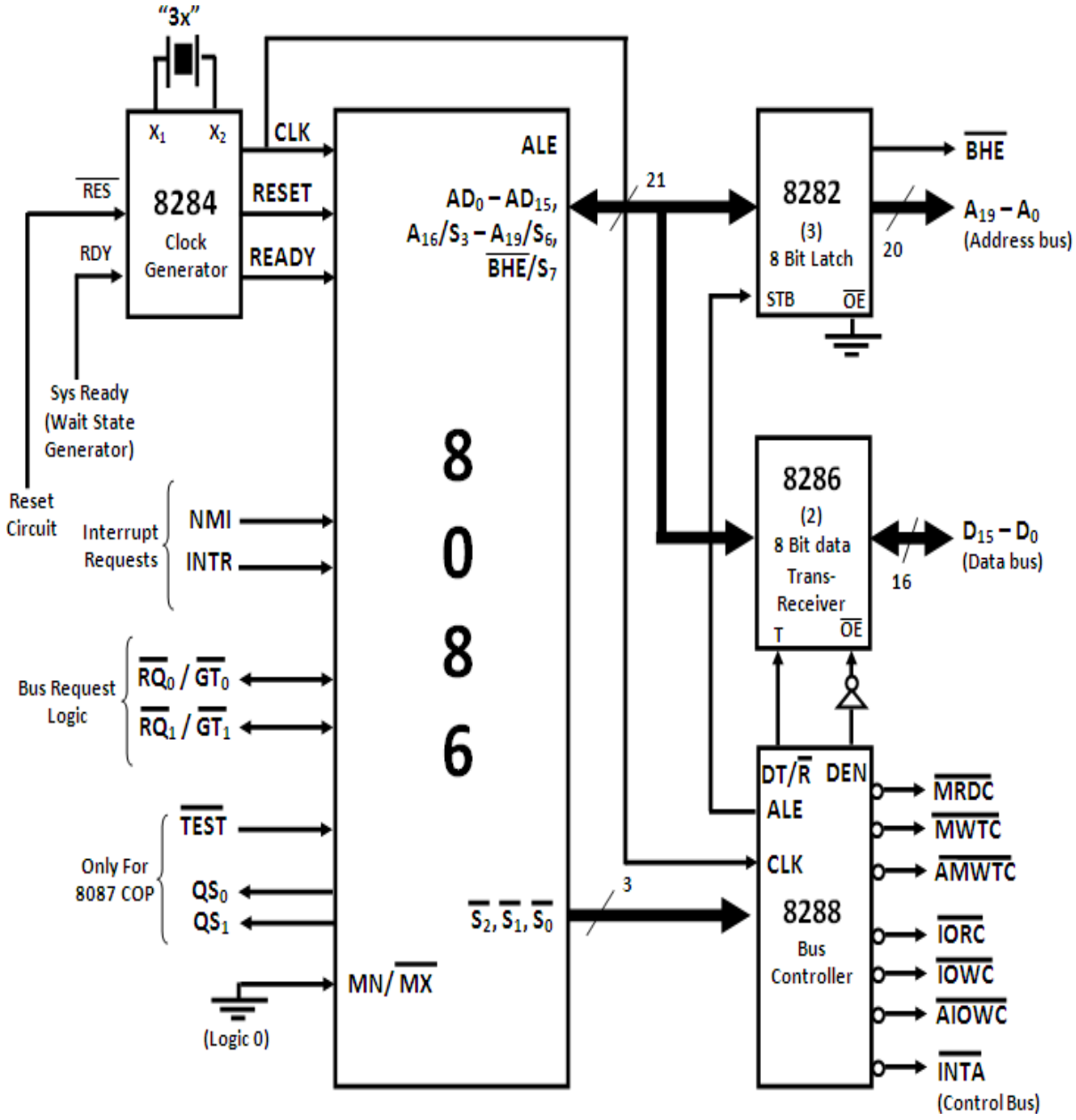
PARSHVANATH CHARITABLE TRUST'S
A.P. SHAH INSTITUTE OF TECHNOLOGY
Department of Computer Science and Engineering
Data Science

8086 DESIGNING

Q1) Design an 8086 based Maximum Mode system working at 6 MHz having the following:
32KB EPROM using 16KB chips,
128KB RAM using 32KB chips,

Soln: Show 8086 max mode config with a crystal of 18 MHZ.



Memory Calculations:

EPORM:

Required = 32 KB, Available = 16 KB

No. of chips = 2 chips.

Starting address of EPROM is calculated as:

FFFFFH – (Space required by total EPROM of 32 KB)

```
  F F F F F H
-   7 F F F H
  F 8 0 0 0 H
```

Size of a single EPROM chip = 16 KB

= 16 x 1KB = 2^4 x 2^{10}
= 2^{14}
= 14 address lines

= **(A 14 … A1)**

RAM:

Required = 128 KB, Available = 32 KB

No. of chips = 4 chips.

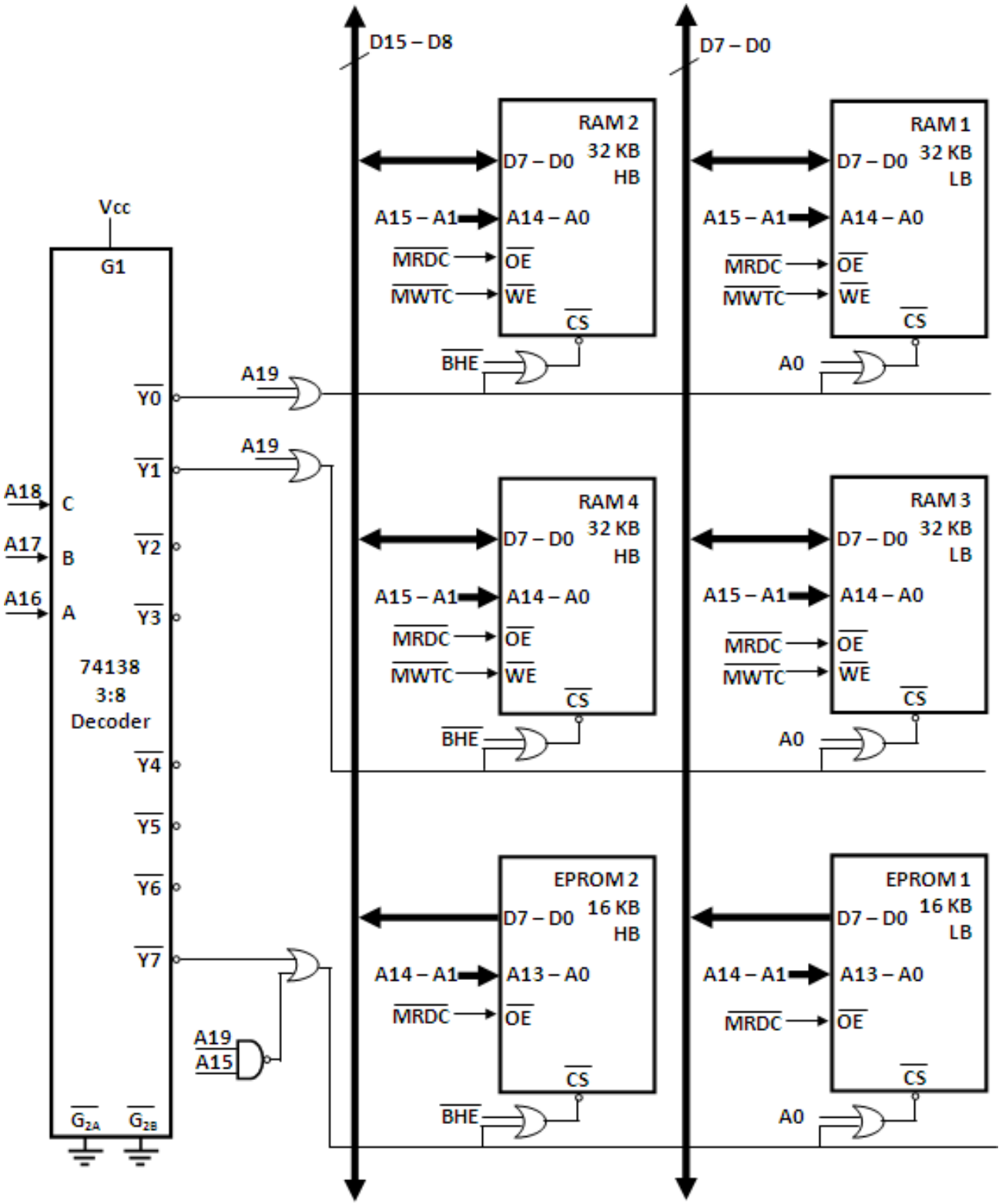
Starting address of RAM is: 00000H

Size of a single RAM chip = 32 KB
= 32 x 1 KB = 2^5 x 2^{10}
= 2^{15}
= 15 address lines

= **(A15 … A1)**

MEMORY MAP

Memory Chip	Address Bus																				Memory Address
	A19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	A0	
RAM 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	00000H
(LB)	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0FFFEH
RAM 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	00001H
(HB)	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0FFFFH
RAM 3	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10000H
(LB)	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1FFFEH
RAM 4	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	10001H
(HB)	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1FFFFH
EPORM 1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	F8000H
(LB)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	FFFFEH
EPORM 2	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	F8001H
(HB)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	FFFFFH


D15 – D8
D7 – D0
RAM 2
32 KB
HB
RAM 1
32 KB
LB
D7 – D0
A15 – A1
A14 – A0
MRDC
MWTC
OE
WE
CS
BHE
A0
Vcc
G1
A19
Y0
Y1
A18
C
A17
B
A16
A
Y2
Y3
74138
3:8
Decoder
RAM 4
RAM 3
Y4
Y5
Y6
Y7
EPROM 2
16 KB
EPROM 1
A14 – A13
A13 – A0
A19
A15
G2A
G2B