22421

12425

3 Hours / 70 Marks Seat No. | | | | | | | | |

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) Use of Non-programmable Electronic Pocket Calculator is permissible.

(7) 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) Draw the symbol and write truth table of EX-NOR logic gate.

(b) Define the terms :

(i) Minterms

(ii) Maxterms for K-map

(c) Convert binary number 1010 into gray number.

(d) State and prove De-morgan's first theorem using truth table.

(e) Identify addressing mode for following instructions :

(i) MOVC A, @ A + PC

(ii) ADD A, # 77H

(f) Explain functions of instruction DAA with example.

(g) State the functions of LCD display pin :

(i) E pin

(ii) RS pin

2. Attempt any THREE of the following : 12

(a) State any two laws of Boolean algebra with example.

(b) Define the terms

(i) Octet

(ii) Quad

(iii) Pair

(iv) Individual by using K-map.

(c) Explain working of half adder with the help of truth table and logical diagram.

(d) Compare between TTL and CMOS logic families on the basis of

(i) Fan In

(ii) Fan Out

(iii) Noise margin

(iv) Propagation delay

3. Attempt any THREE of the following : 12

(a) List any four addressing modes of 8051 with example.

(b) Draw the labelled interfacing diagram of 8051 with stepper motor.

(c) Draw the 8 : 1 MUX by using 4 : 1 MUX. Also write its truth table.

(d) State any eight features of 8051 microcontroller.

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

(a) Explain function of following assembler directives :

(i) ORG

(ii) DB

(iii) EQU

(iv) CODE

(b) After the execution of following program which flags are set or reset ? Show it with the help of PSW register :

```
ORG 0000H
MOV A, #30H
ADD A, #99H
DAA
END.
```

(c) Simplify using K-map and implement by using basic logic gate only :

$Y(A, B, C, D) = \Sigma m\ (0, 1, 2, 3, 4, 5, 7, 8, 9, 11, 12, 13, 14, 15)$

(d) Apply different laws of Boolean algebra to simplify following expression :

$Y = \overline{A}\,B\,\overline{C} + \overline{A}\,BC + AB\,\overline{C} + ABC$

(e) State the functions of following pins of 8051 :

(i) $\overline{EA}$ /VPP

(ii) ALE/ $\overline{PROG}$

(iii) $\overline{PSEN}$

(iv) XTAL1

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

(a) Draw an interfacing diagram of LED with 8051. Also write ALP to turn on LED.

(b) Write ALP for block exchange of five byte from 50H to 60H with algorithm or flow chart.

(c) Draw and explain RAM and ROM memory organization of 8051.

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

(a) Design IP and IE register of 8051 with the help of structure diagram.

(b) Draw interfacing diagram of 16 × 2 LCD display with 8051. Also write ALP for displaying word "MSBTE" on LCD display.

(c) Construct 3 bit synchronous up counter using flip flop. Also draw it's timing diagram.
