

314324

12526

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) Use of Non-programmable Electronic Pocket Calculator is permissible.
- (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) Write the radix of decimal, binary, octal, hexadecimal number system.
- b) Draw symbol and write the truth table of T-flipflop.
- c) Define the term 'Multiplexer'. State two examples of multiplexer.
- d) Find the number of address lines required for
- i) 4k RAM
- ii) 8k ROM
- e) Obtain 2's complement of $(10101011)_2$.
- f) Define
- i) Address bus
- ii) Data bus
- g) Identify addressing modes of following instructions
- i) MOVA, RO
- ii) ADD A, # 85 H

P.T.O.

2. Attempt any THREE of the following : 12

- a) List any eight features of 8051.
- b) Draw the logic diagram of 4:1 multiplexer and give its truth table.
- c) Explain the following instruction
 - i) DAA
 - ii) DIV AB
 - iii) CJNE A, data, rel
 - iv) SWAP A
- d) Explain full adder with its logic diagram and truth table.

3. Attempt any THREE of the following : 12

- a) Describe the function of following pins of 8051
 - i) RESET
 - ii) \overline{EA}
 - iii) PSEN
 - iv) ALE
- b) Draw the logical diagram of SR flip-flop using NAND only and explain the operation with $S = R = 1$.
- c) Describe with sketch the interfacing diagram of 8051 with stepper motor.
- d) Explain the addressing mode in the 8051 microcontroller using ADD instruction.
 - i) immediate
 - ii) Register addressing
 - iii) Direct
 - iv) Indirect

4. Attempt any THREE of the following : 12
- a) Compare between Harvard and Von-Neumann architecture.
 - b) Justify NAND gate as a universal gate. Sketch relevant diagram.
 - c) Explain the following assembler directives - ORG, DB, EQU, DATA.
 - d) Write the alternative function of Port-3 pins of 8051.
 - e) Describe any four addressing modes of 8051 microcontroller with one example each.
5. Attempt any TWO of the following : 12
- a) Convert the following
 - i) $(225)_{10} = (?)_2$
 - ii) $(314)_8 = (?)_{10}$
 - iii) $(AFB^2)_H = (?)_2$
 - b) Describe with sketch the interfacing diagram of LED with 8051.
 - c) Construct and explain 3-bit asynchronous UP counter using flip-flop. Draw its timing diagram.
6. Attempt any TWO of the following : 12
- a) Perform the following
 - i) BCD addition of $(876)_{10} + (348)_{10}$
 - ii) $10110 - 1010$ using 1's complement
 - iii) $11010 - 11110$ using 2's complement
 - b) Draw and explain the flag register of 8051 microcontroller.
 - c) Sketch the interfacing diagram of single seven segment common anode display to 8051 and explain.
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