

314324

25226

3 Hours / 70 Marks

Seat No.

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- Instructions* – (1) All Questions are *Compulsory*.
(2) Answer each next main Question on a new page.
(3) Illustrate your answers with neat sketches wherever necessary.
(4) Figures to the right indicate full marks.
(5) Assume suitable data, if necessary.
(6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. **Attempt any FIVE of the following :** **10**
- a) Convert Hexadecimal number $(0AC)_{16}$ into decimal number.
 - b) Perform the binary addition of 0111 and 1011.
 - c) Draw symbol and write truth table of XOR gate.
 - d) Convert $(55)_{10}$ into binary and octal.
 - e) Write the function of address bus data bus in 8051 microcontroller and state its size.
 - f) Identify the addressing mode of the instruction.
 - i) `MOV A, @ RO`
 - ii) `ADD A, # ZO`
 - g) Add two BCD Numbers $78 + 32$.

P.T.O.

2. Attempt any THREE of the following : 12

- a) Develop OR and XOR gate using NAND gate.
- b) Design 1:8 multiplexer using 1:4 multiplexer. Write its truth table.
- c) Identify and explain the pin of 8051 micro-controller used for following operation.
 - i) Receiving serial data
 - ii) Enabling external memory
 - iii) Multiplexing and demultiplexing address / data bus.
 - iv) Applying external interrupts.
- d) Design an interfacing diagram for 8 LED connected to port2 of 8051 micro controller. Write a program to toggle the LED with a delay between toggle.

3. Attempt any THREE of the following : 12

- a) Write assembly language program to SWAP five number store in internal memory location 60H to 70H.
- b) Draw pin diagram of 8051 micro controller and describe functionality of port 3.
- c) Design 4 bit asynchronous UP counter using flip flop and Draw its timing diagram.
- d) Design half adder using logic gate and derive its truth table.

4. Attempt any THREE of the following :**12**

- a) Perform –
 - i) Binary subtraction of 10111 and 1011;
 - ii) Binary division of 1011010 and 101.
- b) Draw the logic diagram of J-K Flip Flop and derive its excitation table.
- c) Explain operation of SR Flip Flop and derive its truth table. Analyze how different input combination affect the state by Flip Flop.
- d) Define stack memory and explain the function of PUSH and POP instruction.
- e) Compare Harvard and Von-neumann architecture on the basis of
 - i) Memory
 - ii) Speed of operation
 - iii) Number of buses
 - iv) Number of cycle needed for execution of instruction.

5. Attempt any TWO of the following :**12**

- a) Design full subtractor using logic gate. Write its truth table and boolean expression.
- b) Explain the operation of following instruction of 8051 microcent
 - i) MOV A,@Ri
 - ii) SWAP A
 - iii) PUSH
 - iv) ADDC A, RO
 - v) MOVC A,@DPTR
 - vi) RETI
- c) Design an interface for connecting stepper motor to 8051. Write ALP to rotate motor in clockwise direction.

6. Attempt any TWO of the following :**12**

- a) Construct an interfacing diagram to connect a relay with 8051. Write an ALP to control the relay by turning it ON and OFF.
- b) After executing the following program specify the context of accumulator and status of PSW after execution.

Start

MOV A,#23 H

MOV 0F0H, #02H

MUL AB

END

- c) Draw block diagram of 8051 microcontroller and explain function of each component.
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