314324

24225

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) Convert $(A2F)_{16}$ to Decimal number system.

b) For 2 input EX-OR gate –

i) Draw symbol

ii) Write Truth Table

c) State the purpose of the 'preset' and 'clear' inputs in a flip-flop.

d) Define –

i) Address Bus

ii) Data Bus

e) List Four features of microcontroller 8051.

P.T.O.

Marks

f) Identify the direct addressing instruction from the following instructions.

i) MOV A, #0AFH

ii) MOV 0E5H, @RO

iii) MOV R2, 45H

iv) ADD A,45H

g) If the starting address of an external 2K RAM is 1000H, Find the ending address write its memory map.

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

a) Explain half adder using a logical diagram and its truth table.

b) Implement a full subtractor using a multiplexer and write its truth table.

c) Compare Harvard and Von - Neumann architecture with respect to –

i) memory structure

ii) complexity

iii) speed of execution

iv) examples

d) Explain the following directives with example –

i) ORG

ii) DB

iii) EQU

iv) END

Marks

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

a) Perform the subtraction using 2'S Complement methods. $(85)_{10} - (32)_{10}$

b) Explain the operation of an R-S flip-flop using NAND gates only with its truth table.

c) Write the alternative function of Port-3 pins of 8051.

d) Explain the following instruction :

i) DAA

ii) DIV AB

iii) CJNE A, data, rel

iv) SWAP A

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

a) Perform the BCD Addition. $(17)_{10} + (56)_{10}$

b) Explain the term race around condition in J-K flip flop. Suggest a suitable method to overcome it.

c) Draw logical pin diagram of 8051 and explain function of $\overline{EA}$, ALE.

d) Explain the following addressing modes in the 8051 microcontroller using ADD instruction?

i) Immediate addressing mode

ii) Register addressing mode

iii) Direct addressing mode

iv) Indirect addressing mode

e) Identify the input and out devices

i) LED

ii) Relay

iii) LCD

iv) Stepper motor and

Draw the interfacing diagram of 8 LEDs connected to port 2 of 8051.

Marks

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

a) Design a 4 bit asyncronus counter using JK flip flop, write it's truth table and sketch waveforms.

b) Explain internal and external memory organisation of 8051.

c) Describe a system to interface two 2k × 8-bit RAM chips with the 8051 microcontroller. Provide the memory map of the system along with a diagram of the interfacing.

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

a) Realize the AND, OR gate using only NAND gates and NOR gates.

b) Find the status of CY and AC flags for each of the following.

i)
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MOV A, #3FH
ADD A, #45H
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ii)
```
MOV A, #0FFH
SETB C
ADDC A, #00H
```

iii)
```
CLR C
MOV A, #0FFH
ADDC A, #01H
ADDC A, #00H
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c) Draw and explain an interfacing diagram of stepper motor with 8051 using ports.

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