

# 17658

**21819**

**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.

**Marks**

1. a) Attempt any THREE of the following: 12
- (i) List ports of 89C51 and alternate pin functions of port 3.
  - (ii) List various software development tools available in IDE. Explain any one in brief.
  - (iii) Draw and explain CAN bus protocol.
  - (iv) Draw labeled diagram to interface 16x2 LCD with 89C51. State the function of pins.
    - 1) RS
    - 2) R/W
    - 3) EN

P.T.O.

- b) **Attempt any ONE of the following:** **6**
- (i) State various types of Embedded system. Explain any one in brief. State any four applications of embedded system.
  - (ii) State the scheduling algorithms of RTOS and describe the concept of round robin scheduling.
- 2. Attempt any FOUR of the following:** **16**
- a) Draw the internal data memory structure of 89C51 and describe register banks.
  - b) Write C program for 89C51 to read data from port P1 and P2. Compare the data and send bigger data on port 3.
  - c) Draw the pin out of RS 232 and describe the function of TXD, RXD, DTE and DCE Pins.
  - d) Draw the interfacing diagram of  $4 \times 4$  matrix keyboard with 89C51 microcontroller.
  - e) Compare general purpose operating system and RTOS.
  - f) State any four design metrics of an embedded system.
- 3. Attempt any FOUR of the following:** **16**
- a) Compare between CAN and I2C protocols on the basis of following points:
    - (i) Data transfer
    - (ii) Number of field
    - (iii) Addressing bit
    - (iv) Application
  - b) If the content of  $ACC = 0 \times 06$  and  $P1 = 0 \times D2$ . State the result after execution of following statements independently:
    - (i)  $result = ACC \text{ and } P1$
    - (ii)  $result = ACC : P1$
    - (iii)  $result = ACC \wedge P1$
    - (iv)  $result = \sim P1$

- c) State the methods of task synchronization. Describe semaphore with suitable example.
- d) List advantages and disadvantages of embedded system.
- e) Draw labeled interfacing diagram to interface DC motor with micro controller.
- 4. a) Attempt any THREE of the following: 12**
- (i) List the interrupts of 89C51 microcontroller with their vector locations and order of priority.
- (ii) State any four features of Bluetooth Technology.
- (iii) Explain the meaning of Deadlock and starvation with reference to embedded system.
- (iv) State any four specifications of RTOS. Give any four examples of RTOS.
- b) Attempt any ONE of the following: 6**
- (i) Write 89C51 C language program to generate square wave of 10 KHz on pin P2.7 using timer 0. Assume crystal frequency as 12 MHz.
- (ii) Draw the interfacing diagram of DAC with 89C51 micro controller. Write a program in “C” language to generate triangular wave.
- 5. Attempt any FOUR of the following: 16**
- a) Explain JTAG in brief.
- b) Compare synchronous and asynchronous communication. (any four points)
- c) Draw labeled diagram to interface LED to P2.1 of 89C51. Write a language program to turn on and off this LED after some delay.
- d) Explain inter process communication in brief. State various inter process communication methods.
- e) Describe the program downloading tool ISP/IAP.
- f) Draw the interfacing diagram of ADC with microcontroller.

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

- a) Compare between assembly language program with an embedded C with reference to following points:
    - (i) Execution time
    - (ii) Time for loading
    - (iii) Hex file size
    - (iv) Debugging
  - b) Draw and explain USB protocol.
  - c) Draw the interfacing diagram of stepper motor with microcontroller.
  - d) Draw the interfacing of relay with 89C51 microcontroller. Write C language program to make relay on-off after certain delay.
  - e) Write 89C51 C program to toggle all bits of part Po continuously with a 200 millisecond delay.
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