Week 5 In-Lab

BIOE 320 Systems Physiology Laboratory

Student Name: **Total Grade:**   **/25**

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Setting Up

Changing Sampling Rate

5. What are the differences between the recordings at 20 Hz and 200 Hz?

6. What criteria should be used to establish an appropriate sampling rate?

Data Analysis

Segment 1

Table 1: Time and beats per minute (BPM) for three cardiac cycles

Measurement	Cycle 1	Cycle 2	Cycle 3	Mean
Δtime (s)				
BPM				

Table 2: Characteristics of the ECG for cardiac cycle 1

ECG trace	Δtime (sec)	Δamplitude (mV)
P wave		
PR interval		
QRS complex		
T wave		
Q wave to end of T wave (*ventricular systole*)		
End of T wave to end of P wave (*ventricular diastole*)		
Peak of P wave to end P wave (*ventricular diastole*)		

3. Is there always one P wave for every QRS complex? If not, what would this signify?

4. Compare and contrast the shape (duration and amplitude) of the P and T waves. Give the mechanical and electrical reasons for the differences.

Segment 2

Table 3: Time and beats per minute (BPM) while sitting

Measurement	Cycle 1	Cycle 2	Cycle 3	Mean
Δtime (s)				
BPM				

2. Explain the observed heart rate variations in sitting up vs. supine positioning. Describe the physiological mechanisms causing these differences.

Segment 3

Table 4: Time and beats per minute (BPM) while deep breathing

Measurement	Cycle 1	Cycle 2	Cycle 3	Mean
Inspiration Δtime (s)				
BPM				
Expiration Δtime (s)				
BPM				

2. Are there differences in the cardiac cycle with the respiratory cycle (inspiration vs. expiration)? If so, what is the physiological basis for these differences?

Segment 4

Table 5: Time and beats per minute (BPM) after exercising

Measurement	Cycle 1	Cycle 2	Cycle 3	Mean
Start of recording Δtime (s)				
BPM				
End of recording Δtime (s)				
BPM				

Table 6: Characteristics of the ECG after exercising

ECG trace	Δtime (sec)
Q wave to end of T wave (*ventricular systole*)	
End of T wave to end of P wave (*ventricular diastole*)	
Peak of P wave to end P wave (*ventricular diastole*)	

2. What changes occurred in the duration of systole and diastole between resting (Table 2) and immediately after exercise? What could account for these changes?