**Unit III**

**Timer Programming, Serial Port Programming, Interfacing LCD, DAC and Sensor**

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| 1 | Name the timer/ counter available in 8051. Explain the working of the timer/ counter in brief. |
| 2 | Which are the different Special Function Registers associated with Timer/ Counter operation. |
| 3 | With a neat diagram explain each bit of TMOD register. |
| 4 | Indicate which mode and which timer are selected for each of the following.   1. TMOD= 0x10 2. TMOD= 0x01 3. TMOD= 0x11 4. TMOD= 0x20 5. TMOD= 0x02 |
| 5 | Find the timer’s clock frequency and time period for the following XTAL frequencies:   1. 11.0592 MHz 2. 16 MHz |
| 6 | Load TMOD with appropriate value to configure:   1. Timer 0 in Mode 0 2. Timer 1 in Mode 0 3. Timer 0 in Mode 0, Timer 1 in Mode 0 4. Timer 0 in Mode 0, Timer 1 in Mode 1 5. Timer 0 in Mode 0, Timer 1 in Mode 2 6. Timer 0 in Mode 1, Timer 1 in Mode 2 7. Timer 0 in Mode 1, Timer 1 in Mode 2 8. Timer 0 in Mode 1, Timer 1 in Mode 2 9. Timer 0 in Mode 2, Timer 1 in Mode 2 10. Timer 0 in Mode 2, Timer 1 in Mode 2 11. Timer 0 in Mode 2, Timer 1 in Mode 2 |
| 7 | Write an 8051 C program to toggle only bit P1.5 continuously every 50 ms. Use Timer 0, mode 1 (16-bit) to create the delay. |
| 8 | Write an 8051 C program to toggle only pin P1.5 continuously every 250 ms. Use Timer 0, mode 2 (8-bit auto-reload) to create the delay. |
| 9 | Assume that a 1-Hz external clock is being fed into pin T1 (P3.5).Write a C program for counter 1 in mode 2 (8-bit auto reload) to count up and display the state of the TL1 count on P1. Start the count at 0H. |
| 10 | Assume that a 1-Hz external clock is being fed into pin T0 (P3.4). Write a C program for counter 1 in mode 1 (16-bit) to count the pulses and display the state of the TH0 and TL0 registers on P2 and P1,respectively. |
| 11 | Explain each bit of SCON register. |
| 12 | List out the steps in programming the 8051 to transfer character bytes serially. |
| 13 | List out the steps in programming the 8051 to receive character bytes serially. |
| 14 | Write an 8051 C program to transfer the message “YES” serially at 9600 baud, 8-bit data, 1 stop bit. Do this continuously. |
| 15 | Program the 8051 in C to receive bytes of data serially and put them in P1. Set the baud rate at 4800, 8-bit data, and 1 stop bit. |
| 16 | Interface DAC 0800 with 8051 Microcontroller and develop an Embedded ‘C’ program to generate the rectangular waveform with 65% duty cycle on P0. Assume XTAL= 11.0592 MHz and T=100ms. |
| 17 | Define IoT & explain its characteristics.  Ans-  According to the definition of IoT, It is the way to interconnection with the help of the internet devices that can be embedded to implement the functionality in everyday objects by enabling them to send and receive data. |
| 18 | Explain in detail a generic block diagram of an IoT Device.  Physical Design of IoT - IoTbyHVM - Bits & Bytes of IoT |
| 19 | Describe an example of IoT Service that uses Publish-Subscribe communication model. |
| 20 | Describe an example of IoT Service that uses Request Response communication model |
| 21 | Briefly explain all the six IoT levels. |
| 22 | Illustrate the Home Automation IoT application w.r.t. Level-1 Deployment model |
| 23 | Illustrate the weather monitoring IoT application w.r.t . suitable Deployment level |