety of applications due to their unique features such as size, weight, cost, high computing power, and low power consumption, etc., Microprocessor fitted systems are used.

- to monitor and control operations of Industrial devices by measuring key parameters like temperature, pressure, speed.
- in instruments to raise an alert or warning on extreme conditions.
- to automate office work/business processes and improve white collar productivity.
- in simplifying publishing activity.
- to speed up the information exchange through Telephone and Satellite network.
- in rolling out innovations in entertainment, games and Photography.
- to make everybody and everything stay connected with each other.

Answer to the Question No- 1 (b)

8085 Architecture (instruction execution portion only):



Answer to the Question No- 1 (c)

Bit Manipulation Instructions: These instructions are used to perform Bit wise operations.

Logical Instructions	Shift Instructions	Rotate Instructions
NOT	SHL/SAL	ROL
AND	SHR	ROR
OR	SAR	RCL
XOR		RCR
TEST		

When binary data are manipulated in a register or a memory location, the rightmost bit position is always numbered bit 0. Bit position numbers increase from bit 0 toward the left, to bit 7 for a byte, and to bit 15 for a word.

Logical Instructions: Logic operations provide binary bit control in low-level software. The logic instructions allow bits to be set, cleared, or complemented. Lowlevel software appears in machine language or assembly language form and often controls the I/O devices in a system. All logic instructions affect the flag bits. Logic operations always clear the carry and overflow flags, while the other flags change to reflect the condition of the result.

Shift instructions: Shift instructions position or move numbers to the left or right within a register or memory location. They also perform simple arithmetic such as multiplication by powers of $2+n$ (left shift) and division by powers of $2-n$ (right shift). The microprocessor's instruction set contains four different shift instructions: Two are logical shifts and two are arithmetic shifts.

Rotate Instructions: Numbers rotate through a register or memory location, through the C flag (carry), or through a register or memory location only. With either type of rotate instruction, the programmer can select either a left or a right rotate. Addressing modes used with rotate are the same as those used with shifts. A rotate count can be immediate or located in register CL.

Answer to the Question No- 2 (a)

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 HLDA signal from the CPU.

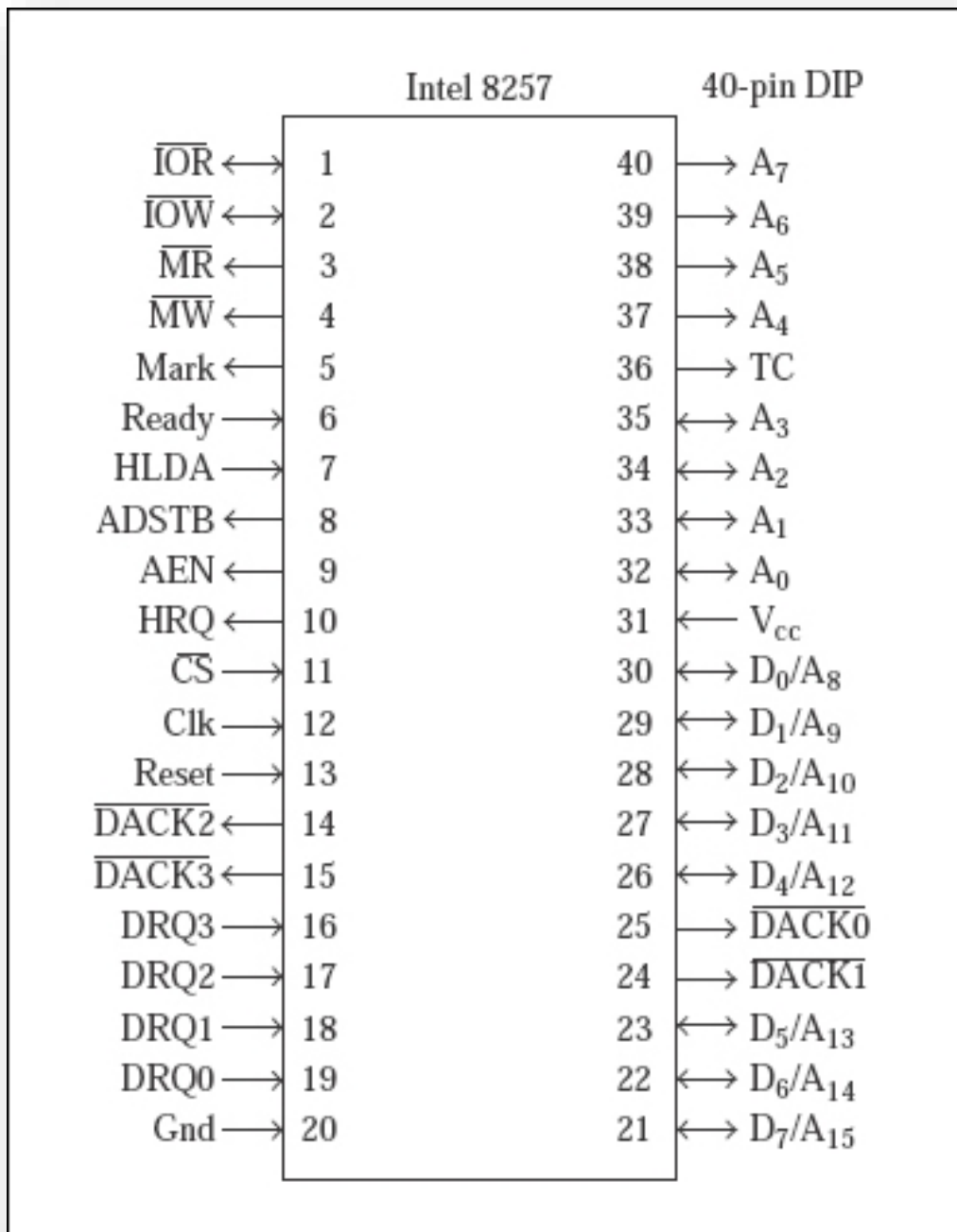
Following is the sequence of operations performed by a DMA–

- 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 acknowledges 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.

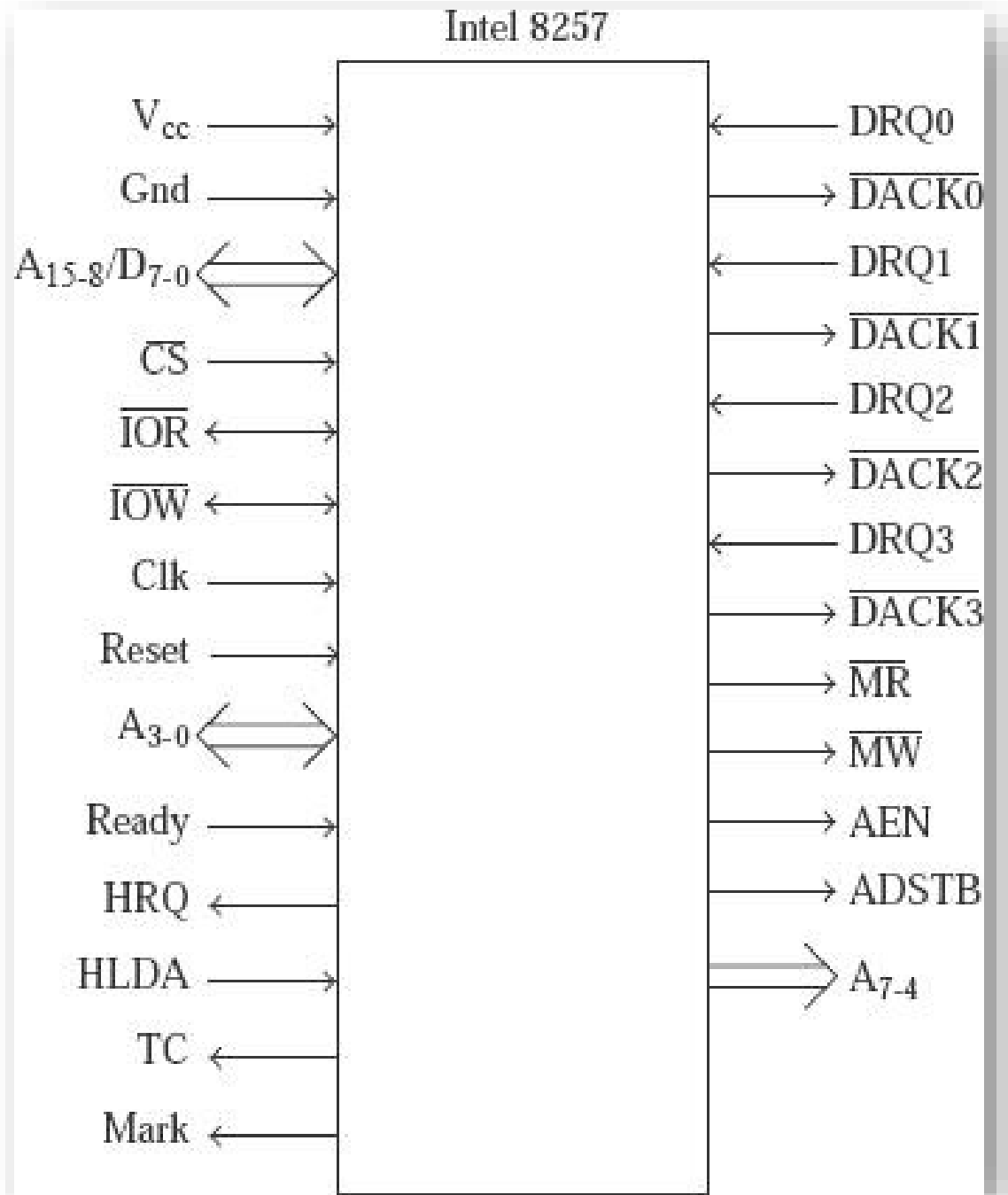
Answer to the Question No- 2 (b)

The 8257 pins are described is given below-

Physical pin diagram of Intel 8257:



Functional pin diagram of Intel 8257:



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