

# 17658

16172

**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) State the interrupts used in 89C51? Give their priorities and vector addresses.
  - (ii) Write difference between synchronous and asynchronous data communication.
  - (iii) List the software development tools in an embedded system and state the function of compiler and debugger.
  - (iv) Draw interfacing diagram of  $4 \times 4$  matrix keyboard with 89C51 micro controller (No program)

P.T.O.

b) **Attempt any ONE of the following:****6**

- (i) Describe the methods of task synchronization and explain any one in details.
- (ii) Draw and explain different hardware units of an embedded system.

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

- a) State any four advantages of an embedded systems.
- b) Draw the format of TMOD SFR and write significance of each bit.
- c) Draw the interfacing diagram of  $16 \times 2$  LCD display with 89C51 and state the function of
  - (i) RS
  - (ii) EN
  - (iii) R/W
- d) Write 89C51 'C' language program to toggle all bits of port P<sub>2</sub> continuously with 500 ms delay.
- e) Differentiate between CAN and I<sup>2</sup>C protocols with respect to
  - (i) Data transfer rate
  - (ii) Number of fields
  - (iii) Addressing bits
  - (iv) Application
- f) Describe semaphore with suitable example.

- 3. Attempt any FOUR of the following:** **16**
- a) Find the content of Accumulator after execution of the following code
    - (i)  $ACC = 0 \times 94 \gg 5;$
    - (ii)  $ACC = 0 \times 5A \ll 2;$
  - b) Write any four feature of RTOS.
  - c) Write 89C51 'C' language program to rotate stepper motor by  $180^\circ$  in clockwise direction motor has step angle  $1.8^\circ$ . Use stepper motor of 4 step pulse sequence.
  - d) Write any four characteristics of an embedded system.
  - e) Write any four feature of USB.
- 4. a) Attempt any THREE of the following:** **12**
- (i) Explain I<sup>2</sup>C protocols with suitable diagram.
  - (ii) Differentiate between General purpose operating system and RTOS (any four points).
  - (iii) Differentiate between RISC an CISC computer.
  - (iv) Write the defination of an embedded system? How it is classified?
- b) Attempt any ONE of the following:** **6**
- (i) Draw interfacing diagram of ADC 0808 with 89C51 micro controller and write 'C' language program to read data from ADC 0808.
  - (ii) Write 89C51 'C' program to transfer 'YES' serially at baud rate 9600 continuously Use 8 bit data and 1 stop bit. Assume crystal frequency 11.0592 MHz.

- 5. Attempt any FOUR of the following:** **16**
- a) Draw the pin out of RS232 and describe the function of TXD, RXD, DTE and DCE.
  - b) Write 'C' language program to generate a triangular waveform of DAC 0808
  - c) Describe deadlock in RTOS with suitable example.
  - d) Draw labelled interfacing diagram of DC Motor with 89C51 microcontroller.
  - e) Write 'C' language program to mask the lower 4 bits of port P<sub>0</sub> and upper 4 bits of port P<sub>2</sub> using logical operator.
  - f) Describe program downloading tools. ISP and IAP.
- 6. Attempt any FOUR of the following:** **16**
- a) Describe parallel protocols PCI, PCI-X.
  - b) Draw labelled interfacing diagram of seven segment display with 89C51 micro controller.
  - c) State all logical operators used in 'C' and explain any one with example.
  - d) Draw interfacing diagram of LED to port pin P2.4 of 89C51 write 'C' language program to turn ON and OFF LED after 20 ms delay.
  - e) List Date types used in 'C' with their values.
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