

Q. No. IT - 501 / 099

B. Tech./Odd

2016-17/Reg

2016-17

MICROPROCESSOR

IT - 501

Full Marks : 70

Time : Three Hours

The figures in the margin indicate full marks.

Answer any *five* questions.

1. (a) Explain the modes of 8255A PPI.
(b) Draw 8255A Mode 1 output configuration and explain the handshake signals.
(c) The control word of 8255A is 83H. What does it signify? Draw the control word format and explain it.
3+6+5
2. (a) What are the differences between Peripheral mapped I/O mode and memory mapped I/O mode? Give 4 differences.
(b) How can the memory map of 1K byte chip be changed? Give any 2 different memory map address ranges by changing the memory map configuration.
(c) How many machine cycles and T states are needed for :
 - (i) IN 03H instruction
 - (ii) CALL 20CDH
 - (iii) STA 2040H

4+(2+2)+6

(2)

3. (a) Give 2 ways in which time delay can be designed. Give proper program with number of machine cycles and T states to show how time delay is generated.
- (b) Design a mod-16 down counter, using 2MHz clock frequency. Give all delay calculations, comments and address locations.
- (c) Draw OP CODE FETCH machine cycle showing the following signals in your time diagram: Clock, address bus, multiplexed data and address bus, ALE, control signals, status signals, IO/M bar signal. (2+2)+5+5
4. (a) What is the use of ALE?
- (b) What is the importance of rotate instructions? Give 2 points.
- (c) Compare and Contrast JUMP and CALL instructions. Give 3 points.
- (d) Show the data transfer during execution of CALL instruction diagrammatically showing movement of data through SP (Stack pointer), address bus (AB), Program counter (PC), data bus (DB) and temporary registers W and Z.
- (e) What is DAA instruction ? Give an example.
2+2+3+5+2
5. (a) Explain the steps of interrupt process.
- (b) What are the maskable and non-maskable interrupts? Name them.
- (c) Compare and contrast the vectored and non vectored interrupts.

(3)

(d) Draw the ACC bit pattern for either RIM or SIM instruction. $5+3+3+3$

6. (a) What is the sequence of serving the following requests? INTR, TRAP, RST 5.5, HOLD.

(b) What is DMA? Explain both modes of operation. What signals are present in 8085A to handle DMA ?

(c) What are the different modes of operation of 8254 PIT? Explain any one of them.

(d) What are the stack instructions? Why is stack initiated at highest location? $2+(1+2+1)+(2+3)+3$

7. (a) What are the priority modes of 8259A PIC ?

(b) How many priority levels can 8259A handle and how ?

(c) Neatly draw the block diagram of the 8259 A PIC labeling each part properly.

(d) What does the initialization command word 76H signify ? (ICW1 = 76H) $3+2+5+4$

8. (a) Write a program to the given on/off time to three signal lights (Green, Yellow, Red) and two pedestrian signs (WALK and DON'T WALK). The signal lights and signs are turned on/off by data bits of an output port as shown below :

Lights	Data bits	On Time
1. Green	D_0	15 seconds
2. Yellow	D_2	5 seconds

P.T.O.

(4)

- | | | |
|---------------|-------|------------|
| 3. Red | D_4 | 20 seconds |
| 4. WALK | D_6 | 15 seconds |
| 5. DON'T WALK | D_7 | 25 seconds |

Traffic and pedestrian flow are on same direction, pedestrian should cross the road when the green signal is on.

- (b) Write a main program to count continuously in binary with 1 second delay between each count.

Write a service routine at XX70H to flash FFH five times when the program is interrupted with some appropriate delay between each flash. 6+8

9. Pick the correct answer :

- (a) EI is a (1 byte/2 byte/3 byte) instruction.
- (b) The Hex code of RST 5 is (CF/EF/E7)
- (c) NMI is Non maskable interrupt which is RST 5.5/ RST 6.5/TRAP
- (d) The time delay using loop within loop is more than/less than /same as time delay using register pair

Fill in the blanks :

- (e) In 8085 A, the index register is _____
- (f) LXI SP, 2099 means stack is initiated at _____ and stack storage starts at _____
- (g) The first operation of any instruction to microprocessor is _____

(5)

- (h) _____ & _____ registers are temporary registers
- (i) _____ & _____ are special registers
- (j) _____ & _____ are two mapping modes of I/O addressing.

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2015-16

MICROPROCESSOR**IT 501****Full Marks : 70****Time : 3 hours***The figures in the margin indicate full marks.***Answer Any five questions**

1. (a) What is importance of program counter ? 3
(b) Draw the MVI A,32H machine cycle. 5
(c) What are the different address modes ? Give examples. 3
(d) How is CALL similar or dissimilar to Jump Instruction ? 3
2. (a) The 8085A has 16 address lines and 8 data lines. How are the address lines and data lines simultaneously used when an instruction is executed ? By what process can the data lines be simultaneously used without overlapping of fetched data on opcode of an instruction ? You may explain with an instruction. 4
(b) How can the memory address range of a memory chip be changed ? Explain with a diagram. 4
(c) What is the difference between memory mapped I/O mode and peripheral mapped I/O mode ? Give examples. 4
(d) What is the importance of ALE signal ? 2

3. (a) What are the 3 ways of generating time delays ? Give examples. 6
- (b) Design a decade up counter, using 2MHz clock frequency. Give all delay calculations, comments and address locations. 7
- (c) Can an i/p and o/p port have same address ? How ? 1
4. (a) Why does the stack grow upwards ? Through a diagram show the movement of stack and that it grows upward. 5
- (b) Where is stack initialized and why ? 1 + 2
- (c) Why are instructions corresponding to flag registers ? 2
- (d) 6 bytes of data are stored in memory locations starting at XX60H. Add all the data bytes. Use a register say B to store the carries generated while adding the data bytes. Display the entire SUM at 2 consecutive output ports or 2 consecutive memory locations. 4
5. (a) What is importance of EI & DI instructions ? 2
- (b) What is difference between RST instructions and vectored interrupts ? Give examples. 3
- (c) What is NMI and its significance ? 1.5
- (d) Draw the hardware to generate RST 5 interrupt. 3.5
- (e) Can a microprocessor be interrupted again once it is interrupted ? Give reasons. 2

- (f) What are the signals available on 8085 A for execution of Interrupt ? If there is a request at HOLD, INTR & all vectored interrupts which shall be serviced first ? 2
6. (a) Give the detailed control word format for I/O mode for the 8255A PPI. 4
- (b) What are the operating modes of 8255A PPI ? 4
- (c) What handshaking signals are used if port A is set up as output port in Mode 1 ? Explain then. 4
- (d) What is BSR Mode ? 2
7. (a) Give the block diagram clearly of 8259A and label it neatly. 4
- (b) Explain the interrupt operation carried out by 8259A. 4
- (c) Explain the priority modes of 8259A. 3
- (d) What is DMA and how is it different from Interrupt ? What signals are available in 8085A to execute DMA ? 3
8. (a) What are the temporary registers and their use ? 3
- (b) How can specific bits of Accumulator be set/reset without affecting other bits ? Give examples. 3

How many byte instructions are the following:

Instruction	Number of machine cycles	No. of T-states
		4

MVI A,32H

CPI 00H

IN Port address

CALL 2072

STA 8000H

- (c) What is the diff between (i) DAA & DAD (ii) CPI and CMP ? 4
9. (a) What are the different operating modes of 8254 PIT ? Explain any one of them. 3
- (b) Draw the sequence of events during CALL instruction execution in a tabular format for instruction CALL 2070H. 5
- (c) Write a traffic signal controller program With Green, Yellow and Red lights, Walk and Don't walk signs. The delay subroutine must also be written as CALL DELAY program. 6
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2014-15

MICROPROCESSOR**IT - 501**

Time - Three Hours

Full Marks - 70

The figures in the margin indicate full marks.

1. (a) What is a Machine cycle ? What is its relation to length of the instruction ? 3
- (b) Draw the IN/OUT machine cycle. 3
- (c) What is difference between CMP and CPI instruction ? 3
- (d) What is PCHL ? How is it similar or dissimilar to Jump Instruction ? 3
- (e) Explain XCHG instruction. 2
2. (a) Draw the diagram to demultiplex the multiplexed address bus of 8085A. 3
- (b) How can the memory address range of a memory chip be changed ? Explain with a diagram 4
- (c) Draw the block diagram of a microprocessor and explain its parts. 5
- (d) What is the importance of ALE signal ? 2

3. (a) When is time delay designed with a register pair (Rp) ? Is it enough to get large time delays ? Is there a better option to design time delay than using Rp ? Give an example through a program. $1+1+3=5$

(b) Design a mod-16 down counter, using 2MHz clock frequency. Give all delay calculations, comments and address locations. 6

(c) Why is it essential to use CPI instruction in UP counter instead of CMP ? 2

(d) What is the first instruction of a micro-processor ? 1

4. (a) What is importance of LXI SP, XXXX instruction ? 2

(b) Where is stack initialized and why ? $1+2=3$

(c) Why are instructions PUSH PSW and POP PSW used ? 2

(d) Can a microprocessor be interrupted again once it is interrupted ? Give reasons. 3

(e) What is difference between RST instruction and Vectored interrupt ? Give significance of SIM instruction. $2+2=4$

5. (a) Give the detailed control word format for I/O mode for the 8255A PPI. 4

(b) Draw the block diagram of 8255A PPI. 4

(c) What handshaking signals are used in Mode 1 ? Explain them. Then give the timing diagram of the strobed input with handshake for Mode 1. 6

6. (a) Give the block diagram clearly of 8259A and explain each block in detail and neatly label the different blocks. 8

(b) After the 8259 A is initialized give the steps of interrupt operation. 6

7. (a) What is DMA ? What are the signals available on 8085A MPU for DMA execution ?

(b) Explain both the modes of DMA execution.

(c) Draw the block diagram of 8254 and name the different modes of operation. 14

8. (a) What is the significance of Rotate instructions ? 2

(b) What are the uses of temporary registers W & Z ? 2

(c) Why is STACK initiated at the highest location ? 2

(d) Add two numbers 75 and 15 and display it in decimal form. 2

(e) How can specific bits of Accumulator be set/reset without affecting other bits ? 2

(f) What is NMI ? 2

(g) Can input and output port have the same address ? 2