Assignment - 1
(Unit - 1 and 2)

Q1: Define following in 8085 microp. -
(A) Program Counter
(A) Stack Pointer
(C) HOLD and HLDA PIN
(D) Instruction Registers
(E) General Purpose Prog. Registers
(F) Control and status pins
(G) Flags
(H) PSW

Ans (A) **Program Counter** —
MP uses Program counter register to sequence execution of instructions. The function of program counter is to point to memory address from which next byte is to be fetched when a byte is being fetched, PC is incremented by one to point to next memory location.

(B) **Stack Pointer** —
Stack Pointer is also a 16-bit register used as memory pointer. It points to memory location in R/W memory,

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called the stack. The beginning of stack is defined by loading a 16-bit address in stack pointer. It is register which stores address of top of stack.

(C) HOLD and HLDA PIN –

HOLD signal indicates that peripheral such as DMA controller is requesting use of address and data buses. HLDA signal acknoledges the HOLD request. It is active high signal.

(D) Instruction Register –

It is an 8-bit register. When an instruction is fetched from memory then it is stored in the instruction register.

(E) General purpose registers –

8085 MP has 6 general-purpose register to store 8-bit data. These are identified as B, C, D, E, H, L. They can be ~~formed~~ combined as register pairs – BC, DE, HL to perform 16-bit

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operations. These registers are used to store or copy data.

(f) control and status Pins -

i) ALE - This is positive going pulse generated every time 8085 begins an operation (machine cycle). It indicates that bits on AD_0-AD_7 are address bits

ii) $\overline{RD}$ (Read) - This is read control signal. This is active low signal. This signal indicates that selected I/O or memory device is to be read and data are available on data bus

iii) $\overline{WR}$ (write) - This is write control signal. This signal indicates that data on data bus are to be written into selected memory or I/O location

iv) IO/$\overline{M}$ - when it is high, it indicates I/O operation when it is low, it indicates memory location

v) S_1 and S_0 - These status signals, similar to IO/$\overline{M}$ signals, can identify various operations, but

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they are rarely used in small systems.

(G) Flags –
ALU includes 5 flip-flops which are set or reset after an operation according to data conditions of result in accumulator and other registers. They are called zero (z), carry (c), sign (s), parity (P), auxiliary carry (AC). The MP uses these flags to test data conditions.

(H) Power supply signals –
8085 MP operates on single +5V power supply connected to Vcc at pin no 40. The ground reference is connected to Vss at pin no 20.

Q2 Define multiplexed pins of 8085 MP. Explain with block diagram of demultiplexing of AD_0-AD_7 pins of 8085.

Ans: Lower order address bus (A_0-A_7) are multiplexed with 8-bit data bus (D_0-D_7). It means that

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data and address are sent on same line but at different instant of time. This configuration is done to reduce no. of pins on 8085 microprocessor IC. This multiplexed bus is denoted by $AD_0 - AD_7$. The signal lines $AD_0 - AD_7$ are bidirectional.

Demultiplexing of $AD_0 - AD_7$ pins -

ALE signal is used to demultiplex the address/data bus. The multiplexed address/data bus ($AD_0 - AD_7$) is connected as input to 8-bit latch IC (74LS373). The enable input (G) of latch IC is connected to ALE pin of MP whereas output control ($\overline{OC}$) is grounded.

ALE signal goes high during earlier part of execution of instruction, latch is transparent and $AD_0 - AD_7$ is reflected to $A_0 - A_7$. In this way, complete address is available in address bus ($A_0 - A_{15}$). once address

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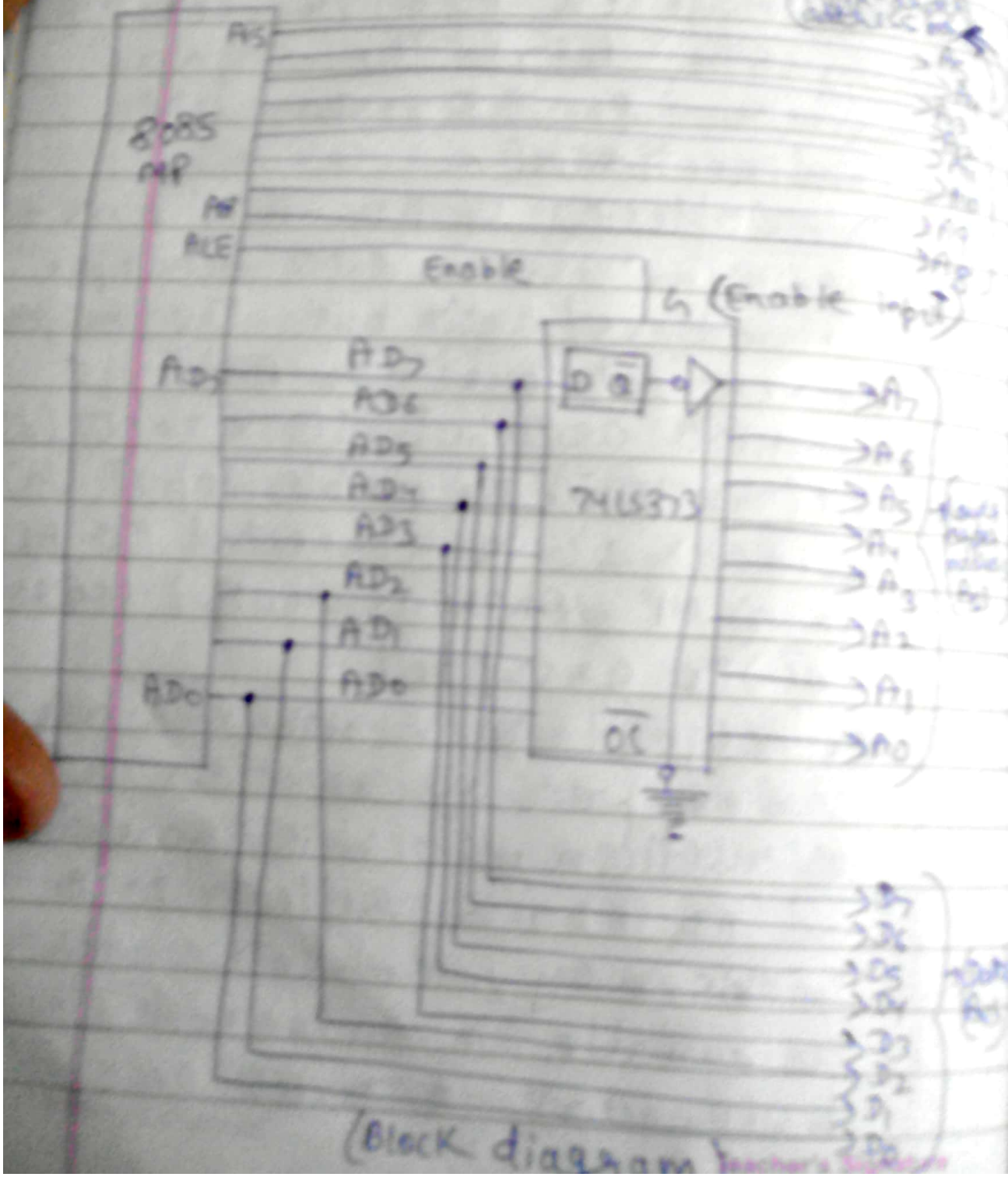
is located, ALE signal goes high and latch is disable. Now data is available on multiplexed bus ($AD_0 - AD_7$), which may flow from MP to memory or vice-versa.



(Block diagram)