

# 17658

16117

**3 Hours / 100 Marks**

Seat No.

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- 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) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.
  - (7) Write the answers in sequential order.

**Marks**

1. **Attempt any FIVE of the following:** **20**
- a) Draw the architecture of 89CSI Microcontroller.
  - b) Write C language program to toggle all bits of P0, P1, P2 and P3 ports continuously with certain delay.
  - c) Differentiate between synchronous and asynchronous serial communication (any four points).
  - d) Draw the interfacing of  $8 \times 8$  matrix keyboard with 89C51 microcontroller.
  - e) Write C language program to generate a triangular wave by using DAC0808.
  - f) State any four design metrics of an embedded system.
  - g) With help of neat diagram describe binary semaphore.

P.T.O.

**2. Attempt any FOUR of the following:****16**

- a) Differentiate between Harvard and Von Neumann architecture with suitable diagram (any four points)
- b) Draw the pin out of RS232 and describe the function DCE and DTE pins.
- c) Write a language program to read P2 and P3. Shift the bits of P2 to right by two bits and P3 to left by four bits. Store the content of P2 to P0 and P3 to P1.
- d) Write C language program to rotate stepper motor by 90 degree clockwise. Assume step angle is 1.8 degree and 4 step sequence.
- e) What is embedded system? Draw the block diagram of an embedded system.
- f) What is inter task communication? Describe the different methods of inter task communication.

**3. Attempt any FOUR of the following:****16**

- a) Describe the following terms:
  - (i) Cross compiler
  - (ii) Emulator
  - (iii) Debugger
  - (iv) In-circuit Emulator
- b) Write C language program to read P0 and P1. Add the content of P0 and P1 and store the result to P2.
- c) State any two important features of following protocols.
  - (i) IrDA
  - (ii) Bluetooth
  - (iii) Zigbee
  - (iv) IEEE 802.11

- d) Draw the interfacing of relay with 89C51 microcontroller. Write C language program to make relay ON/OFF after certain delay.
- e) List the classification of an embedded system and describe any two embedded system in brief.
- f) Differentiate between desktop OS and RTOS (any four point)

**4. Attempt any FOUR of the following: 16**

- a) Describe DSP and multicore processor in brief.
- b) Write C language program to read P1 and store the one's complement of P1 to P2
- c) State any two advantages of I<sup>2</sup>C and USB.
- d) Draw the interfacing of DC motor with 89C51 microcontroller. Write C language program to rotate DC motor clockwise and anticlockwise.
- e) State any two advantages and two applications of an embedded system.
- f) List the scheduling algorithm of RTOS. Describe any one scheduling algorithm in brief.

**5. Attempt any FOUR of the following: 16**

- a) Differentiate between assembly language and embedded C (any four points)
- b) Write C language program to transfer 10 bytes from array A to array B.
- c) Draw the interfacing of LCD display to 89C51 microcontroller and describe the function of RS and RW pins.
- d) Draw the interfacing of ADC 0808 with 89C51 microcontroller.
- e) State the meaning of following terms:
  - (i) multitasking
  - (ii) Shared Data Problem
- f) Draw and describe CAN bus protocol.

**6. Attempt any FOUR of the following:****16**

- a) What is meant by deadlock? Describe any three methods to prevent the deadlock.
  - b) Draw the interfacing of DAC 0808 with 89C51 microcontroller.
  - c) Describe the parallel protocols PCI and PCI-X.
  - d) Write C language program to generate a square wave of 2 KHz frequency on P1.1 pin by using timer 0 and mode 1. Assume XTAL frequency is 11.0592 MHz.
  - e) Draw the interfacing of key and LED to 89C51 microcontroller pins P1.0 and P2.0 respectively. Write C language program to read the status of key and display it on LED.  
(Key open = LED OFF and key closed = LED ON)
  - f) Write C language program to transfer the message "MSBTE" serially at 9600 baud rate, 8 bit data and 1 stop bit.
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