

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.

1. (a) Attempt any **THREE** questions.

[12]

(i) Compare assembly language and embedded C language. (Any Four)

(ii) Compare Von Neumann and Hardware architecture. (Any Four)

(iii) List the software development tools in an embedded system and state the function of compiler and debugger.

(iv) Draw interfacing diagram of 4×4 matrix keyboard with 89C51 micro controller (No program).

(v) Draw the interfacing diagram of 16×2 LCD display with 89C51 and state the function of

(1) RS

(2) EN

(3) R/W

1. (b) Attempt any **ONE** questions.

[6]

(i) Describe any 6 design metrics of an embedded system. List any 3 applications of an embedded system.

(ii) State different scheduling algorithms of RTOS and describe Round Robin scheduling algorithm.

(iii) Draw and explain different hardware units of an embedded system.

2. Attempt any **FOUR** questions.

[16]

(a) Draw the architecture of 89C51.

(b) Define the semaphore and deadlock

(c) State any two features of IDE and ICE.

(d) Write 89C51 'C' language program to toggle all bits of port P2 continuously with 500 ms delay.

(e) Draw and describe architecture of RTOS.

(f) Draw interfacing diagram of LCD with microcontroller 89C51.

3. Attempt any **FOUR** questions.

[16]

(a) Draw and describe the RS 232 interface with 8051 using Max232C.

(b) Give the classification of embedded system.

(c) Write 89C51 'C' Program to transfer the message "MSBTE" serially at 4800 baud rate continuously. Use 8 bit data and 1 stop bit.

(d) Write C language program to rotate stepper motor by 90 degree clockwise. Assume step angle is 1.8 degree and 4 step sequence.

(e) Differentiate between CAN with I2C protocols with respective to

(1) Data transfer rate

(2) Number of fields

(3) Addressing bit

(4) Application

(f) List the Parallel Communication Protocol and describe any one.

4. (a) Attempt any **THREE** questions.

[12]

(i) Find the content of Accumulator after execution of the following code

(1) $ACC = 0 \times 94 \gg 5;$

(2) $ACC = 0 \times 5A \ll 2$

- (ii) Write any four features of RTOS.
- (iii) State any four features of USB serial communication protocol.
- (iv) Differentiate RTOS with desktop operating system. (Any four points).

(b) Attempt any **ONE** questions. [6]

- (i) Draw the interfacing of key and LED to 89C51 microcontroller pins P1.0 and P2.0 respectively. Write C language program to read the status of key and display it on LED.
(Key open = LED OFF and key closed = LED ON)
- (ii) Write C language program to generate a square wave of 2 KHz frequency on P1.1 pin by using timer 0 and mode 1. Assume XTAL frequency is 11.0592 MHz.
- (iii) Draw and explain different hardware units of an embedded system.

5. Attempt any **FOUR** questions. [16]

- (a) How the assembly language instruction is used in C language Program.
- (b) Describe hard and soft real time operating system with example.
- (c) Describe following wireless communication protocols:
 - (i) IrDA
 - (ii) WiFi
- (d) Write 'C' language program to check bit P1.2. If it is high send 55 H to P0, otherwise send AAH to P2.
- (e) Write 'C' language program to mask the lower 4 bits of port P₀ and upper 4 bits of port P₂ using logical operator.
- (f) Define embedded system. List any two advantages and disadvantages of embedded system.

6. Attempt any **FOUR** questions. [16]

- (a) List Date types used in 'C' with their values.
- (b) Describe parallel protocols PCI, PCI-X.
- (c) Draw the format of SCON register and explain all the bits.
- (d) Draw the frame format of I²C and explain each field in brief.
- (e) Explain inter-task communication with reference to RTOS.
- (f) Describe the CAN bus protocol with neat diagram.



Paper Discussion Schedule for: T.Y. Diploma Sem. VI

Date	Day	Timing	Centre
14 April 2018	Saturday	8 a.m. to 10 a.m.	Dadar
14 April 2018	Saturday	11 a.m. to 1 p.m.	Thane