

22421

23242

3 Hours / 70 Marks

Seat No.

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- 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.

Marks

1. Attempt any FIVE of the following :

10

- (a) Draw the symbol and write truth table of EX-OR gate.
- (b) Define sum of product with any variable example.
- (c) Draw the symbol and write truth table of 3 input NAND gate.
- (d) List any four application of Flip Flop.
- (e) Define assembler and compiler.
- (f) Draw program status word register of 8051.
- (g) List any two important control signal for external RAM interface with 8051.

2. Attempt any THREE of the following :

12

- (a) Obtain the dual of the following equations :
 - (1) $AB + A = 1$
 - (2) $(A + C)(A + B) = A + BC$
- (b) Design half adder using K-map and realize it using gates.
- (c) Draw logical diagram of SR flip flop using NAND gate only and explain the operation when $S = R = 1$ input is given.



(d) State the term's with reference to logic families :

- (1) Fan-in and Fan-out
- (2) Speed of operation and figure of merit

3. Attempt any THREE of the following :

12

(a) Minimize the following expression using K-map & realize using basic gate.

$$Y = \sum m(1, 2, 4, 6, 9, 10, 11, 14, 15)$$

(b) Draw the pin diagram of 8051 & label it.

(c) Explain the following assembler directives – ORG, DB, EQU, DATA

(d) Draw Relay interface diagram with 8051 of port 2 of any pin that glow output blub when relay is ON.

4. Attempt any THREE of the following :

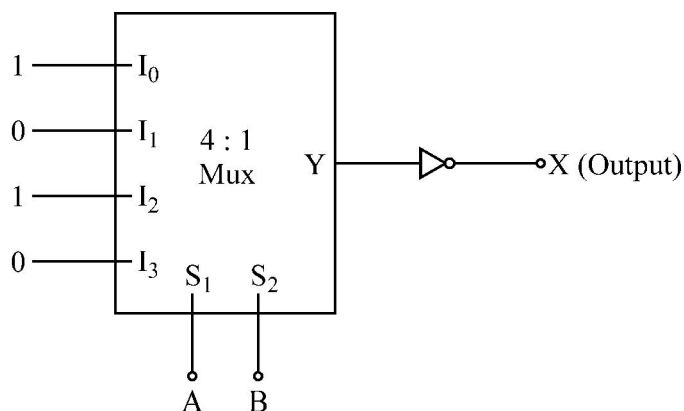
12

(a) State the types of addressing modes & identify it for the following instructions :

- (1) MOV A, @ RO
- (2) ADD A, # data

(b) Write an assembly language program to add 35 H and 25 H data and store the 16 bit result in register RO in LSB. R₁ will have MSB.

(c) What will be the output 'X' in the given circuit ?



(d) Compare Haward & Von-Neuman architecture (any 4)

(e) Sketch the internal memory organization in 8051.

5. Attempt any TWO of the following : 12

- (a) Draw interface 'LED' with 8051 and to turn ON the LED, write ALP.
- (b) Describe power saving options of 8051 with neat circuit diagram.
- (c) Draw flow chart and write ALP for multiplication of two number $\Rightarrow$ 05 H & 06 H using 8051.

6. Attempt any TWO of the following : 12

- (a) Draw interfacing diagram of 64 K RAM and 64 K ROM with 8051 with proper memory mapping.
 - (b) Draw and explain TMOD register of 8051 of each bit.
 - (c) Construct 3 bit synchronous up counter using JK FF with Truth table & Waveform.
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