

17658

15162

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) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (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) State four differences between RISC and CISC architecture.
 - (ii) List any four software development tools used in an embedded system and state the function of each.
 - (iii) Draw the frame format of I²C and explain each field in brief.
 - (iv) Draw the interfacing diagram of 4×4 matrix keypad with 89C51 microcontroller.
- b) **Attempt any ONE of the following:** **6**
 - (i) Draw block diagram of embedded system and describe any four hardware units of embedded system.
 - (ii) List scheduling algorithms of RTOS. Describe concept of pre-emptive multitasking scheduling algorithm of RTOS with suitable diagram.

P.T.O.

2. Attempt any FOUR of the following: 16

- a) Draw the format of TMOD. Describe the function of each bit.
- b) Write 89C51 'C' program to toggle all the pins of port P2 continuously with 400 ms delay.
- c) Differentiate between synchronous communication and asynchronous communication (Any four points)
- d) Write a 'C' program to read the status of key connected to P1.3. If the key is pressed, turn on the LED connected to P3.5 for 20m sec.
- e) Explain the concept of deadlock with suitable schematic.
- f) Describe the following characteristics of embedded system:
 - (i) Processor power
 - (ii) Memory
 - (iii) Reliability
 - (iv) Safety

3. Attempt any FOUR of the following: 16

- a) Draw the pinout of RS-232 (DB-9) connector and the interfacing diagram of RS232 with 89C51.
- b) Find the contents of port after execution of following code:
 - (i) $P2 = 0 \times 74 \gg 3;$
 - (ii) $P3 = 0 \times 04 | 0 \times 68;$
- c) Explain inter-task communication with reference to RTOS.
- d) Define embedded system. List any two advantages and disadvantages of embedded system.
- e) Write a 'C' program to transfer the message "MSBTE" serially at 9600 baud rate continuously.

- 4. a) Attempt any THREE of the following:** **12**
- (i) Draw the format of SCON register and explain all the bits.
 - (ii) List four features of each of the following
 - (1) Bluetooth
 - (2) Zigbee
 - (iii) Classify an embedded system. Describe any two types.
 - (iv) Differentiate RTOS with desktop OS (any four points)
- b) Attempt any ONE of the following:** **6**
- (i) Write a 'C' program to generate a square wave of 100 Hz on P1.3. Also draw the output observed on P1.3.
 - (ii) Draw the circuit diagram to interface LCD with 89C51. Write 'C' program to send letters 'M', 'D' and 'E' to the LCD display.
- 5. Attempt any FOUR of the following:** **16**
- a) State any four data types used in Embedded C, with their value range.
 - b) List the serial and wireless communication protocols. And describe IEEE 802.11.
 - c) Draw interfacing diagram of DAC0808 with 89C51 microcontroller.
 - d) State the methods of task synchronization. Describe Semaphore with suitable example.
 - e) Differentiate between assembly language program with an embedded 'C' with respect to
 - (i) Execution Time
 - (ii) Time for coding
 - (iii) Hex file size
 - (iv) Debugging
 - f) Draw labelled interfacing diagram of stepper motor with 89C51 microcontroller.

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

- a) Define the terms :
 - (i) In-circuit Emulator
 - (ii) Integrated Development Environment
 - b) Differentiate between CAN and I²C protocols with respect to
 - (i) Data transfer rate
 - (ii) No. of fields
 - (iii) Addressing bit
 - (iv) Application
 - c) Draw labelled interfacing diagram of ADC0808 with 89C51, show the handshaking signals clearly.
 - d) Draw the interfacing diagram of relay with 89C51.
 - e) Write Logical operators in 'C' for AND, OR, Ex-OR and NOT for 89C51 and state one example of each.
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