



# 17509

16117

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) *Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.*

**Marks**

1. A) Attempt **any three** : **12**
- a) State any eight features of 8051 microcontroller.
  - b) Draw format of PSW register in 8051 microcontroller and state significance of each bit.
  - c) Explain the interfacing of  $3 \times 3$  key matrix with 8051 microcontroller.
  - d) State any four C data types with their value range.
- B) Attempt **any one** : **6**
- a) Draw internal RAM organization of microcontroller 8051 and show address areas for each Section.
  - b) Write an ALP to find the largest number in an array of 10 numbers stored in internal RAM.
2. Attempt **any two** : **16**
- a) Write an assembly language program for 8051 microcontroller to generate a delay of 1 second. Use timer 1. Assume crystal frequency = 12 MHz. Draw flowchart.
  - b) Draw interfacing diagram of 8 bit serial ADC, MAX112 with 8051 microcontroller. Write a 'C' language program to read data.
  - c) Draw interfacing diagram of stepper motor control with 8051 microcontroller. Draw flow chart to rotate a stepper motor clockwise through  $360^\circ$ . Assume step angle of  $1.8^\circ$ .
3. Attempt **any four** : **16**
- a) Draw neat labeled interfacing diagram of LCD with 8051 microcontroller.
  - b) Compare Von-Neumann and Harvard Architecture. Give examples.
  - c) Write down instructions to READ input port and send hex data to output port using 'C' operators.

**P.T.O.**



- d) Describe timer operations of 8051 microcontroller in mode 1 and mode 2 with respect to application and advantages.
- e) Describe stack operations in 8051 microcontroller with suitable examples.

**4. A) Attempt any three :****12**

- a) Draw interfacing diagram or temperature measurement using LM35 with 8051 microcontroller.
- b) Write 'C' language program to toggle a bit of P1.5 continuously with 250 msec. delay. Use timer 0, mode 2. Assume crystal freqn. 11.0592 MHz.
- c) Compare RISC and CISC machines with examples.
- d) Describe operations of DPTR register in 8051, along with related instructions.

**B) Attempt any one :****6**

- a) Describe any four assembler directives used in 8051 programming.
- b) Draw the format of TCON register in 8051 and describe in short.

**5. Attempt any two :****16**

- a) Write an assembly language program for 8051 microcontroller to generate a square wave of 2 KHz frequency on Pin P1.5. Assume crystal freqn. = 11.0592 MHz.
- b) Write 'C' language program to receive bytes of data serially and put them in port P1. Set baud rate of 4800, 8 bit data and 1 stop bit. Assume crystal freqn. = 11.0592 MHz.
- c) What is integrated development environment for microcontroller based systems? Describe at least four features of Keil  $\mu$ -vision.

**6. Attempt any four :****16**

- a) Draw format of IE register in 8051 microcontroller and explain each bit.
  - b) Draw and explain the interfacing of ADC with 8051 microcontroller.
  - c) Write an ALP for 16 bit multiplication. Assume numbers to be stored in internal RAM.
  - d) State and explain the interrupts used in 8051 microcontroller.
  - e) Draw neat labeled interfacing diagram to control a lamp at pin P1.0, by using optoisolator with 8051 microcontroller.
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