



# 17509

11819

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

**Marks**

1. A) Attempt **any three** :

**12**

a) Perform following subtraction using 2's complement method

1)  $(69)_2 - (34)_2$

2)  $(18)_2 - (27)_2$

b) Describe function of following pins of 8051 microcontroller

i)  $\overline{\text{PSEN}}$

ii)  $\overline{\text{EA}}$

iii) RST

iv) ALE.

c) With help of ADD instruction, explain

1) Direct addressing mode

2) Indirect addressing mode

3) Register addressing mode

4) Immediate addressing mode.

d) Explain various modes of serial communication operation.

**P.T.O.**



B) Attempt **any one** :

6

- a) Write ALP to find smallest number in an array of 10 numbers stored in Internal RAM.
- b) With the help of interfacing diagram, write ALP to rotate stepper motor clockwise.

2. Attempt **any two** :

16

- a) Draw and explain internal RAM organization of microcontroller 8051, and show address areas for each section.
- b) Write ALP for 8051 microcontroller to generate a delay of 3  $\mu$ s using timer 1. Draw flow chart also. Assume crystal frequency 12 MHz.
- c) Draw and explain interfacing diagram for DC motor speed control using 8051  $\mu$ c. Also develop flowchart for same operation.

3. Attempt **any four** :

16

- a) Compare microprocessor and microcontroller.
- b) Draw block diagram of 8051 microcontroller.
- c) Explain following assembler directives :
  - i) DB
  - ii) ORG
  - iii) EQU
  - iv) END.
- d) State any four 'C' data types with their range of values.
- e) Draw and explain interfacing of 3×3 key matrix with 8051 microcontroller.

4. A) Attempt **any three** :

12

- a) Compare 8051 and 8052 microcontrollers.
- b) Draw format of PSW register of 8051  $\mu$ c and explain function of any two flag.



c) Describe function of following instructions of 8051  $\mu$ c.

1) MOVX A, @ DPTR

2) SWAP A

3) MUL AB

4) MOV A, RO.

d) Write a program to send “WELCOME” serially on 8051  $\mu$ c, use baud rate of 2400.

B) Attempt **any one** :

**6**

a) List all I/O ports of 8051  $\mu$ c and describe alternative functions of each ports.

b) With necessary interfacing diagram, write a ‘C’ program to generate a triangular wave using DAC.

5. Attempt **any two** :

**16**

a) Write ALP to exchange 10 bytes of data from source location 20H to destination location 60 H for 8051  $\mu$ c.

b) Write ‘C’ language program to toggle all bits of port 1 of 8051  $\mu$ c continuously with 5 ms delay.

c) Draw neat labeled interfacing diagram to control a lamp at pin 1.0, by using opto isolator with 8051  $\mu$ c.

6. Attempt **any four** :

**16**

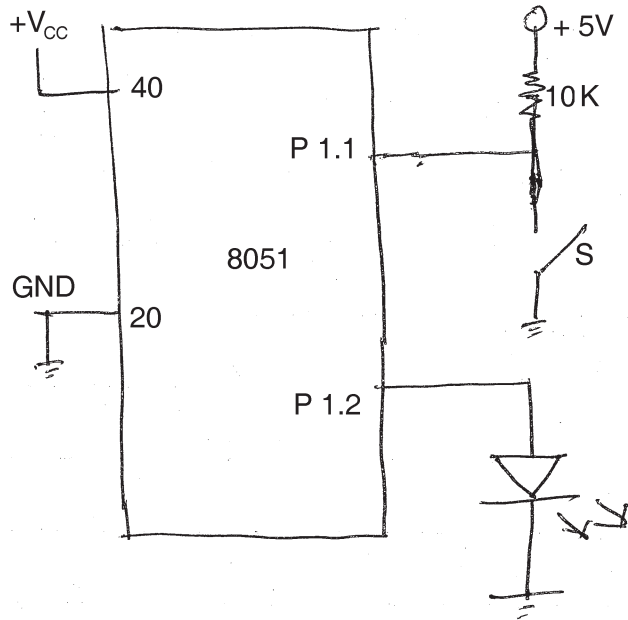
a) Explain Von Neumann architecture with suitable diagram.

b) With help of neat diagram, describe timer modes of 8051  $\mu$ c.

c) What is integrated development environment for microcontroller based system ? Describe at least four features of Keil  $\mu$ -version.



- d) Write a program to read switch as shown below. If switch is closed, turn ON the LED  
Else turn OFF the LED.



- e) Draw interfacing diagram for temperature measurement using LM 35 sensor with 8051  $\mu$ c.

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