

Key _____

Frequency _____ Hz

Clock Frequency: 8MHz, 10MHz, 16MHz, 20MHz

Timer: T0, T1, T2, Custom _____ (default 12 bits)

IMPOTANT: Please read before you begin:

1. Unless otherwise directed (see question 8), please provide base 10 answers using decimal notation (no powers of 2 or fractions $1/3$). If not a whole number, you can limit written answers to **three places past the decimal point**. Please round up or down as needed (**round 5 down**). For example 62.4875 would be written as 62.487.
2. Prefix hexadecimal digits using 0x notation.
3. To avoid round-off errors later in the quiz, use the memory function on your calculator to save the answer to earlier (dependent) question.
4. Always check your answers. When possible turn your answer into a question. For example, take your answer to question 9 and convert to a decimal number, the answer to question 8, to verify that conversion is correct. Using this approach you can also verify your answers to questions 6, 4, and 7.

	Question	Answer	Units
1	How many bits is the Timer/Counter		bits
2	Assuming the counter is cleared (equal to 0), How many tics of the clock have occurred at the moment the overflow bit is set (for example for Timer 1 overflow bit is TOV1)?		tics
3	What is the period of the waveform?		msec
4	Assuming a 50% duty cycle, what delay should be programmed into the Timer/Counter?		msec
5	What clock prescalar should be selected (1, 8, 64, 256, and 1024)?		
6	Assuming this prescalar value, how many microseconds does it take for 1 tic of the clock?		μ sec
7	What is the maximum delay that can be generated by this delay?		msec
8	What whole number (positive interger) should be preloaded into the Timer/Counter register(s) to generate the desired delay in decimal?		Base 10
9	What value should be preloaded into the Timer/Counter register(s) to generate the desired delay in hexadecimal?		Base 16
10	What assemble instruction opcode mnemonic (do not include operands) would you use to load this constant into register r16?		

Show all your work here and on the back of this page.