Name: _____**Key**_____   *ID #:* _____

Time: 20 Min.   **Marks:** Maximum: 24   Obtained:

*Each question carries **2** points except the last question.*

Q.1 Why 8051 microcontroller cannot be connected directly to RS232?

Due to voltage differences of logic 0 and logic 1 between 8051 microcontroller (TTL/CMOS) and RS232.

Q.2 What would happen if **REN** bit is not set high in serial communication?

Microcontroller will not receive anything serially. It will be like write-protect.

Q.3 Due to which hardware the full-duplex operation in 8051 microcontroller becomes possible?

Due to TWO physical SBUF registers.

Q.4 Assume if **External 1 interrupt (X1)** and **Timer 1 interrupt (T1)** are changed to high level priority levels and all others kept at low level. If the interrupts X0 **(External 0 interrupt)**, X1, and T1 occur at the same time, which interrupt will be serviced?

X1

Q.5 **Put a ✓ in ❑ of the correct answer:**

TI will be set when SBUF   ❑✓ Empty   ❑ Full
RI will be set when SBUF   ❑ Empty   ❑✓ Full

Q.6 Draw the 9-bit UART frame with the proper labeling and values (if fixed)?

Start bit 0	D0	D1	D2	D3	D4	D5	D6	D7	9TH bit	Stop bit 1

Q.7 Why 12 MHz crystal is not suitable for serial communication in 8051 microcontroller?

12MHz crystal gives rounding error with the higher baud rates. While more than 5% is not acceptable for successful communication.

Q.8 What is the importance of Baud rate?

Baud rate is the frequency of serial port operation. If it is not same at the both ends (receiver and transmitter), successful communication is not possible,

Q.9 If an interrupt occurs while the execution of main program, what value will be loaded into the PC register?

The vector address of that interrupt.

Q.10 Following is the formula for determining the baud rate in the modes where the variable baud rate is required

$$BAUD\ RATE = TIMER\ 1\ OVERFLOW\ RATE \div 32$$

Using the formula, calculate the TIMER 1 overflow rate, when BAUD RATE = 900bps. What value should be loaded in TH1 assuming that the crystal is of 12 MHz. (Show all the calculations.)   (6 Points)

900 = TIMER 1 OVERFLOW RATE ÷ 32
TIMER 1 OVERFLOW RATE = 900 x 32 = 28800 = 28.8KHz
Overflow required every 1000 KHz = 1000/ 28.8 ~ 35 clocks
So TH1 should be loaded with -35 or 23H.