BME 360 Biomeasurment Exam #1 (sample) Spring 2011 Name:

Open book/note. 10 points for each question (10 x 10 = 100 points).

1. ( ) Which of the following ECG leads corresponds to a vector pointing straight down on the frontal plane? (A) Lead II, (B) Lead III, (C) aVF, (D) aVL, (E) none of the above.

2. ( ) Which of the following is likely to be the cause of a premature ventricular contraction? (A) ectopic focus, (B) left bundle branch block, (C) right bundle branch block, (D) atrial fibrillation, (E) none of the above.

3. Connect each of the 5 signals of the left to the 5 frequency ranges on the right. The mapping should be one-on-one.

Diagnostic ECG	DC – 10 KHz
Monitoring ECG	0.5 Hz – 40 Hz
EEG	0.1 Hz – 100 Hz
EMG	25 Hz – 5 KHz
Neuronal action potentials	0.05 Hz – 150 Hz

4. Connect each of the 5 physiological events of the heart on the left to the 5 signals on the right. The mapping should be one-on-one.

Ventricular contraction	P wave
Ventricular relaxation	QRS wave
Atrial contraction	T wave
Atrial fibrillation	broadened QRS
Bundle branch block	absence of P wave

5. ( ) Which of the following statements regarding the PIC18F452 microprocessor is <u>incorrect</u>? (A) It is a 8-bit microprocessor. (B) Its CPU architecture belongs to the Reduced Instruction Set Computer (RISC). (C) Its arrhythmic operations include integer addition and subtraction, but not multiplication or division. (D) It is equipped with RAM, EEPROM and flash memory, (E) none of the above.

6. ( ) After the execution of the *for* loop shown on the right, what is the value of *count*? (A) 12, (B) 15, (C) 18, (D) 21, (E) none of the above.

```
unsigned char i, count;
count = 0;
for(i=0; i<5; i++) {
    count += 3;
}
```

7. ( ) After the execution of the *while* loop shown on the right, what is the value of *count*? (A) 63, (B) 64, (C) 65, (D) 66, (E) none of the above.

```
unsigned char count;
count = 0;
while(count <= 64) {
    count += 3;
}
```

8. ( ) The decimal values for hexadecimal number D2 using the unsigned binary representation and the 2's complement representation, respectively, are: (A) 182 and 244, (B) 210 and -52, (C) 182 and -108, (D) 210 and -46, (E) none of the above.

9. ( ) The PIC processor performs the following addition: 0x6B + 0xA3 = 0x0E. After the execution, the condition codes should be: (A) CNOZ = 1000, (B) CNOZ = 1010, (C) CNOZ = 0010, (D) CNOZ = 0000, (E) none of the above.

10. ( ) Timer 0 of the PIC processor is driven by a 1 MHz clock. If we want to generate interrupts at an interval of 10 ms, what is the 16-bit number that should be loaded into TMR0H and TMR0L? (A) 0x2710, (B) 0xD8EF, (C) 0x1F2A, (D) 0xE0D5, (E) none of the above.