T.Y. Diploma : Sem. VI
[ET/EJ/EN/EX]

Embedded Systems

Prelim Question Paper

Time: 3 Hrs.] **[Marks : 100**

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.

1. Attempt any **FIVE** of the following : **[20]**

(a) Compare assembly language and embedded C language.
(b) Describe the CAN protocol with neat diagram.
(c) List the Parallel Communication Protocol and describe any one.
(d) Differentiate RTOS with desktop operating system. (Any four points).
(e) Draw the interfacing of 8 × 8 matrix keyboard with 89C51 microcontroller.
(f) State any 4 features of IDE and ICE.
(g) Describe program down loading tool ISP / IAP.

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

(a) State any four design metrics of an embedded system.
(b) Interface 4×4 matrix key pad to 8051 and write the C language program to send the key code on any port.
(c) Define multitasking. Describe the process of multitasking with suitable example.
(d) Find the contents of port after execution of the following code.
(i) P2 = ~ 0 × FF
(ii) ACC = ACC & 0 × 00
(e) How the assembly language instruction is used in C language Program.
(f) Draw and describe the RS 232 interface with 8051 using Max232C.

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

(a) Write 89C51 'C' Program to transfer the message "MSBTE" serially at 4800 baud rate continuously. Use 8 bit data and 1 stop bit.
(b) Draw the interfacing of relay with 89C51 microcontroller. Write C language program to make relay ON/OFF after certain delay.
(c) Write 89C51 'C' Program to toggle bit of P1.5 continuously with a 250 ms. Use the timer interrupt delay.
(d) Interface the DC motor to microcontroller and write the C program to drive the motor.
(e) Define the semaphore and deadlock
(f) Write C language program to rotate stepper motor by 90 degree clockwise. Assume step angle is 1.8 degree and 4 step sequence.

4. Attempt any **THREE** of the following : **[12]**

(a) Write 'C' language program to generate triangular waveform continuously using DAC0808. The digital input is applied through Port P1. Also draw interfacing diagram.
(b) Draw the interfacing of LCD display to 89C51 microcontroller and describe the function of RS and RW pins.
(c) 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)
(d) 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.
(e) List the scheduling algorithm or RTOS. Describe any one scheduling algorithm in brief.
(f) Write C language program to read P1 and store the one's complement of P1 to P2.

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

(a) Draw the frame format of I^2C and explain each field in brief.

(b) List any four software development tools used in an embedded system and state the function of each.

(c) Draw block diagram of embedded system and describe any four hardware units of embedded system.

(d) Find the contents of port after execution of following code:
(i) P2 = 0 × 7 4 >> 3; (ii) P3 = 0 × 0 4 | 0 × 6 8;

(e) Explain inter–task communication with reference to RTOS.

(f) Define embedded system. List any two advantages and disadvantages of embedded system.

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

(a) List four features of each of the following.
(i) Bluetooth (ii) Zighee

(b) Draw the format of SCON register and explain all the bits.

(c) State any four data types used in Embedded C, with their value range.

(d) State the methods of task synchronization. Describe Semaphore with suitable example.

(e) Differentiate between CAN with I2C protocols with respective to
(i) Data transfer rate (i) Number of fields
(iii) Addressing bit (iv) Application

(f) What do you mean by starvation?

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

Date	Day	Timing	Centre
9 April 2017	Sunday	9 a.m. to 11 a.m.	Dadar, Nerul
9 April 2017	Sunday	12 p.m.to 2 p.m.	Thane

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