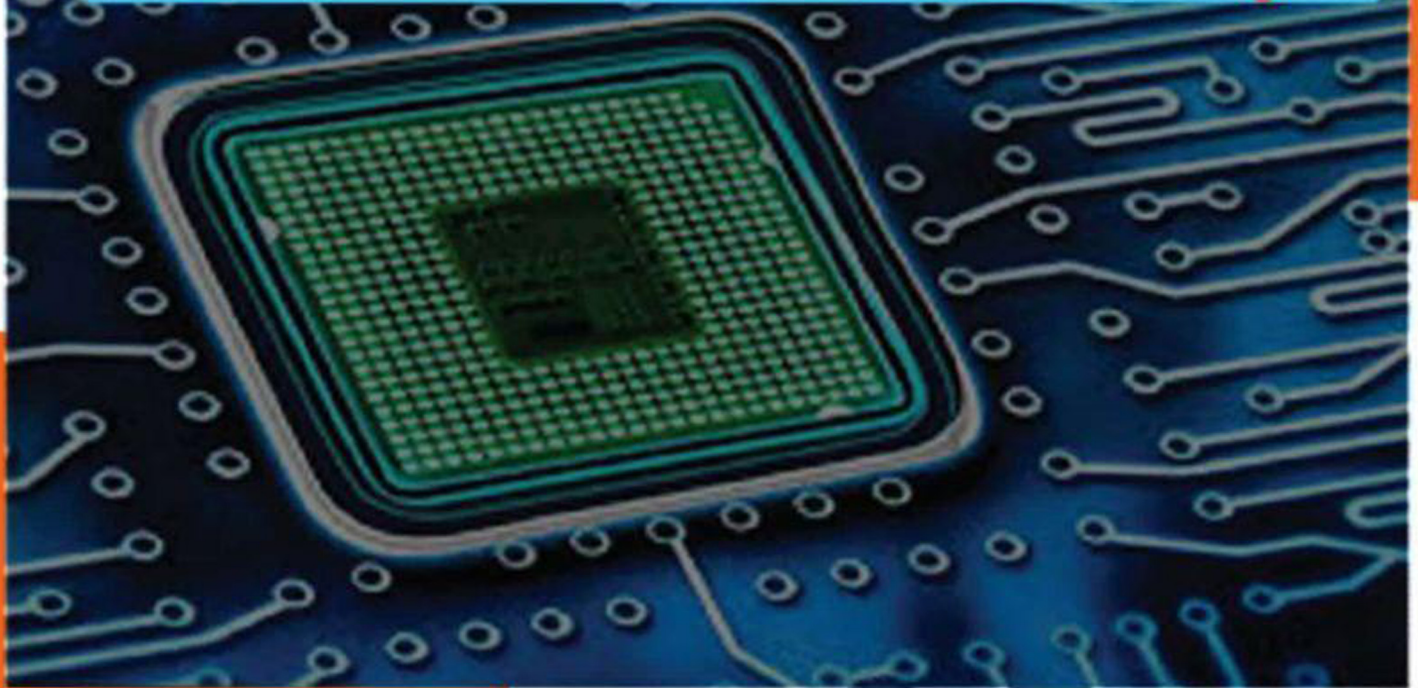


Electrical Engineering - Optional For IAS (UPSC)



Microprocessor & Microcomputers - 2015-2021

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UPSC – ELECTRICAL Engineering optional – 2015 Questions

1. Discussing the issues in memory addressing, explain the five addressing modes used in 8085. [10M]

2. What is pipelining? Explain how it improves the performance of a processor. Discuss how BRANCH like instructions can be handled in a pipelined system.

A machine language program has N instructions, each having m parts. Suppose each part can be executed in one cycle and there is no BRANCH like instruction in the program. How much time does a processor (i) with pipelining and (ii) without pipelining take to execute the program? [20M]

3. What is 8255A PPI? Discuss its blocks-output ports and control logic. Write the instructions to load 65 H in register C and 92 H in accumulator A. Display the number of 65 H and 92 H at PORT 0 and PORT 1 respectively. [10M]

4. (i) Briefly discuss the functional classification of the instruction set, explaining role and format of instructions from each category-data transfer, arithmetic/logic, branch and control. [10M]

(ii) Discuss the role and purpose of the three buses-address, data and control. Explain how they connect microprocessor CPU to ROM, RAM and I/O for data transfer. [10M]

UPSC – ELECTRICAL Engineering optional – 2016 Questions

1. Compare memory mapped I/O (Input/Output) with peripheral mapped I/O for 8085 microprocessor. [10M]

2. Write down the purpose of each bit in SIM (Set Interrupt Mark) instruction. Give three different functions of SIM instruction. [10M]

3. Write down the ALP (Assembly Language Program) to exchange 10H data bytes stored from memory locations 2450H with data bytes stored from memory locations 2480H onwards. [10M]

4. With the help of a neat diagram, explain the functioning of a Ramp type Analog-to-Digital Converter. A Ramp type ADC makes use of a 1 MHz clock generator and a ramp voltage that increases from 0 – 1.25 V in 125 ms. Find the number of clock pulses counted into the register for an input of 0.75 V. [10M]

5. (i) Assume that the accumulator contains data byte 82H and the instruction MOV C, A (4FH) is fetched. List the steps in decoding and executing the instruction. [10M]

(ii) Describe the function of each of the following mnemonics. How many cycles do each of them require for execution and which are the flags affected? Explain, [10M]

1. DAD (Double Add)
2. CMC (Complement Carry)
3. LHLD (Load H-L Register Pair Direct)
4. ORI (OR Immediate)

UPSC – ELECTRICAL Engineering optional – 2017 Questions

1. (i) Describe the two ways in which the interrupt RST 7.5 in 8085 micro-processor can be disabled.
(ii) Calculate the number of memory chips needed to design 8k-bytes memory for an 8085 microprocessor. The memory chip size is 1024×1 . [10M]
2. What is the difference between cycle stealing DMA and interleaved DMA in 8085 microprocessor? What is meant by block transfer DMA ? [15M]
3. (i) How long can the INTR pulse stay high in 8085 microprocessor? [05M]
(ii) What is a jump-on-reset circuit in a processor? [05M]
4. In an 8085 microprocessor, what is the value of stack pointer after the following program is run? [05M]

MOV	SP, 07FFH
PUSH	B
CALL	Subroutine
POP	B
ADD	B
PUSH	B
HLT	

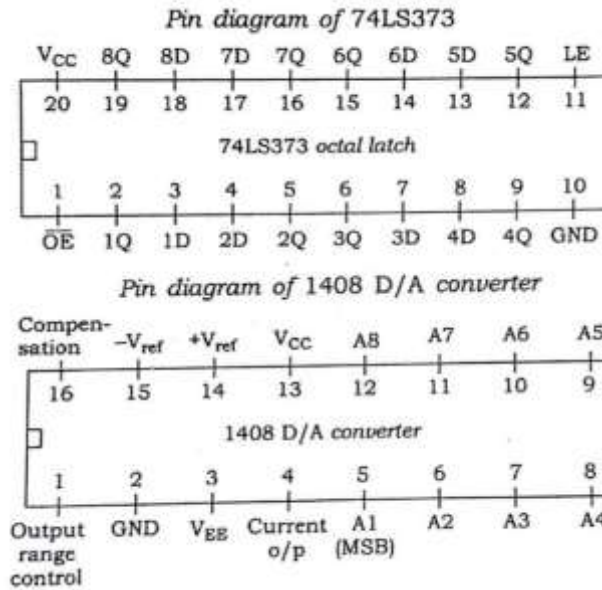
5. Suppose that an 8085 microprocessor has received three interrupt requests in the following order: RST 7.5, RST 6.5 and RST 5.5. If these three interrupts are nested, to what depth does the stack penetrate if all registers within the CPU must be saved? Assume that the stack pointer initially points to location FFFFH. [10M]

UPSC – ELECTRICAL Engineering optional – 2018 Questions

1. Draw the schematic diagram for interfacing an 8-bit analog to digital converter to 8085 microprocessor using 8255 PPI. [10M]
2. Write 8085 microprocessor assembly language program to turn ON an LED connected to bit 4 of the 8155 I/O port B. Use address of port B as 22_{16} . [10M]
3. Differentiate between the following pairs of Instructions:
 - (i) LDA addr and STA addr
 - (ii) LDAX rp and SHLD addr
 - (iii) LDAX rp and STAX rp
 - (iv) RLC and RAL
 - (v) PCHL and SPHL [10M]
4. (i) What do you mean by maskable interrupts? Which interrupt cannot be masked? [10M]
(ii) Write an assembly language program to enable RST 6.5 interrupt. [10M]
5. Explain five addressing modes of 8085 microprocessor. [10M]

UPSC – ELECTRICAL Engineering optional – 2019 Questions

1. Explain the function of the following signals in 8085 microprocessor: [10M]
 - (i) ALE
 - (ii) \overline{RD}
 - (iii) \overline{WR}
 - (iv) $10/\overline{M}$
2. Design an output port with address FFH to interface the 1408 D/A converter that is calibrated for a 0 to 10 V range (with the use of 8085 microprocessor). Write a program to generate a continuous ramp waveform. The pin diagram of an octal latch (74LS373) and the 1408 D/A converter are provided for reference: [20M]



3. Write an assembly language program using the instruction set of 8085 microprocessor for addition of six bytes of data stored in memory locations starting at 2050H. The carry generated (if any) must be saved in register B. The entire sum must be stored at two memory locations 2070H and 2071H. [10M]
4. What is the format of the control word of 8255 programmable peripheral interface? Explain the significance of each bit of the control word. [10M]

UPSC – ELECTRICAL Engineering optional – 2020 Questions

1. Explain briefly the following control instructions of 8085 microprocessor: [10M]
 - (i) HLT
 - (ii) EI
 - (iii) DI
 - (iv) RIM
2. (i) Name various registers in 8085 microprocessor with suitable example. [10M]
 - (ii) Explain indirect addressing modes in 8085 microprocessor with suitable example.
3. (i) For 8085 microprocessor, write a program to do the following: [10M]
 - (1) Load the number 30H in register B and 39H in register C
 - (2) Subtract 39H from 30H
 - (3) Display the answer at Port 1
 - (ii) Find the output displayed at Port 1.

4. For an 8085 microprocessor program, the instructions are as follows:

[05M]

Opcode	Operand
MVI	B, 91H
MVI	C, A8H
MOV	A, B
ORA	C
OUT	Port 1
HLT	

Determine the output at Port 1, with the explanation of each statement.

5. For an 8085 microprocessor program given below

[05M]

Label	Opcode	Operand
Loop:	MVI	B, 64H
	NOP	
	DCR	B
	JNZ	Loop

Find the number of times the loop will be executed.

UPSC – ELECTRICAL Engineering optional – 2021 Questions

1. Explain the following related to computer programming: [10M]
- (i) Machine Language (ii) Assembly Language (iii) Compiler (iv) interpreter
(v) ASCII
2. List the functional classification of 8085 instruction set. Give one example for each class. [10M]
3. A commercial interface unit uses different names for the handshake lines associated with the transfer of data from the I/O device into the interface unit. The interface input handshake line is labelled STB (strobe), and the interface output handshake line is labelled IBF (input buffer full). A low-level signal on STB loads data from the I/O bus into the interface data register. A high-level signal on IBF indicates that the data item has been accepted by the interface. IBF goes low after an I/O read signal from the CPU when it reads the content of the data register. [20M]
- (i) Draw the block diagram showing the CPU, the interface, and the I/O device together with the pertinent interconnections among the three units.
- (ii) Draw a timing diagram for the handshaking transfer.
- (iii) Obtain a sequence of events flowchart for the transfer from the device to the interface and from the interface to the CPU.

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