

# 22532

**23242**

**3 Hours / 70 Marks**

Seat No.

--	--	--	--	--	--	--	--

- 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) Use of Non-programmable Electronic Pocket Calculator is permissible.
  - (7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks**

- 1. Attempt any FIVE of the following: **10****
- a) Define term RISC and CISC.
  - b) List any four features of ARM microcontoller.
  - c) State the use of MAX-232 in communication.
  - d) Draw the format of SCON register.
  - e) List the four different methods of Inter task communication.
  - f) Illustrate any two logical operators used in ‘C’ with their example.
  - g) Draw the two switch and two LEDs Interfacing diagram with 89C51 microcontroller.

P.T.O.

- 2. Attempt any THREE of the following:** **12**
- a) List the classification of an Embedded system. Describe any two types.
  - b) Write C language program to read P1 and store the one's complement of P1 to P2.
  - c) Compare synchronous and asynchronous type of serial communication. (any four points.)
  - d) Draw block diagram of Embedded system and describe any four hardware units of Embedded system.
- 3. Attempt any THREE of the following:** **12**
- a) Draw interfacing diagram of  $4 \times 4$  matrix keyboard with 89C51 microcontroller.
  - b) Differentiate between desktop OS (GPOS) and Real time operating system (RTOS).
  - c) State any four features of USB serial communication protocol.
  - d) Write C language program to transfer the message "LEDON" serially at 4800 baud rate, 8-bit data 1 stop bit.
- 4. Attempt any THREE of the following:** **12**
- a) Write a 'C' language program to toggle all the pins of port 2 continuously with 250 ms delay in between.
  - b) Differentiate between I<sup>2</sup>C and CAN Bus protocol. (any four points)
  - c) Draw labelled diagram to Interface  $16 \times 2$  LCD display with 89C51. State function of pins
    - i) RS
    - ii) R/W
  - d) List four features of each of the following:
    - i) Bluetooth
    - ii) ZigBee
  - e) Draw the interfacing of DC motor with 89C51 microcontroller. Write C language program to rotate DC motor in clockwise direction.

**5. Attempt any TWO of the following: 12**

- a) List scheduling algorithms of RTOS. Describe concept of pre-emptive multitasking scheduling algorithm of RTOS with suitable diagram.
- b) Draw Interfacing diagram of DAC 0808 with 89C51, microcontroller. Write C language program to generate triangular waveform with DAC interfacing
- c) Write C language program to generate square wave of 5 KHz frequency on P 2.7 pin of microcontroller 89C51. Use timer 0, mode 1 to generate delay. Assume crystal frequency = 11.0592 MHz.

**6. Attempt any TWO of the following: 12**

- a) What is deadlock in an Embedded system. State the reason of occurrence and list the deadlock handling techniques.
  - b) State and describe any six design matrices of embedded system.
  - c) Draw interfacing diagram of ADC with 89C51 microcontroller and explain function of following pins of ADC
    - i) SOC
    - ii) EOC
    - iii) OE
-