

Date of Examination: 12/05/2019

AHSANULLAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

Department: Computer Science and Engineering

Program: Bachelor of Science in Computer Science and Engineering

Semester Final Examination: Fall 2018

Year: 3rd Semester: 2nd

Course Number: CSE3215

Course Name: Microcontroller Based System Design

Time: 3 (Three) hours

Full Marks: 70

[There are seven questions carrying a total of 14 marks each. Answer any five questions.
Marks allotted are indicated in the right margin.]

1. a) Distinguish between Von-Neumann and Harvard architecture. [4]
- b) Write an assembly program, which will move 10H, 15H and 20H into R1, R2 and R3 registers of Bank2. Then move 2H and 4H into the R0 and R2 registers of Bank3. After executing the above program show the contents of the RAM locations. [4]
- c) Explain how 8051 handles an interrupt. Discuss what happens if interrupts INTO, TFO, and INT1 are activated at the same time. [6]
2. a) Write down the characteristics of an Ideal OpAmp. [4]
- b) What is offset null? Explain the process of offset nulling in op-amp. [4]
- c) Voltage Follower is a special type of non-inverting amplifier. Suppose you have a non-inverting amplifier. Explain how you can make a voltage follower from it. [3]
- d) Prove that for voltage divider circuit $V_{out} = V_{in} \cdot (R_2 / (R_1 + R_2))$. [3]
3. a) Explain how stacks are initialized and accessed in the AVR. [4]
- b) Explain why AVR use LDI and LDS instructions. What are the advantages of IN instruction over LDS instruction? [3+2]
- c) Find the ROM memory address, on-chip ROM in bytes and ROM organization of each of the following AVR chips. [3]
- ATtiny32
- ATmega256
- d) Find SRAM size of ATmega16 and ATmega32 where data memory are 1120 and 2144 bytes respectively. [2]
4. a) Explain how sonar sensor detects an object. A sonar sensor is showing 1089m distance as output in air where speed of sound is 344 m/s. Calculate the time needed for the generated sound wave to hit the obstacle. If the same sensor gives same distance reading underwater within 1467.65 milliseconds, then what is the speed of sound underwater? [3+4]
- b) What is Data Acquisition System? Describe the Process of Data Acquisition System. [5]
- c) If your system is 3.3V and your 10-bit ADC is reporting 602, what is the analog voltage measured? [2]
5. a) Explain the working procedure of UART. [5]

- 5) What is the function of a watchdog timer? [4]
- 6) In 8051, if you need to use register banks 1 and 2 for a single program then there might be a conflicting problem with the stack. How you can solve this problem? [2]
- 7) A DAC is showing 4.2V output for the input code 101010. Calculate the LSB and reference voltage if it operates within 2V to 12V. [3]
16. a) Suppose two Arduino boards are programmed to communicate with one another in a 'MasterReceiver/SlaveWriter' configuration via the I₂C synchronous serial protocol. Draw the schematic diagram and appropriate code for transmission. [6]
- b) Explain how SPI can control multiple slaves in two different ways. [5]
- c) What are the differences between serial and parallel communications? [3]
17. a) Write short notes on Relay, Stator and Rotor. [6]
- b) What are the purpose of using motor driver circuits? Explain the process of connecting a L293D motor driver with a microcontroller. [4]
- c) What is the relationship between resistance and light intensity in an LDR? Write down the applications of LDR. [4]
- 0.0312
112

Analogue waveforms to digital data *V. grainy* *physical property to detect electronic signals*

AHSANULLAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

Date of Examination: 15.09.18

8/1

Department: Computer Science and Engineering
Program: Bachelor of Science in Computer Science and Engineering

Semester Final Examination: Spring 2018

Year: 3rd Semester: 2nd

Course Number: CSE3215

Course Name: Microcontroller Based System Design

Full Marks: 70

Time: 3 (Three) hours

[There are seven questions carrying a total of 14 marks each. Answer any five questions.
Marks allotted are indicated in the right margin.]

watchdog timer *function* *real time system* *function* *5*
a) Distinguish between a microprocessor and a microcontroller.

b) What is Real-time system? There are two types of real-time systems, explain each of them with examples. *Hard, soft* *airbag* *controller* *car reacts, anti-lock + grainy* *video conference* *5*

c) What is the function of a watchdog timer? *every 1 sec* *5*

semi auto, timer *video sum x not sync* *4*
a) What are the major differences between AVR and 8051 microcontrollers? Explain why AVR use LDI and LDS instructions. *6*

b) Find the ROM memory address range of each of the following AVR chips:

- i. ATtiny25 with 2 KB
- ii. ATmega16 with 16KB
- iii. ATmega64 with 64KB

c) Write the instructions required to add -7 and -4. Show the value of the status registers V, N, S and P flags. *for 3* *1 1 0* *4*

current (Am) *3*
a) Write down the characteristics of an Ideal op-amp as well as describe the real life scenario. *5*

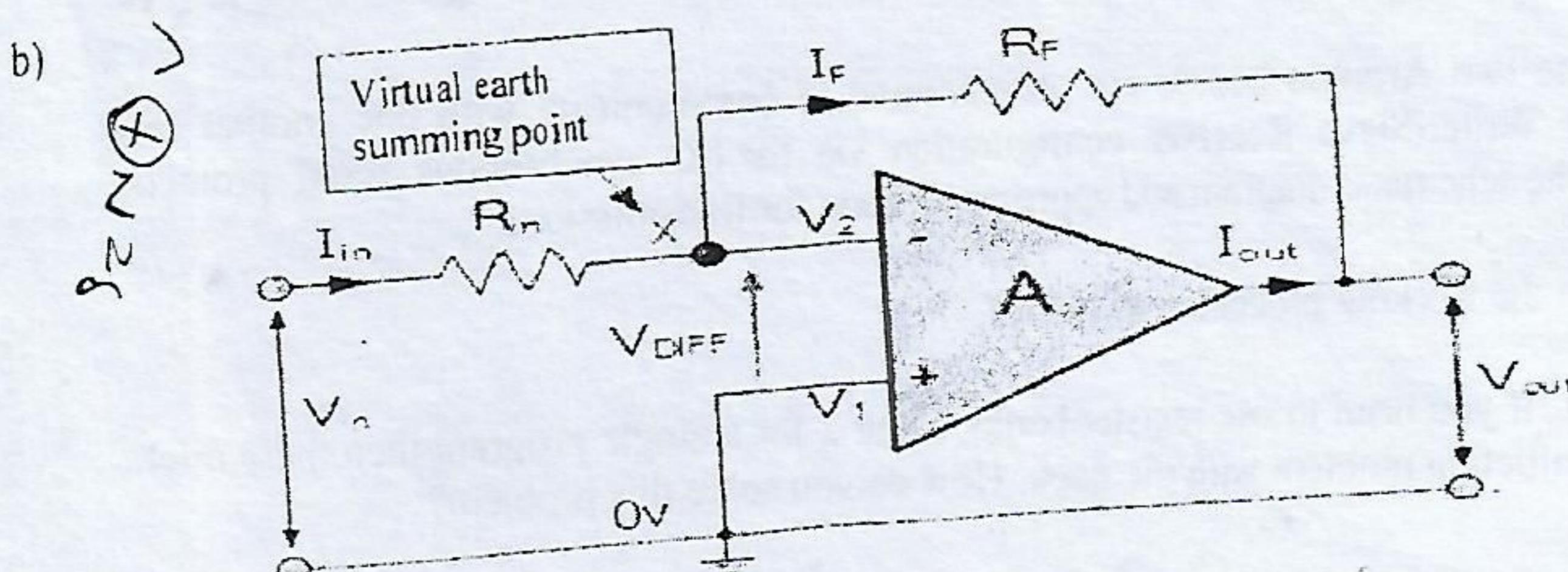


Figure 1

17

use on one JFR

$$V = IR$$

$$I = \frac{V}{R}$$

$$V = I^2 R$$

$$I = \frac{V}{R}$$

$(\oplus 1) \times (\oplus 1)$

For figure 1, let $R_F = 100k\Omega$, $R_m = 10k\Omega$ and $V_{in} = 1V$. Calculate I , V_o and A_v .

$$\text{Then prove that } I = \frac{V_{in} - V_2}{R_m} = \frac{V_2 - V_{out}}{R_F}$$

$= 1 \times 0$
 $= 0$

- c) What is voltage follower and what are the purpose of using voltage follower?

important for V. d.
(K)

signa 4

5 short ext
5 light
underwater
light

4 a) Write down the characteristics of a sensor.

b) An ultrasonic sensor is showing 1089m distance as output in air where speed of sound is 344 m/s. Calculate the time needed for the generated sound wave to hit the obstacle. If the same sensor gives same distance reading underwater within 1467.65 milliseconds, then what is the speed of sound underwater?

c) What is the relationship between resistance and light intensity in an LDR? Write down the applications of LDR.

automatic
light, prob to
shutter

5. a) In a SPI communication system, a Master device is connected with 4 other Slave devices. There is a separate Slave Select line for each Slave devices which is active low. Whenever the master sends the character 'A' (0x41) to any of the slaves, the slave returns its ID as a response. ID numbers are as following: '1' (0x31), '2' (0x32), '3' (0x33), and '4' (0x34).

Draw the circuit diagram as well as the timing diagram consisting of all necessary signal lines for Master to communicate with the slave having ID: '3'.

b) Write short note on asynchronous serial communication.

4

c) How UART detects any changes in data during transmission?

2

6. a)

I_2C is a serial communication protocol which allows to connect multiple slaves to a single master, and multiple masters controlling single or multiple slaves. Now explain step by step how I_2C does this.

6

b) Describe the process of data acquisition system.

— physical property
electrical signals

sup in
data

c) A DAC is showing 4.5V output for the input code 1010101.

Calculate the LSB and reference voltage if it operates within 2V to 12V.

3

$$\frac{V_{out}}{12}$$

7. a) Suppose two Arduino boards are programmed to communicate with one another in a Master Writer/Slave Receiver configuration via the I_2C synchronous serial protocol. Draw the schematic diagram and appropriate code for transmission.

7

b) Explain the working procedure of UART.

5

c) In 8051, if you need to use register banks 1 and 2 for a single program then there might be a conflicting problem with the stack. How do you solve this problem?

2

1.1.17 01 01
0000 1010
0000 1011

Yout = Vref + $\frac{V_{in}}{2^8}$

1. a) Explain the difference between a microcontroller and a microprocessor. 5

b) Briefly explain the PIC microcontroller family and its members. 4

c) Suppose an Atmega328 chip has 128B EPROM, 2 serial ports, 2 timers, 4x8 I/O pin ports in built. It has a 4x4 keypad and a LCD display connected to it. It is connected with 256 MB flash storage for a surveillance system. Which microcontroller architecture is appropriate for this system? Explain its characteristics with necessary diagrams. 5

2. a) What is the work of status register in a microcontroller? Explain its contents. 1 TSHVN?C 6

b) What will be the value of SREG in a AVR microcontroller after the execution of each of the following instructions: 4

MOV R1, F9h
ADD R1, 09h
XOR R1, R1
BST R1, 2

c) Explain the different types of registers found in AVR microcontrollers. 4

3. a) Explain the idealized characteristics of an operational amplifier with the aid of a block diagram. 6

b) Design a circuit that takes two voltage signals as inputs and turns on an LED if given inputs have an average which is greater than their input difference. 5

c) What is the use of the OFFSET NULL pins in the Operational Amplifier IC? Explain why two OFFSET NULL pins are used. 4

4. a) (i) A sound wave created by an underwater ultrasonic sensor takes 734 milliseconds to hit an object placed 1200 meter away from the sensor. What is the speed of underwater sound? 5

(ii) If an object is placed 700 meters' front of another ultrasonic sensor, what will be the total till the sensor gives a reading in air medium? Consider the speed of sound in air medium 344 meters per second. 5

b) What is active and passive transducer? Explain the characteristics of transducers. 4

- (S)
(S)
H.W.
- c) A DAC is receiving 01010011 as input. What is the reference voltage if output is 50V? 3
Calculate the LSB of the DAC.
5. a) What do you mean by UART? What are the different registers used in UART? 4
- b) Briefly describe the transmission procedure in Serial Peripheral Interface (SPI)? How can a Master communicate with multiple Slaves in SPI? 6
- c) Explain what are the advantages of I²C over UART and SPI? 4
6. a) A system uses the following 5x8 keypad:

A	F	J	P	U	Z	4	9
B	G	K	Q	V	0	5	+
C	H	M	R	W	1	6	-
D	I	N	S	X	2	7	*
E	J	O	T	Y	3	8	/

D/P → row
I/P → column

What will be the I/O codes if user inputs B*10+A? Define your I/O lines.

- b) We want to interface 512KB memory using 64KB memory modules with a 4B 4
microcontroller. How many lines are required for addressing and decoding? Explain the
memory map with necessary connection figures.
- c) In a AVR system, the IVT and the values of GPR and Stack at a certain time is given as 5
shown below:

IVT			GPR		Stack	
#	Address	Name	R26	FFh	FE05h	A5h
5	AA08h	INT0	R27	05h	FE04h	DAh
6	AA0Ah	INT1	R28	F0h	FE03h	FDh
7	AA0Ch	TIMER0	R29	EFh	FE02h	A5h
8	AA0Eh	TIMER1	R30	15h	FE01h	B6h
9	AA10h	SPI	R31	00h	FE00h	DCh

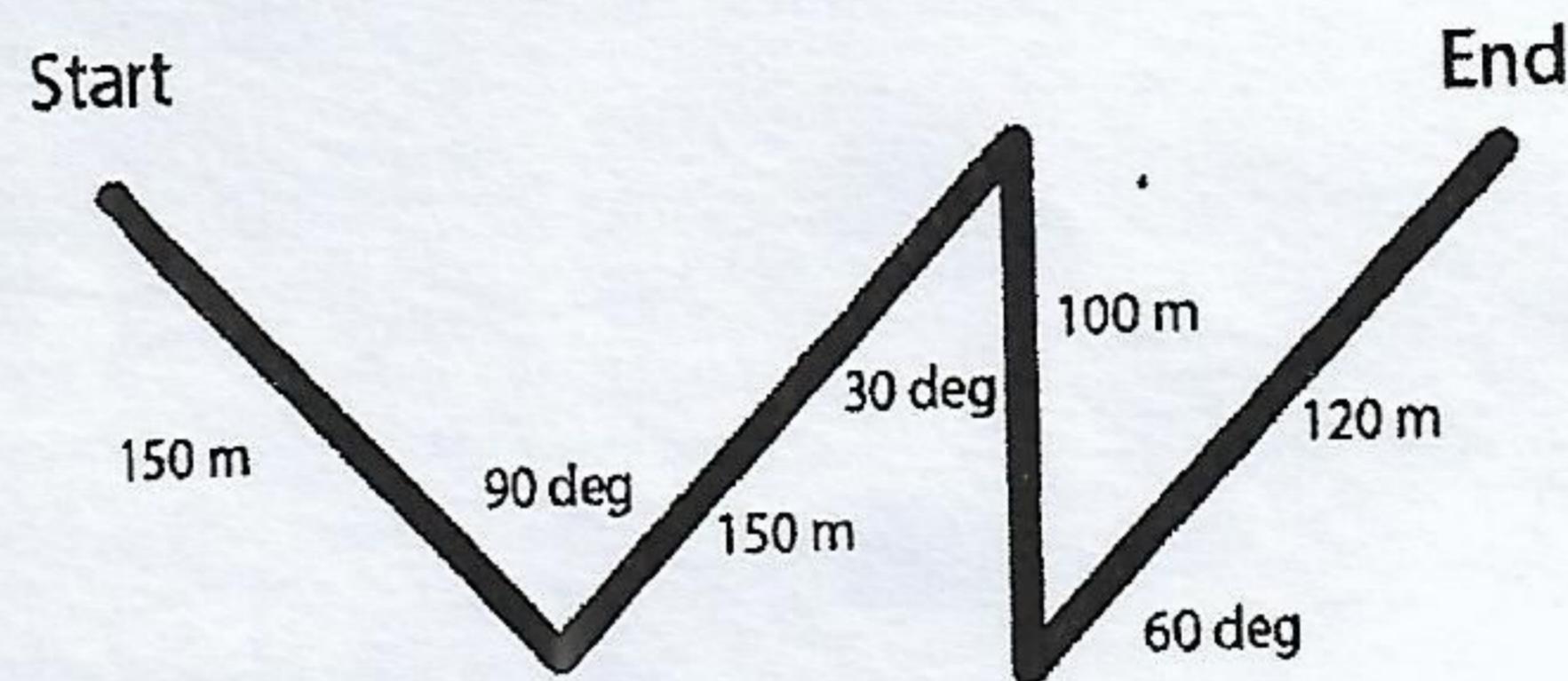
The following instructions are to be executed:

Address	Instruction
00A0h	SP ← FE02h
00A2h	POP Z
00A4h	XOR R2, R2
00A6h	BLD Y, 0Dh
00A8h	BST R2, 02h

After the execution of the instruction at 00A2h, INT0 and SPI occurs at the same time.
Which interrupt will be handled? After returning, the remaining instructions get executed.

Explain the changes in GPR, Stack, SP, PC in every iteration and what are their final values.

7. a) In terms of microcontroller based quad copters, explain the following with appropriate figures: flying modes, yaw, pitch, roll, and throttle. 4
- b) A BLDC motor is rated 1200KV and connected with a 3 cell (4.2V each) lithium polymer battery via appropriate electronic speed controller. What will be the PWM signal if we wish to run it at 5040 RPM? 4
- c) Consider a two wheeler robot going in the following path, going from Start to End. 6
 Calculate the number of pulses of wheel encoders attached to both wheels at each steps.
 Each encoder has a total of 100 slots, wheel radius is 10cm and wheel spacing is 6cm.



Ahsanullah University of Science and Technology

Department of Computer Science and Engineering

3rd Year, 2nd Semester, Final Examination, Spring-2016

Course No: CSE3215 Course Title: Microcontroller based System Design

Time: 3 hours

Full Marks: 70

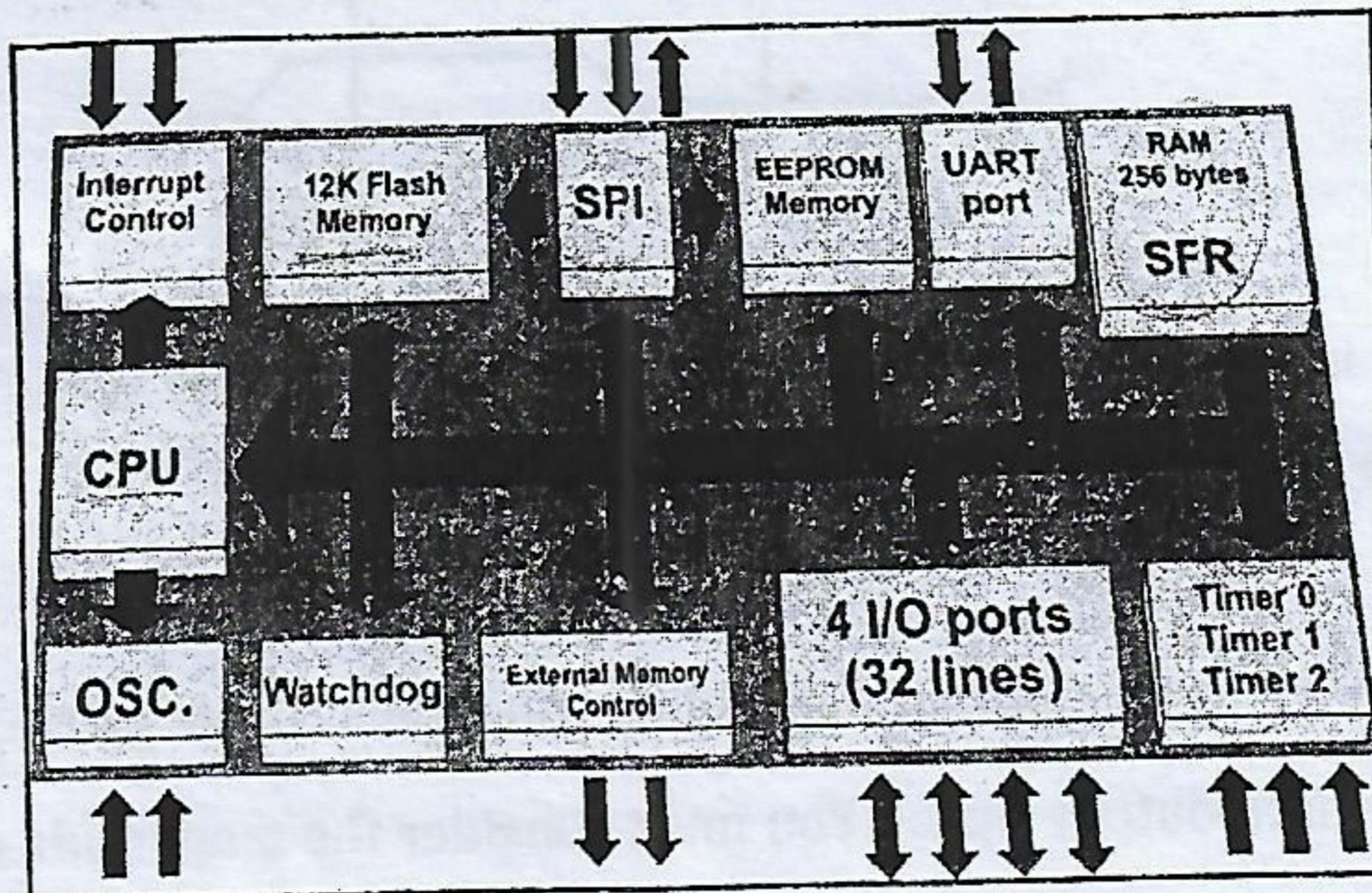
[Answer any 3 (Three) from Section 'A' and any 2 (Two) from Section 'B']
 [Marks allotted are indicated in the right margin]

Section 'A'

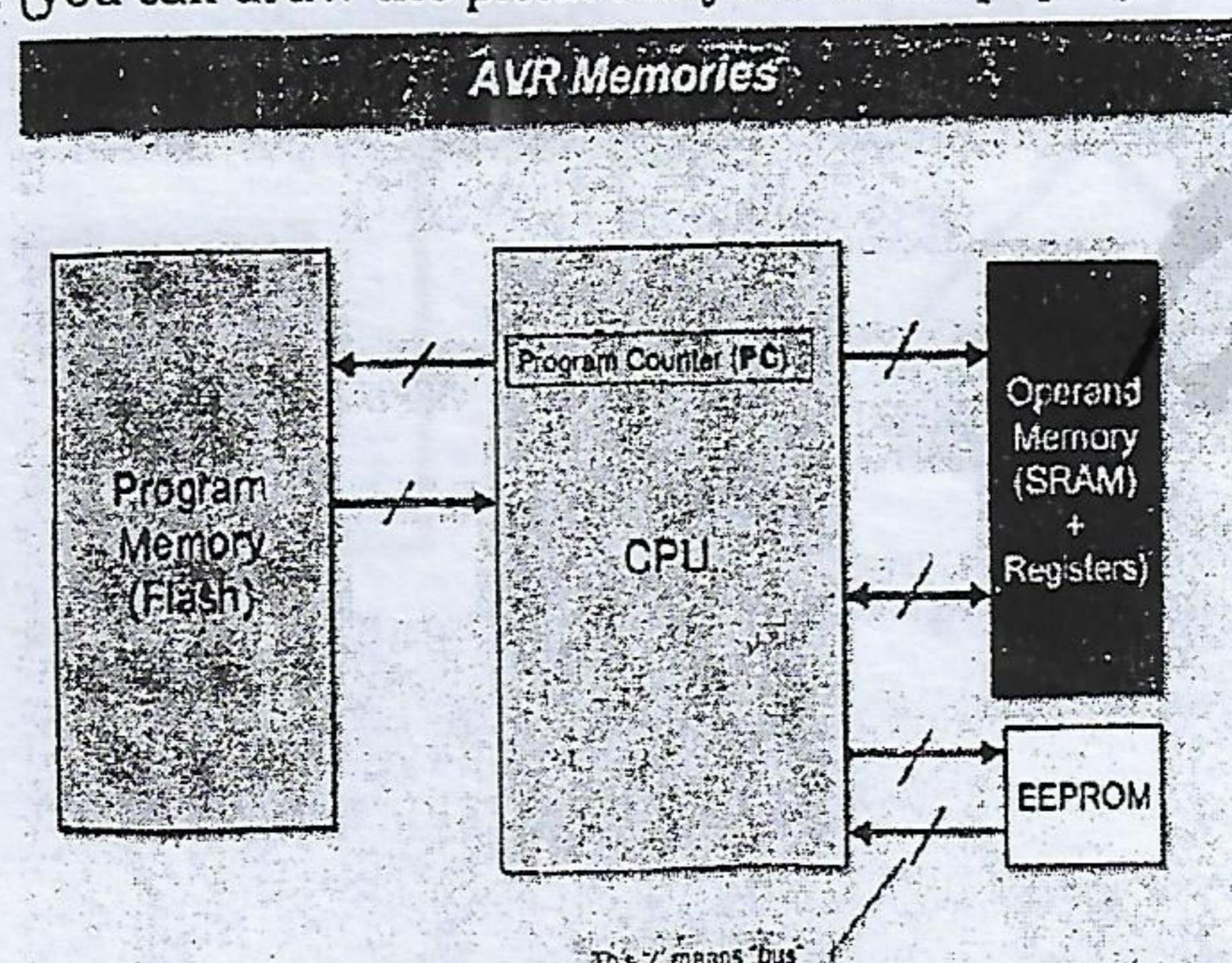
1.a) Compare RISC vs. CISC architecture in a table

4

b) Following diagram shows some of the important units of a microcontroller unit. Briefly 10
 explain any 6 of the units



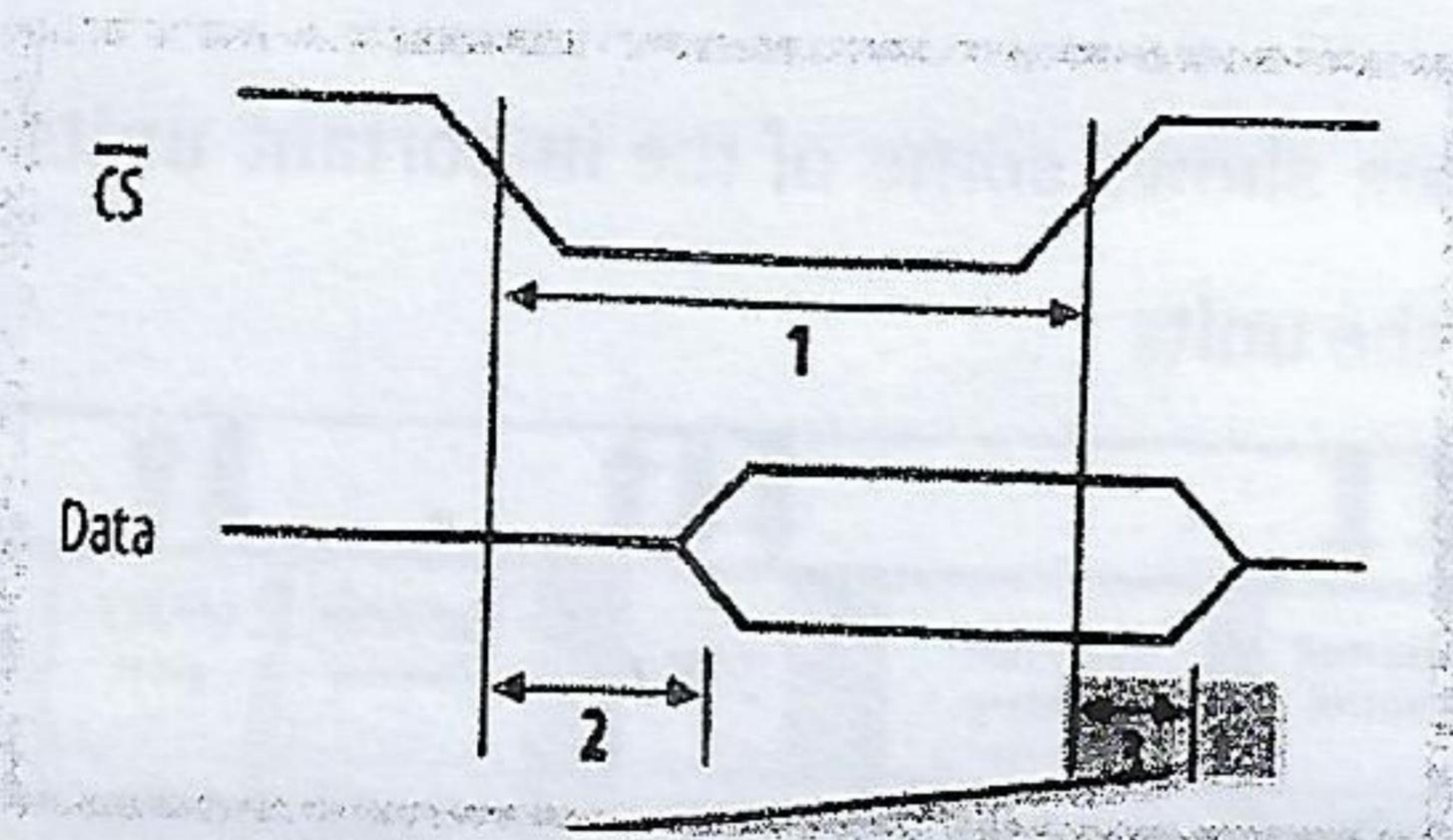
2.a) The following picture shows the flow diagram of the connectivity of memory units and 6
 CPU in AVR microcontroller. The connectivity is indicated through some data bus. The
 names of the data bus and the bus width have been hidden. Write the name of the bus and
 their bus width. (you can draw the picture in your exam paper)



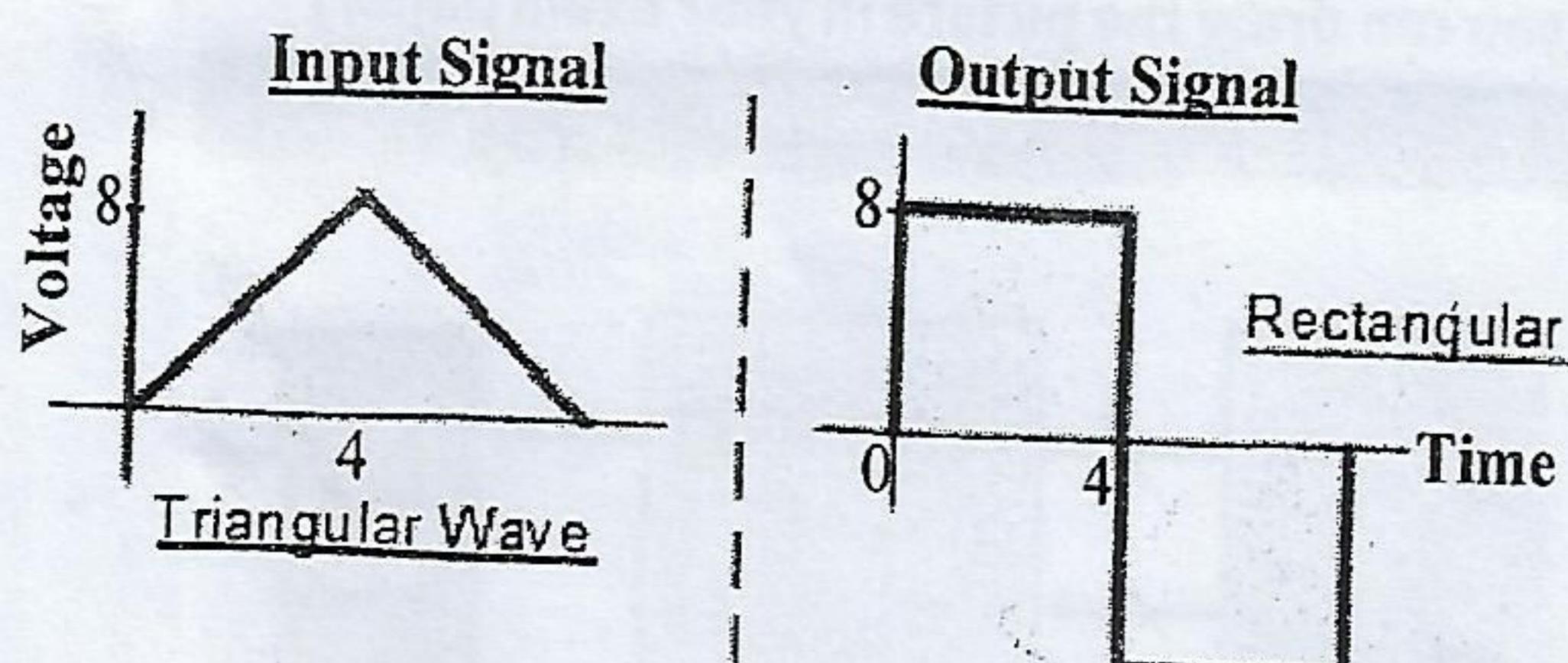
b) What are timers? Write some specific examples where timers are used

4

- c) Write three advantages for each of the serial communications protocols - UART, SPI and I2C
- 3.a) What are the special purpose registers? Write the usage of these registers. Also mention the size of these registers in AVR microcontrollers. 4
- b) Atmega32 is a 8 bit AVR microcontroller with 32kbytes of flash program memory. What is the largest program that can fit into this program memory? Show your calculation. 4
- c) Explain the 3 states of the timing diagram 6



- 4.a) What is a high pass filter? Write the equation for its cutoff frequency. Draw an Opamp circuit that works as a voltage comparator. 6
- b) Consider the following input and output signal. Draw an Opamp circuit that can convert signals into output signal. You must consider the magnitude of both the input and output signal and confirm that the designed circuit is able output the signal with correct amplitude. 8



Section 'B'

- 5.a) What is pulse width modulator (PWM)? How is that used in DC motor control? 4
- b) Consider two analog signals in voltage coming from two sensors A and B. 5
- i) You have to design two Opamp circuits that can calculate the voltage error (V_e) and average of the signals (V_a). Voltage error can be calculated by the difference of the input voltage divided by the number of signals. Average of the signals can be calculated by the summation of the input signals divided by the number of the signals.
- ii) You have to design another circuit that can compare these two signals (V_e and V_a) 5
- 6.a) Consider a 3 bit ADC. Now consider you connected V_{ref} of 1.0 v, 2.0v and 2.5 v to this ADC. 4
Calculate the smallest analog output change that can occur as a result of changing the lsb of the digital input or the step size for each of those V_{ref} . $\frac{A}{2^8}$ 6
- b) Design a 4 bit digital to analog converter.
- c) Convert the following binary numbers into analog signals using a 8 bit DAC when $V_{ref} = 3.3$ V 4
a. 11100011 b. 00011100
- 7.a) What is a data acquisition (DAQ) system? Write the important components of DAQ. 4
- b) What are active and passive transducers? Give example of two transducers that convert chemical energy into electrical energy and magnetic energy into electrical energy. 4
- c) Suppose you are given an Ultrasonic sensor and 5 IR sensors. You have been asked to use them in the following applications. 3
(i) Water level measurement in tank
(ii) Recognizing objects in distance 3
How could you utilize the sensors? Explain with proper reasoning.

Ahsanullah University of Science and Technology

Department of Computer Science and Engineering

3rd Year, 2nd Semester, Final Examination, Fall 2015

Course No: CSE3215 Course Title: Microcontroller Based System Design

Time: 3 hours

Full Marks: 70

[There are 7 (seven) questions carrying 14 marks each. Answer any 5 (five) questions]

[Marks allotted are indicated in the right margin]

1. a. What is an Embedded System? [2]
- b. What is the basic difference between RISC and CISC architecture? Which embedded system design scenarios does each of these two architectures should be applied to? [1+3]
- c. Discuss five features of Intel 8051 microcontroller with Pin diagram. [8]
2. a. How will you mask the IRQ3 and IRQ4 in PIC Intel 8259? Assume use of nested priority resolution in 8259. How will you allocate the IRQ pins for the keypad, printer, LCD and timer interrupts? [2]
- b. If 8051 has off chip ROM, how is it accessed? 8051 microcontroller has 16 address lines (4 KB memory.) However, this time we wish to interface 8051 with 8 KB external ROM. For this purpose we must use 4K x 8 memory chip and NAND gate decoder circuit to active CS line. Now draw the interface diagram to connect 8051 with 8 KB external ROM. [1+3]
- c. Write the steps to detect and identify the key pressed of 4 X 4 matrix keypad using Row-Scanning algorithm. [8]
3. a. How does IRQ pin of RTC DS12887 activate, when the possible source of interrupt is periodic pulse interrupt? [2]
- b. If a motor takes 90 steps to make one complete revolution, what is the step angle for this motor? What is the purpose of ULN2003 placed between the 8051 and stepper motor? Explain. [1+3]
- c. Briefly describe the working principle of DC motor and draw the interface circuit to connect 8051 with bidirectional DC motor using L293 chip. [8]
4. a. Explain the use of MAX232 chip to realize an RS232 interface. [2]
- b. Draw the frame format for the transmission of the ASCII character 'A' using the asynchronous serial mode. (ASCII value of 'A' is 01000001.) How does USB communication occur between host and end points? [1+3]
- c. Briefly discuss about standard 8 bit UART serial data transmission and reception for Intel 8051 microcontroller. [8]

- ✓ a. Give the advantages of solid state relay over an electromagnetic relay. [2]
- ✓ b. What is an opto-coupler? How does it allow data communication between two isolated systems? [1+3]
- ✓ c. Write the operation principle of Successive-Approximation type ADC with schematic diagram. [8]

- ✓ a. What are the applications of sample and hold circuit in data acquisition system? [2]
- ✓ b. What is the main advantage of Integrated circuit type DACs? Draw the schematic diagram of the AD 1408 DAC with unipolar output. [1+3]
- ✓ c. Describe AD0808/809 circuit and its operation when interfaced to 8051 with help of timing diagram. [8]

- ✓ a. In what application might you use a temperature-dependent voltage device such as the LM35? Write the working principle of the transducer LM35. [1+3]

- ✓ b. Design a circuit of basic line follower Robot using 8051 microcontroller. Your design must includes the following components: [10]
- Sensor consists of LED/LDR pairs
 - Comparator circuit to convert analog to digital signal
 - Intel 8051 microcontroller
 - Motor Driver-ULN2003A IC
 - DC motor

Ahsanullah University of Science and Technology

Department of Computer Science and Engineering

3rd Year, 2nd Semester, Clearance/Carry Over/Improvement Examination, Fall 2015

Course No: CSE3215 Course Title: Microcontroller Based System Design

Time: 3 hours

Full Marks: 70

[There are 7 (seven) questions carrying 14 marks each. Answer any 5 (five) questions]
[Marks allotted are indicated in the right margin]

1. a. What are the major non-functional requirements you need to consider in [2] embedded system design?
 b. What is watchdog timer? What is the significance of watchdog timer in [1+3] microcontroller based system design?
 c. Briefly discuss all the special purpose registers (SFRs) used in 8051 [8] microcontroller.

2. a. How are the hardware interrupts of 8051 microcontroller activated? [2]
 b. What is key-bounce? How can the key bounce problem be overcome using [1+3] hardware based approach?
 c. Describe the exchange of signals between LCD, 8255A, and 8051 as a byte of [8] data is transferred from LCD to the 8051 and vice versa using single handshaking mode of parallel data transfer. (Note: You can use either port A or Port B of 8255A PPI)

3. a. For what kind of applications are stepper motors popular? [2]
 b. Which motor is best for moving a wheel exactly 90 degrees? The amount of [1+3] voltage applied to a permanent-magnet DC motor, and the amount of current going through the armature windings of a permanent-magnet DC motor, is related to two mechanical quantities: maximum speed, and torque output (twisting force). Which electrical quantity relates to which mechanical quantity? Explain.
 c. Briefly describe the working principle of Stepper motor and draw the interface [8] circuit to connect 8051 with unipolar stepper motor.

4. a. In the RTC DS12887, how many pins are designated as address/data pins and [2] what are the addresses assigned to registers A-C?
 b. Why is synchronous serial communication more efficient than asynchronous [1+3] communication? Explain the use of the RTS-CTS handshaking signal pairs for data transfer using RS-232 interface.
 c. USB host computer sends DATA packets to the peripheral device through the [8] USB cables. Explain the way of data transmission between USB host and peripheral device.

5. a. List the drawbacks of binary weighted register type D/A conversion. [2]
 b. Of the electromagnetic relay and solid state relay, which one has the problem of [1+3] back EMF? Write basic working principle of SPDT relay.
 c. Write the operation principle of Dual-slop ADC with schematic diagram. [8]

6. a. What is an analog multiplexer? [2]
- b. Why is thyristor type SCR used in solid state relay? Write the working principle of semiconductor power switch SCR. [1+3]
- c. Discuss how the AD363 DAS can be interfaced to a microcontroller and explain its operation with help of timing diagram. [8]
- X. a. Why are strain gages usually connected in bridge configuration? Write the working principle of strain gage transducer. [1+3]
- b. Design a circuit of real time clock display using 8051 microcontroller. Your design must includes the following components:
- I. DS 12C887 RTC module
 - II. LM1600 LCD module
 - III. Switch
 - IV. Intel 8051 microcontroller

Date: 08.09.2013

Ahsanullah University of Science and Technology

Semester Final Examination, Spring 2013

Department of Computer Science and Engineering

Bachelor of Science in Computer Science and Engineering (CSE)

3rd Year 2nd semester

CSE-315, Microprocessor based System Design

Time: 3 hours Full Marks: 70

There are 7 Questions. Answer any 5 Questions.

(Marks allotted are indicated in the margin)

1. a) Explain how FPLA, PROM and PAL programmed to implement some simple logic functions with necessary diagram. 6
- b) Explain the optical shaft encoder and incremental shaft encoder with necessary diagrams. Why Gray code is used instead of Binary in optical disk of a shaft motor? 8
2. a) Explain the functions of Strain Gages and Load Cells with diagrams. 6
- b) Describe different methods of Flow sensors with Diagram.
What is Embedded System? Write the differences between general purpose Microcontroller and Embedded controller? 8
3. a) How can we control the speed of a motor using tachometer? What are the problems related to tachometer in controlling the speed of a motor? And how can we overcome these problems using the correction feedback circuit? 12
- b) What is Coprocessor? Give an example. 2
4. a) Draw and Explain the Internal block diagram of Intel 8087 math coprocessor. 6
- b) Explain the different CRT scanning methods. Also describe the character display production system in a CRT screen with necessary diagram. 8
5. a) Explain the READY and WAIT state of 8086 and 8284A with their respective timing diagram. 7
- b) Describe the Maximum Mode and Minimum Mode operations of 8086/8088 microprocessor. Which mode is better and why? 7

6. a) Draw and explain the Error detection and correction circuit of memory operation (RD/WR) of microprocessor.

7

b) Why Interrupt is needed for a microprocessor? How to handle the 16550 UART interrupt request using registers?

7

7 a) Write short notes on:

- i) Floppy Disk
- ii) Magnetic Hard Disk
- iii) Optical disk data storage

9

b) i) Explain the process of producing color pixels in CRT monitor.

4

ii) What is Bitmap Image?

1

fall: 11
Sp: 11
fall: 10
Sp: 10

Zayed

Date of Examination: 5. 3. 12

Ahsanullah University of Science & Technology

Department of Computer Science and Engineering

Semester Final Examination Fall 2011

Course No. CSE-315

Full marks: 70

Course Title:Microprocessor based System Design

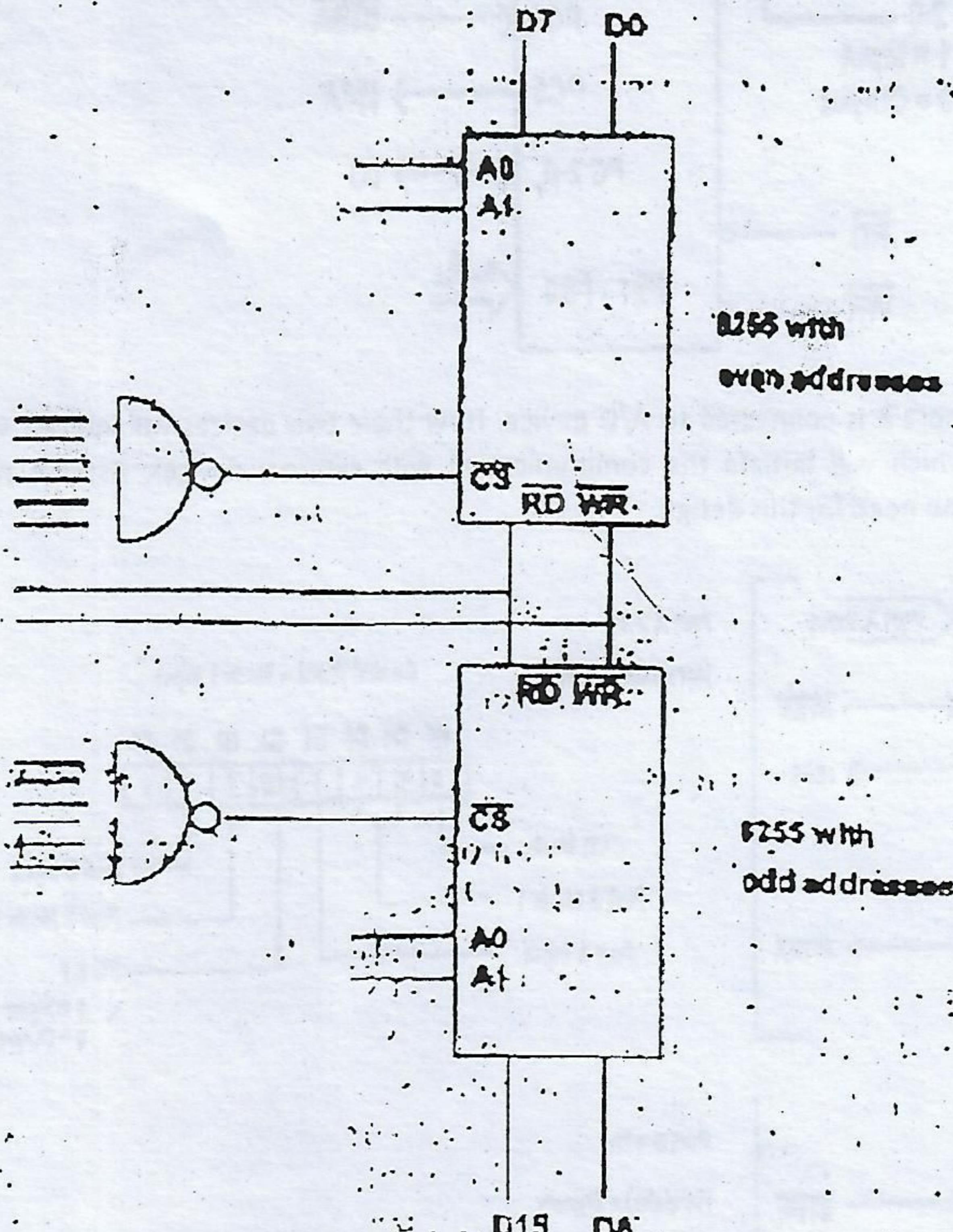
Time: 3 hours

There are 7 (seven) questions. Answer any 5 (five). Part marks are shown in the right margin.

1

$$3+4+7$$

- a) In order to select I/O and memory device, there requires address decoding. What are options available for address decoding?
 - b) Interfacing 8-bit programmable peripheral interface (PPI) to 16bit data bus, there are two separate PPI devices, one for even address and other for odd address. The port address is

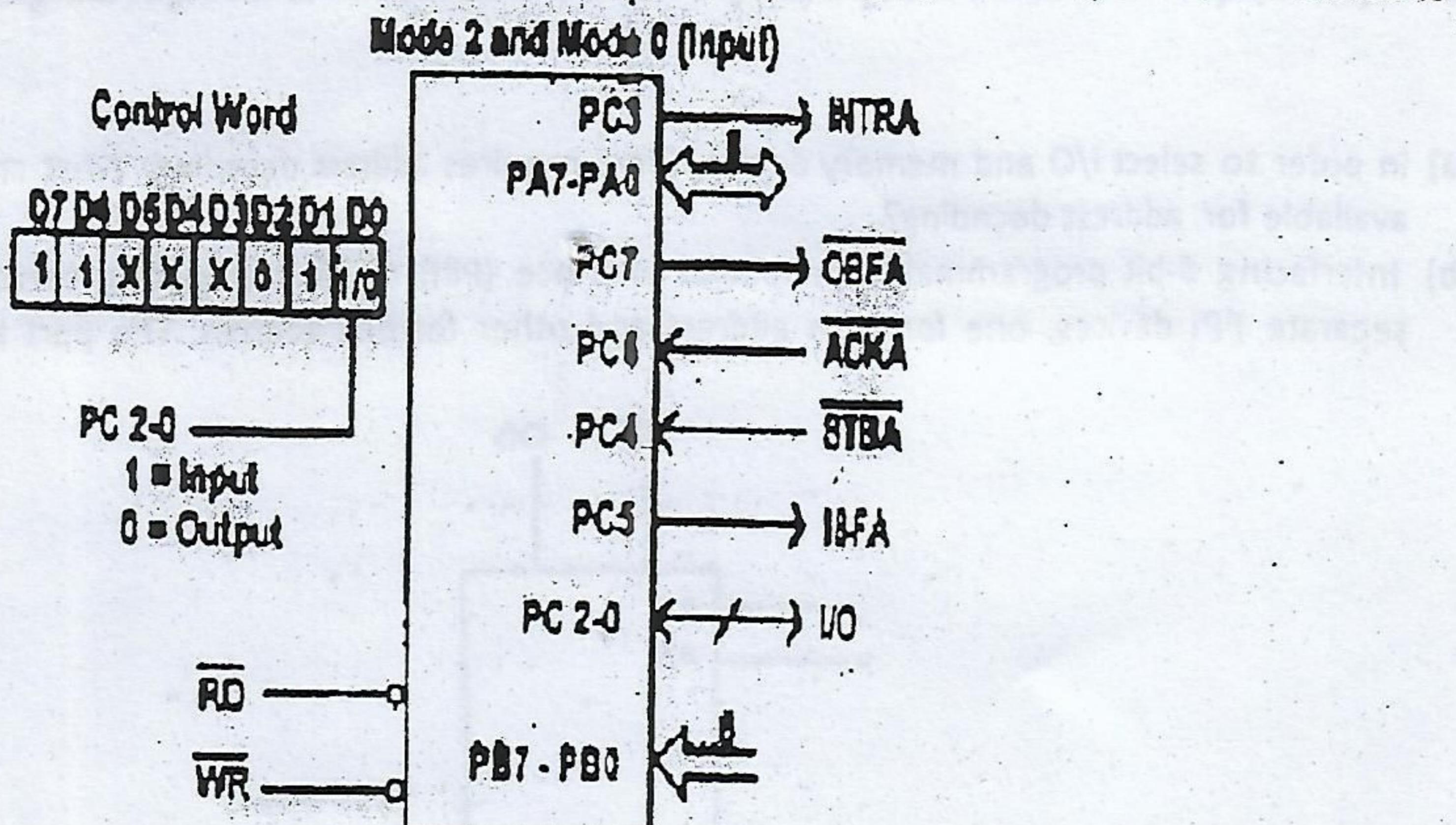


assigned 80H. Based on this information complete the following design.

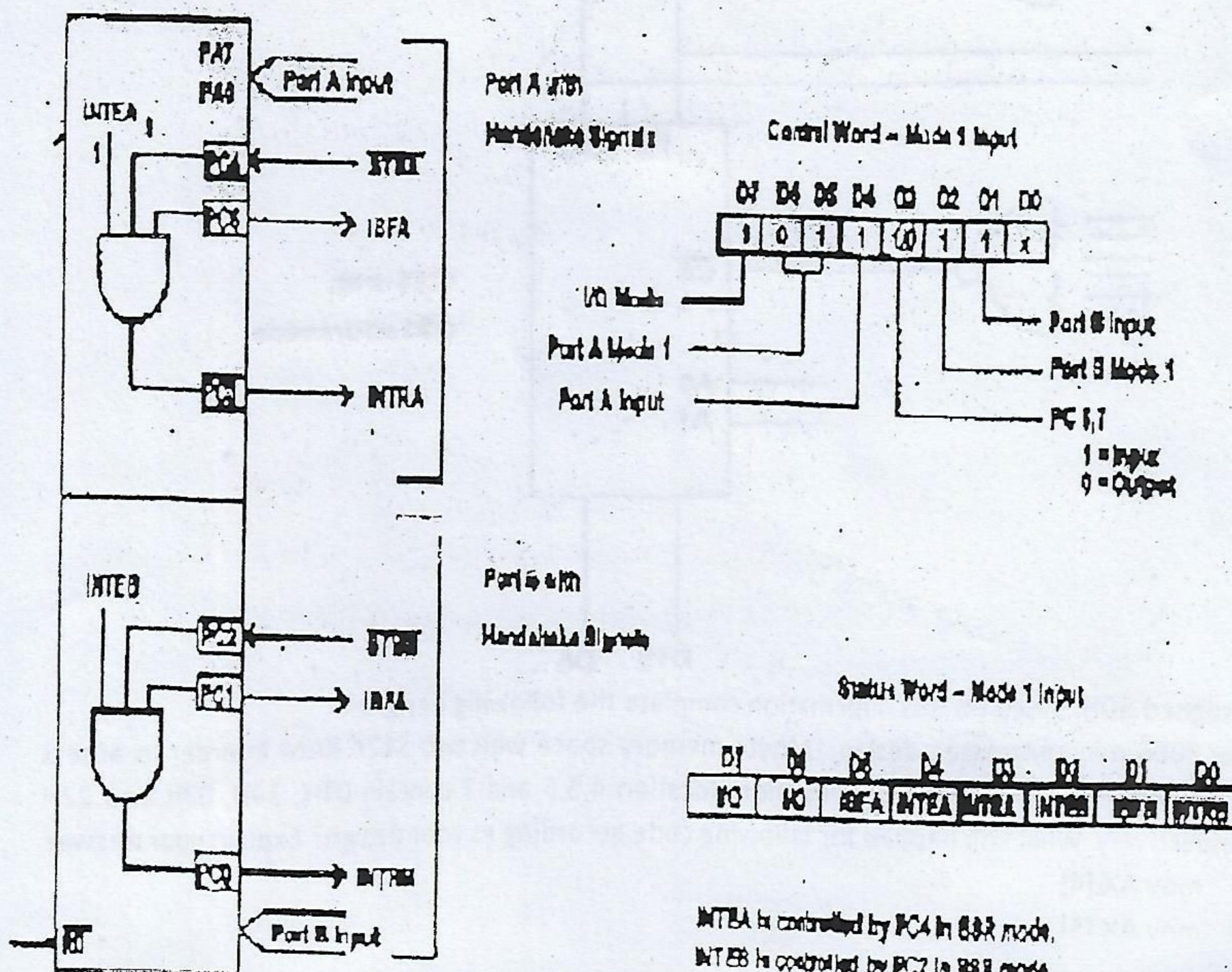
- c) For 8086 microprocessor, design 1Mbyte memory space with two 512K RAM in order to access 16bit data. If it is assumed that memory location 4,5,6 and 7 contain 01H, 34H, 02H and 22H respectively. What will happen for following code according to your design? Explain your answer.

 - `mov AX,[4]`
 - `mov AX,[5]`

- a) What is polling? What are problems with polling?
 - b) Based on the following mode 2 of PPI, what will be operation on this circuit possible? Explain operation of port A, B and C. If PPI is connected to 10H, write code for initializing PPI.
 - c) For PPI, mode 1 typical timing diagram is shown in following figure. Now port A is connected to



scanner and port B is connected to A/D device. How these two devices will interact with PPI? Write code which will initiate the communication with external devices. Assume necessary information you need for this design.



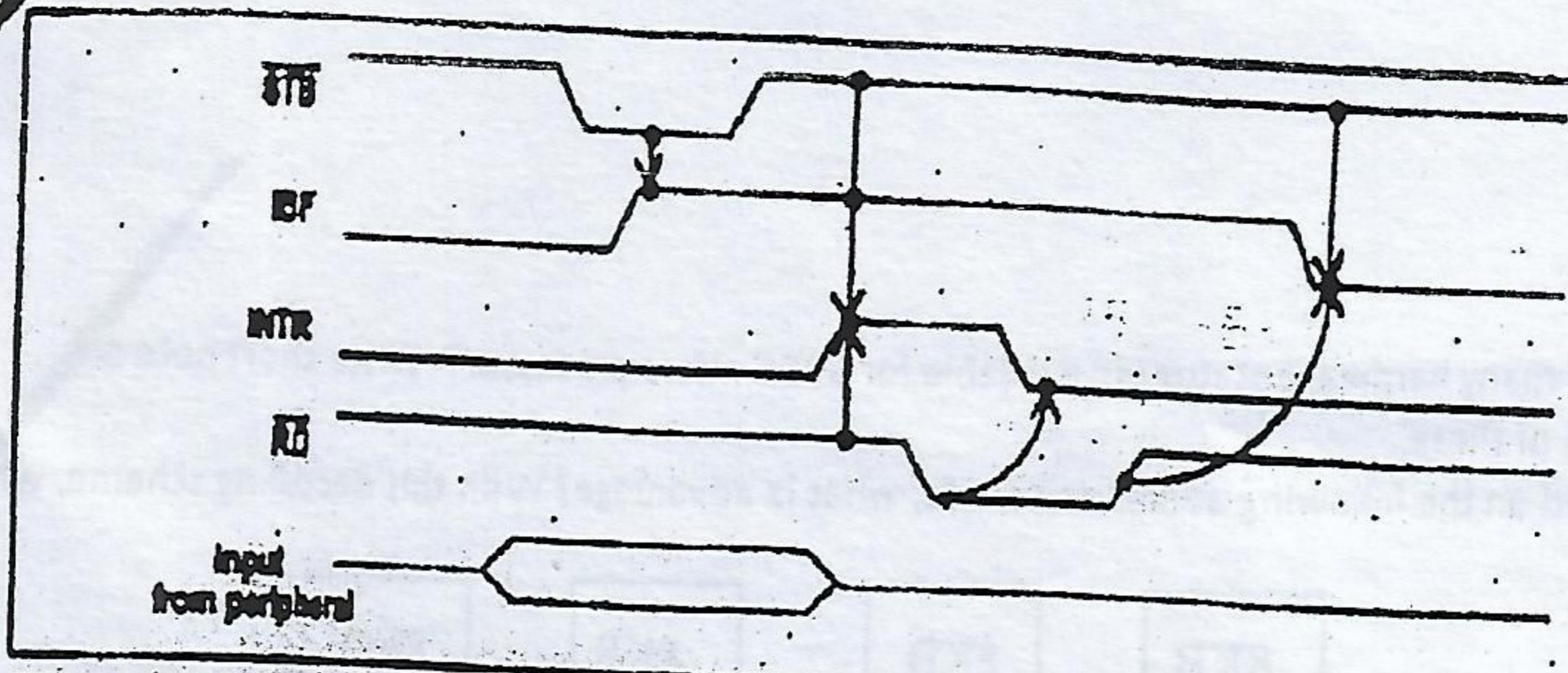
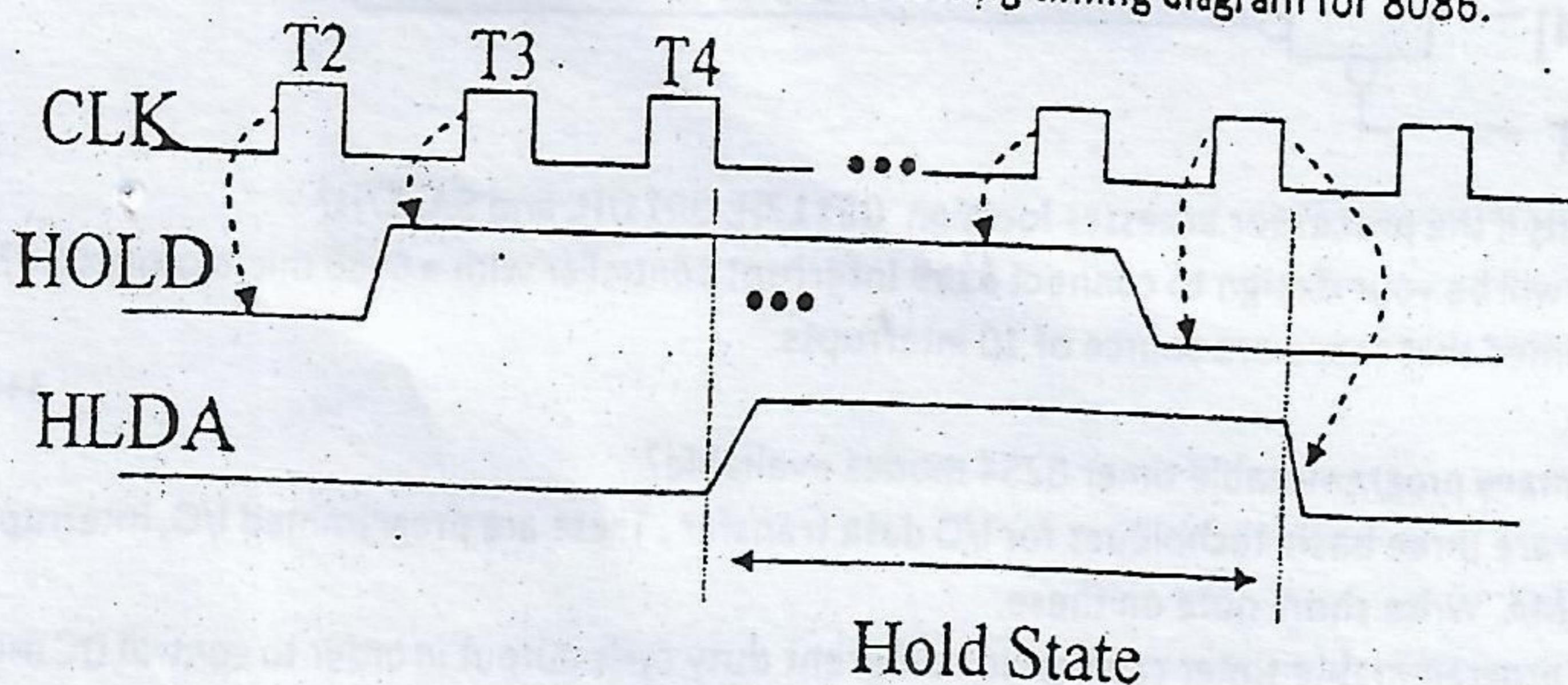


Figure 4-13. Timing Diagram for Mode 1 Input
 (Reprinted by permission of Intel Corporation, Copyright Intel Corp. 1983)

- a) What modes available for PPI? Which modes are available for which port?
 b) Hold is used for slave processor. Explain the following timing diagram for 8086.

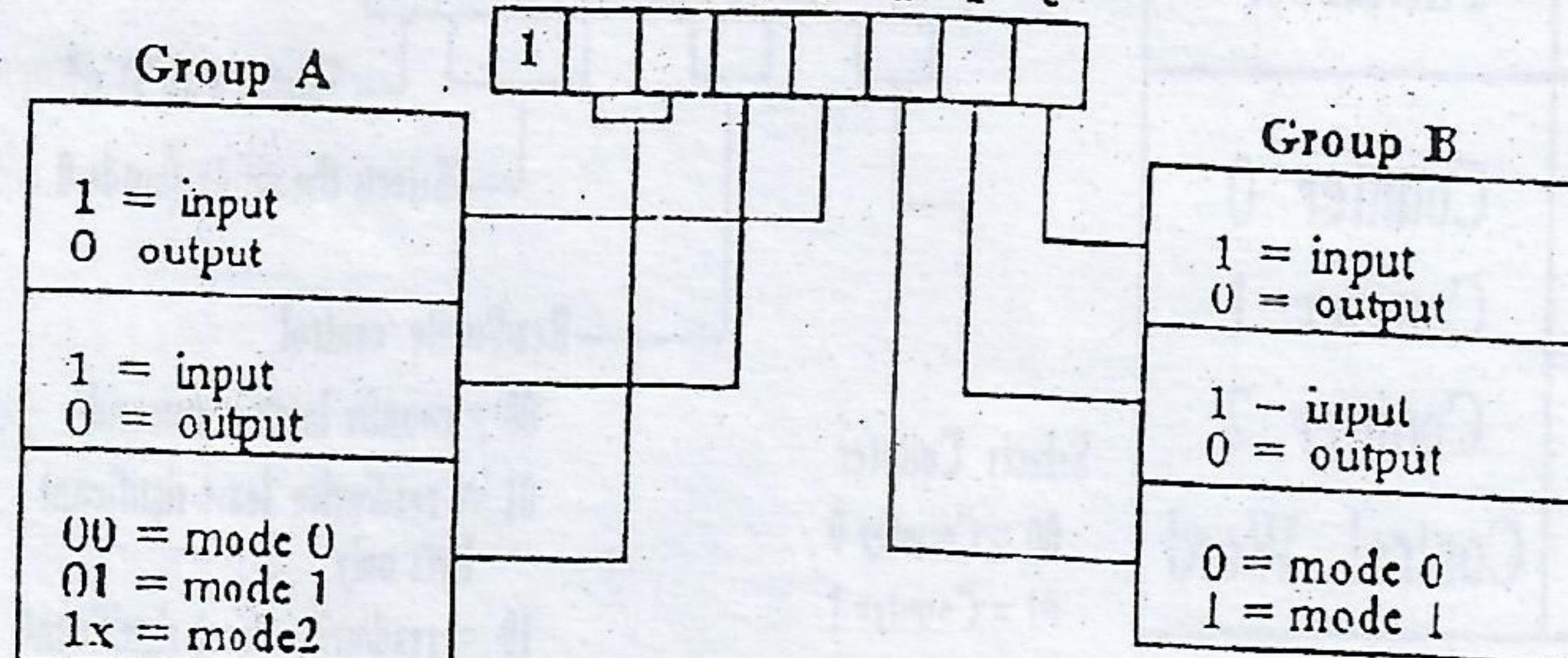
3+4+7



- c) It is intended to receive data by port A, port B is to drive

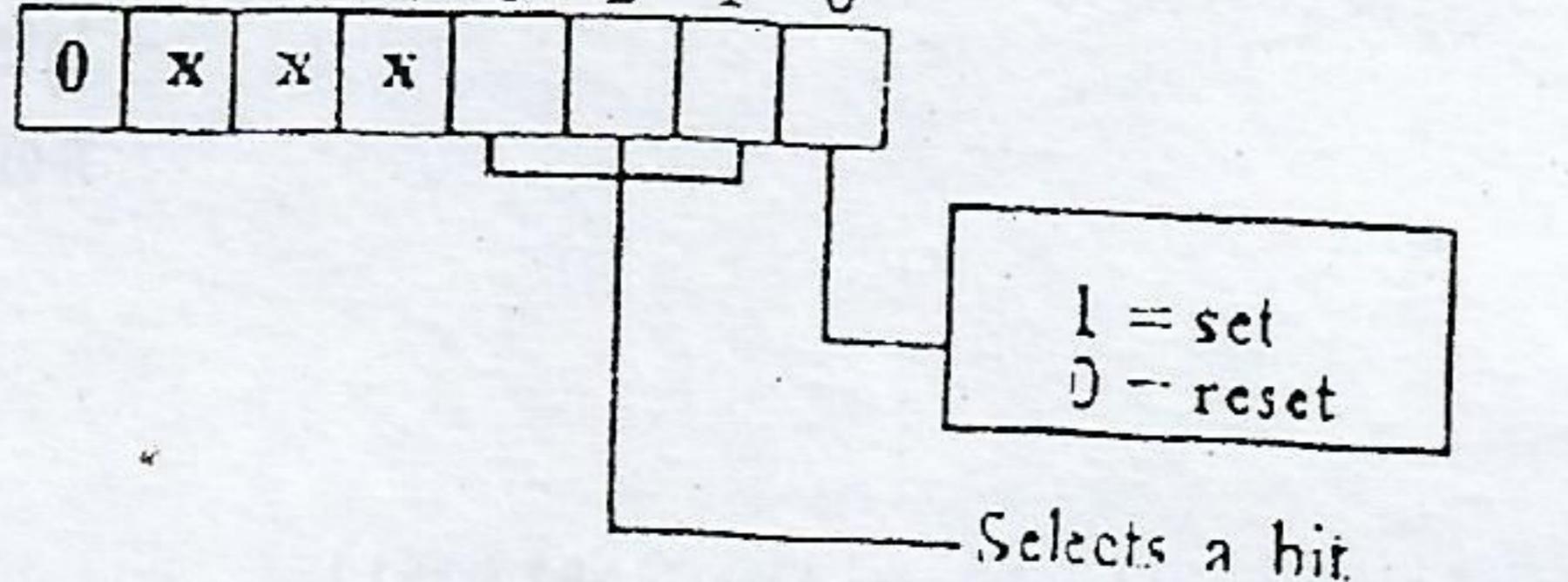
Command Byte A (Programs ports A, B, C)

7 6 5 4 3 2 1 0

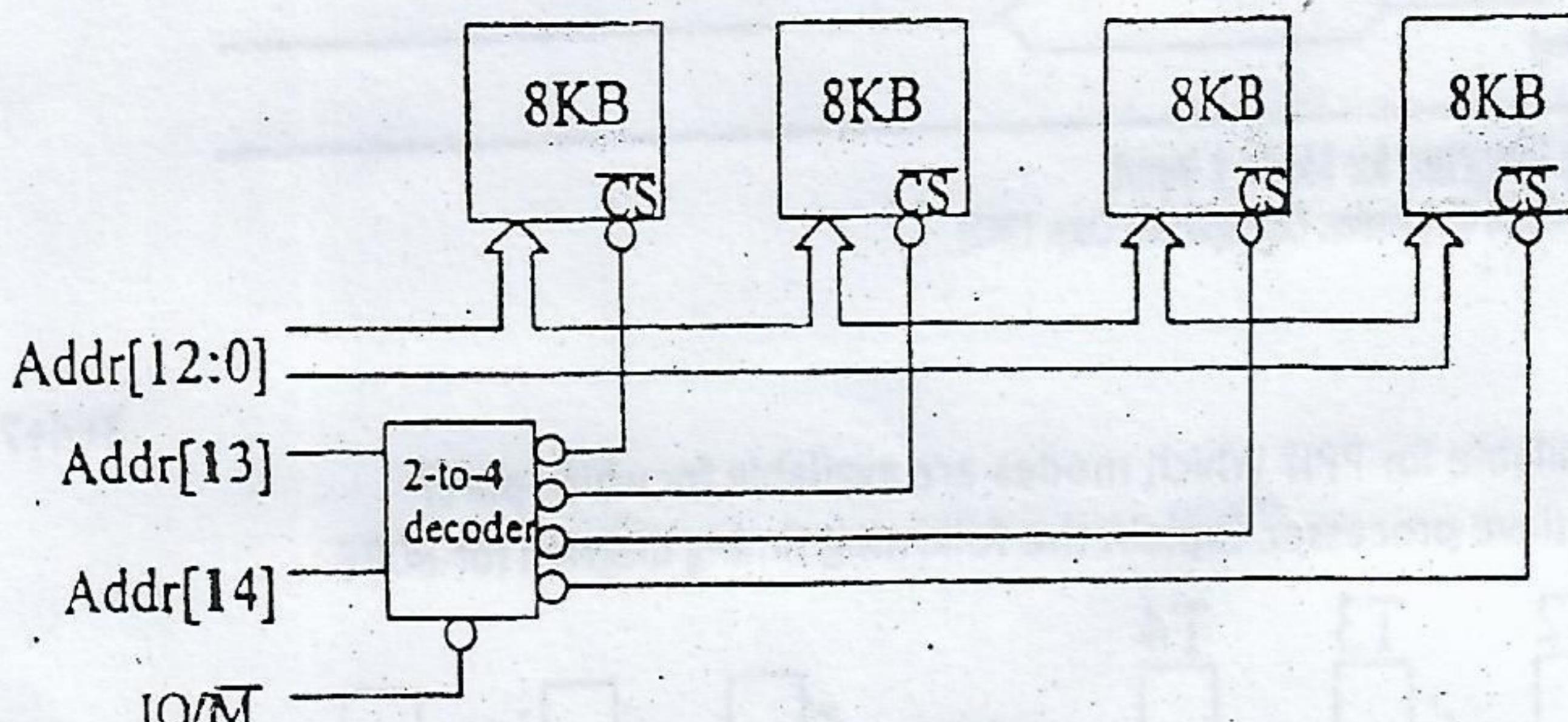


Command Byte B (Sets or resets any bits in port C)

7 6 5 4 3 2 1 0



- A.
- How many hardware status pin available for 8086 micro processor? Write short note on three of these.
 - Based on the following addressing mode, what is advantage? With this decoding scheme, what happens if the processor accesses location 02117H, 32117H, and 9A117H?



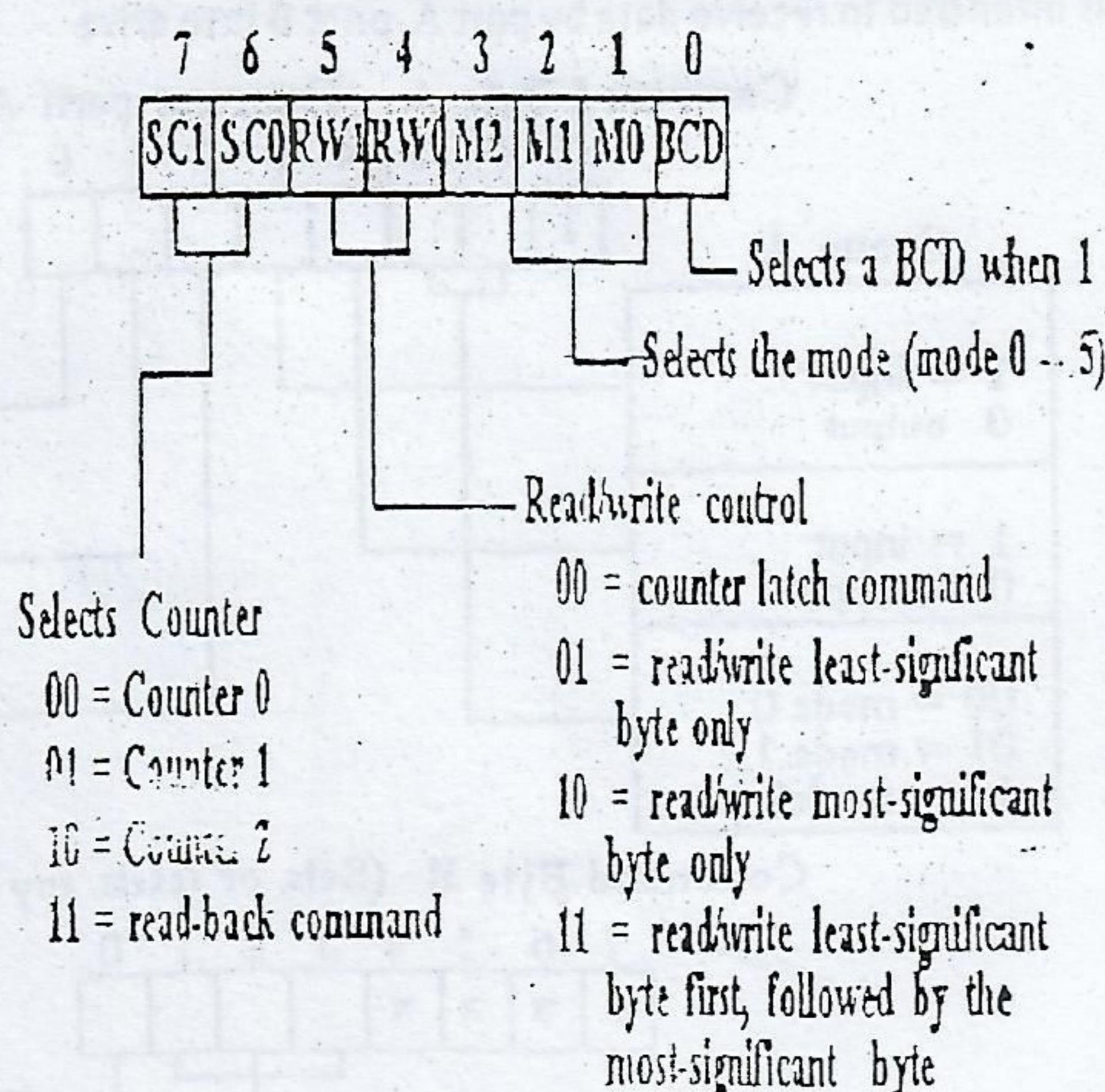
- happens if the processor accesses location 02117H, 32117H, and 9A117H?
- What will be your design to connect 8259 Interrupt controller with a 8086 micro processor? It is assumed that there are source of 10 interrupts.

5.

3+4+7

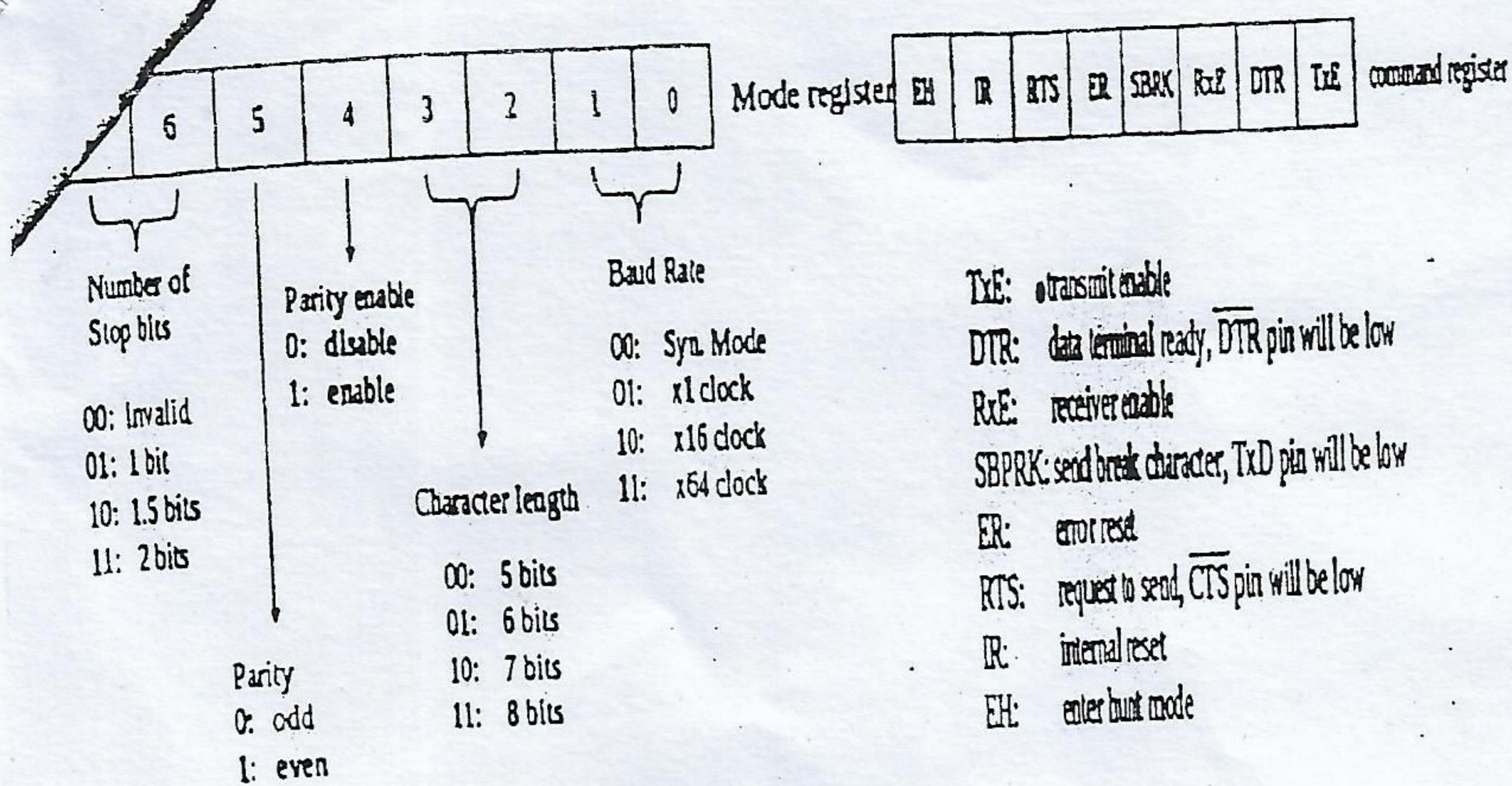
- How many programmable timer 8254 modes available?
- There are three basic techniques for I/O data transfer. These are programmed I/O, interrupt I/O and DMA. Write short note on these.
- 8254 programmable timer can provide different duty cycle output in order to control DC motor speed. Using the following information design the circuit and sample code for operation

A ₁	A ₀	Function
0	0	Counter 0
0	1	Counter 1
1	0	Counter 2
1	1	Control Word

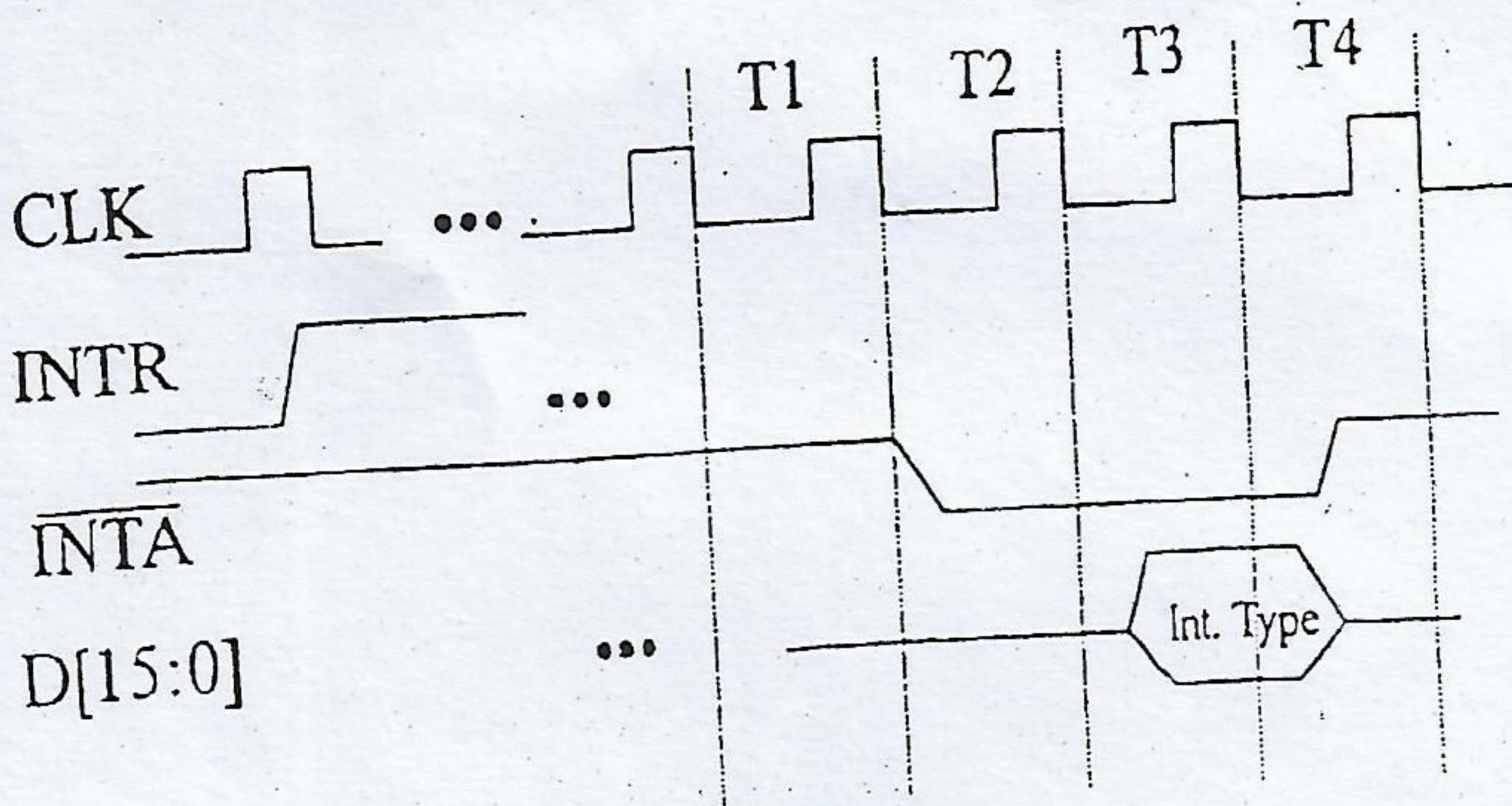


- 6.
- What type of errors can be detected by USART 8251?
 - In order to transmit data externally, two basic modes of data transmissions are available. Write brief on each of these.

3+4+7



3+4+7



- Explain the interrupt timing diagram for 8086.
- Write in brief the steps of DMA operations with 8086 micro processor.
- Explain the basic components of the 8259 interrupt controller as shown in the following figure.

