22232

3 Hours / 70 Marks   Seat No.

Instructions :   (1)   All Questions are *compulsory*.

(2)   Illustrate your answers with neat sketches wherever necessary.

(3)   Figures to the right indicate full marks.

(4)   Assume suitable data, if necessary.

(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 :   **10**

(a)   State & Explain Duality Theorem.

(b)   Draw symbol & write Truth Table for EX-OR Gate & EX-NOR Gate.

(c)   Convert binary number 1011 into gray number.

(d)   Define min. term & max. term.

(e)   State the function of compiler.

(f)   Identify the addressing mode of the instruction MOV A, @ RO.

(g)   State the function of RS and R/W pin in 16×2 LCD display.

2.   Attempt any THREE :   **12**

(a)   State and verify de-morgan's first and second theorem using Truth Table.

(b)   Compare TTL, CMOS, ECL Logic family on the basis of (1) Fan-out (2) Power dissipation (3) Figure of merit (4) Propagation delay.

(c) What is Rule around condition in J-K flip flop. Suggest a suitable method to overcome drawback.

(d) State the need of De-multiplexer. Design 1 : 8 De-multiplexer using 1 : 4 De-multiplexer.

3. Attempt any THREE : **12**

(a) Simplify using K-map and implement using NAND-NAND gate only.

$$Y = \Sigma m\ (0, 1, 2, 3, 5, 7, 8, 9, 11)$$

(b) Compare between Micro-processor & Micro controller. (4 points)

(c) Evaluate the following program and specify the content of accumulator and status of PSW Register after execution :

MOV A, # 23 H

MOV OF OH, # 02 H

MUL AB

END.

(d) Draw the interfacing diagram of 8 LED connected to port 2 of 8051. Write a program to toggle LED after some delay.

4. Attempt any THREE : **12**

(a) $Y = A\overline{B} + \overline{A}B + AB + \overline{A}\overline{B}$. Simplify this expression using Boolean rules.

(b) Design Full Adder with Two half adder and write its Truth Table.

(c) Draw pin diagram of 8051 and explain function of pin 9, pin 20, 40.

(d) Which pins of 8051 are used to perform the following function :

(i) Receive the serial data

(ii) Enable External memory interface.

(iii) Multiplexing & De-multiplexing of address / data lines.

(iv) Applying External interrupts.

(e) List addressing mode of 8051 with one example of each.

5. **Attempt any TWO :** 12

   (a) Draw block diagram of internal architecture of 8051 and explain function of each block.

   (b) Develope ALP to transfer seven number from internal memory location 20 H to 40 H.

   (c) Draw interfacing diagram of 7 segment display with 8051. Write ALP to display number from 0 to 9.

6. **Attempt any TWO :** 12

   (a) Construct 3 bit asynchronous up counter using Flip Flop. Draw it's timing diagram.

   (b) Describe the memory organization of 8051 microcontroller.

   (c) Draw a interfacing diagram of stepper motor with 8051. Write ALP to rotate stepper motor in clockwise direction.

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