

22532

21222

3 Hours / 70 Marks

Seat No.

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15 minutes extra for each hour

- 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) Classify embedded system.
 - b) Define RISC and CISC.
 - c) State any two features of IrDA.
 - d) State any two data types used in C with their range.
 - e) Define Reliability, Scalability related to RTOS.
 - f) Draw the format of TMOD register.
 - g) List various temperature sensors used in industry.

P.T.O.

- 2. Attempt any THREE of the following:** **12**
- a) Compare Harvard and Von-Neumann architecture.
 - b) Write 89C51 C program to mask the lower 4 bits of P2 and upper 4 bits of P0. using logical operator.
 - c) Draw and explain CAN bus with frame format.
 - d) State features of 89C51 microcontroller.
- 3. Attempt any THREE of the following:** **12**
- a) Draw labelled diagram to interface 16×2 LCD with 89C51.
State function of pins
 - i) RS
 - ii) RIW
 - iii) EN
 - b) Differentiate between general purpose operating system (GPOS) and real time operating system (RTOS).
 - c) Draw the pin out of RS 232 and describe function of TXD, RXD, DTE and DCE pins.
 - d) Write 89C51 C program for multiplication of two 8 bit numbers.
- 4. Attempt any THREE of the following:** **12**
- a) Write C program to send character 'ESY' serially at 9600 baud rate continuously. Assume crystal frequency 11.0592 MHz.
 - b) Draw and explain USB protocol.
 - c) Draw interfacing diagram of 3×3 matrix keyboard with 89C51.
 - d) State any four features of zigbee.
 - e) Draw interfacing diagram of ADC to 89C51 and explain function of following pins SOC, EOC, and OE.

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

- a) Explain watchdog timer and semaphore in detail.
- b) Draw the interfacing diagram for temperature measurement using LM35, ADC 0808 with microcontroller 89C51.
- c) Write a C program to toggle all bits of port 1 continuously with 60 ms delay in between. Use timer 0 in mode 1 to generate the delay.

The XTAL frequency is 11.0592 MHz.

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

- a) Explain pre-emptive and round robin scheduling algorithm in RTOS.
- b) Draw the block diagram of embedded system and explain with hardware component.
- c) Draw interfacing diagram of DAC to 89C51 and write a 'C' language program to generate sawtooth wave.
