17658

21718

3 Hours / 100 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. a) **Attempt any THREE of the following:** **12**

(i) Draw internal RAM organisation of 89C51 microcontroller. Explain register banks in it.

(ii) State the function of simulator, linker compiler and debugger.

(iii) Describe parallel communication protocols.

(iv) Draw a labelled interfacing diagram of ADC 0808 with 8951 microcontroller.

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

(i) Classify embedded system. Describe any two of them in short.

(ii) Explain pre-emptive scheduling and round-robin scheduling algorithms in RTOS.

Marks

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

a) Compare RISC and CISC architectures with any four points.

b) Explain the use of assembly language in C language with suitable example.

c) Draw a labelled interconnection diagram between RS232 and 8951 microcontroller.

d) A 230 V AC bulb is connected through a relay at P2.2. A light sensor is connected at P3.4. A light sensor produces logic high in dark condition. Write a 'C' program to switch 'ON' the bulb in 'DARK' condition and switch it OFF in 'LIGHT' condition.

e) Describe intertask communication in RTOS.

f) Draw and explain block diagram of embedded system.

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

a) List wireless communication protocols and state four features of zigbee protocol.

b) Write a 'C' program to toggle P2.1 continuously with 100 ms delay. (Use simple delay subroutine).

c) Compare desktop operating system with RTOS with any four points.

d) State any two advantages and disadvantages of embedded system.

e) Draw a labelled interfacing diagram of DAC 0808 with 8951 microcontroller. Also write a 'C' program to generate triangular waveform using DAC.

Marks

4. a) **Attempt any THREE of the following:** **12**

(i) Draw format of TMOD register. Find the value of TMOD register to operate timer 0 in mode 1.

(ii) Explain CAN Bus protocol with the frame structure.

(iii) State any eight design metrics of embedded system.

(iv) Explain the concept of deadlock with suitable example.

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

(i) Write a 'C' program to generate a square wave of 5 kHz. (Operate timer 0 in mode 1).

(ii) Draw labelled interfacing diagram of stepper motor with 8951. Write a 'C' program to rotate it in counterclockwise direction.

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

a) State 'C' language logical operators for AND, OR, NOT and EX-OR operation. Give one example of each.

b) Distinguish between synchronous and asynchronous communication with any four points.

c) State number of portlines required for a keyboard matrix having following keys:

(i) 16

(ii) 256

(iii) 64

(iv) 144

d) State four key specifications of RTOS.

e) Describe in-circuit emulator.

f) Draw labeled interfacing diagram of 4×4 matrix keypad with 8951.

Marks

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

a) Distinguish between assembly language and C language with reference to:

(i) Ease of programming

(ii) Memory requirement

(iii) Coding time

(iv) Execution time

b) Draw pin diagram of DB9 connector, stating function of each pin.

c) Draw labelled interfacing diagram of 16 × 2 LCD with 8951 and state function of RS and R/W pin.

d) A key is connected at P3.2 and 8 LEDs are connected to P_1 of 8951. Write a 'C' program to display 0 to 255 in binary on LEDs, when a key is pressed.

e) Manipulate the following table for data types used in 'C' language.

Sr. No.	Data type	Bit size	Data range
1.	Unsigned char	?	?
2.	Signed int	?	?
3.	Sbit	?	?
4.	Sfr	?	?