



17509

21415

3 Hours/100 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.
(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. A) Attempt **any three** of the following :

12

- a) Write any four features of 8051 microcontroller.
b) State function of following pins of 8051 microcontroller.

- 1) $\overline{\text{PSEN}}$
2) ALE
3) $\overline{\text{EA}}$
4) $\overline{\text{INT0}}$.

- c) Describe 'sbit' and 'sfr' data types used in C programming for 8051.
d) List control signals of LCD display and state their functions.

B) Attempt **any one** of the following :

6

- a) Draw the organization of data memory (RAM) of 8051 and describe in brief.
b) Describe following instructions with reference to their function and addressing mode :
1) ADD A, R1
2) SUBB A, R0
3) ORL A, # 30 H

P.T.O.

2. Attempt **any two** :

16

- a) Write assembly language program to find largest number of an array containing 16 numbers. Store this number in the internal RAM location 50H. Write appropriate comments.
- b) Draw interfacing diagram of 7 segment display with Port 1 of 8051 microcontroller. Write C program to display BCD numbers from 0 to 9.
- c) Draw interfacing diagram where P1.0 pin of 8051 microcontroller is used to control relay contact which in turn ; controls the fan connected to 230 V. Describe operation of this circuit.

3. Attempt **any four** :

16

- a) Draw the format of PSW register of 8051 and state the functions of each bit.
- b) Write alternate functions of port 3 of 8051.
- c) Describe the following C program for 8051

```
#include <reg 51.h >
void main (void)
{
    unsigned char z;
    for (z = 0; z <= 8; z++)
        P1 = z ;
}
```

- d) Compare EEPROM and Flash memory (any four points).
- e) Draw interfacing diagram of 8 key connected to P0 of 8051 and label it.



MARKS

4. A) Attempt **any three** : **12**
- a) Draw the interfacing diagram of stepper motor to Port 1. Use ULN 2003 driver IC.
 - b) Describe bitwise Left/Right shift operator used in 8051 C programming with examples.
 - c) Compare microprocessor and microcontroller (any 4 points).
 - d) Draw the format of TMOD register and describe each bit.
- B) Attempt **any one** : **6**
- a) Describe following branching instructions :
 - 1) DJNZ R0, UP
 - 2) CJNE, @ R1, # 80 H, LOOP
 - 3) JB P1.5, Here
 - b) Compare 8051 microcontroller with 8052, with reference to :
 - 1) On chip ROM
 - 2) On chip RAM
 - 3) Timers
 - 4) Interrupt sources.
5. Attempt **any two** : **16**
- a) Draw the format of SCON register and describe the function of each bit. State the importance of SMOD bit when it is set. If XTAL = 12 MHz, calculate the baud rate for TH1 = - 12 and SMOD = 1.
 - b) Write assembly language program for 8051 to generate square wave of 10 KHz on port pin P1.7. Assume XTAL = 12MHz. Use timer 0 to generate delay. (Show delay calculation with comments).
 - c) Draw interfacing diagram to interface 8 switches to port 0 and 8 LEDs to port 1. Write program for 8051 in 'C' language to read switch status and display it on LEDs.



6. Attempt **any four** :

16

- a) Draw diagram of PORT 0 of 8051 and label it. Write the process to read port 0 pin status.
 - b) Draw a labelled interfacing diagram of ADC 0809 with 8051 microcontroller.
 - c) State addressing modes for 8051. Describe any two addressing modes with example.
 - d) Draw format of IE register and describe each bit.
 - e) Assuming temperature control system using LM 35 as temperature sensor and ADC 0809. Draw flow chart of this system to keep temperature within 25°C to 35°C.
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