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| yildiz teknik amblem ile ilgili görsel sonucu | **YILDIZ TECHNICAL UNIVERSITY**  **BIOMEDICAL ENGINEERING DEPARTMENT**  **BME3402- MEDICAL INSTRUMENTATION LABORATORY** |

**EXP-4 ECG & PULSE**

**NOTE: Each group must bring a tape measure with them to the laboratory (for length measurements).**

**A.** Comparison of ECG with Pulse Plethysmogram

**Table 1**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Condition** | **Selected Area** | **Measurement** | | | **Cycle I** | **Cycle 2** | **Cycle 3** | | **Mean** | |
|  | R-R Interval | **DeltaT** | CH 1 |  | |  |  |  | |
| **Arm Relaxed** | Heart Rate | **BPM** | CH 1 |  | |  |  |  | |
|  | Pulse Interval | **DeltaT** | CH 1 |  | |  |  |  | |
|  | Pulse Rate | **BPM** | CH 1 |  | |  |  |  | |
|  | R-R Interval | **DeltaT** | CH 1 |  | |  |  |  | |
| **Temp. Change** | Heart Rate | **BPM** | CH 1 |  | |  |  |  | |
|  | Pulse Interval | **DeltaT** | CH 1 |  | |  |  |  | |
|  | Pulse Rate | **BPM** | CH 1 |  | |  |  |  | |
|  | R-R Interval | **DeltaT** | CH 1 |  | |  |  |  | |
| **Arm Up** | Heart Rate | **BPM** | CH 1 |  | |  |  |  | |
|  | Pulse Interval | **DeltaT** | CH 1 |  | |  |  |  | |
|  | Pulse Rate | **BPM** | CH 1 |  | |  |  |  | |

**B.** Relative Volume Changes

**Table 2**

|  |  |  |  |
| --- | --- | --- | --- |
| **Measurement** | **Arm Resting** | **Temperature** | **Arm Up** |
| **QRS Amplitude** CH1 P-P |  |  |  |
| **Relative Pulse Amplitude (mV)** CH 40 P-P |  |  |  |

**C.** Calculation of Pulse Speed

Distance between Subject’s sternum and shoulder? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_cm

Distance between Subject’s shoulder and fingertip? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_cm

Total distance? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_cm

*Data from ‘Arm relaxed’ recording of the recording (measure with I-Beam)*

Time between R-wave and Pulse peak? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_secs

Speed?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_cm/sec

*Data from ‘Arm up’ recording of the recording (measure with I-Beam)*

Time between R-wave and Pulse peak? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_secs

Speed?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_cm/sec

**Questions**

1. Referring to data in Table 1, are the values of heart rate and pulse rate similar for each condition? Yes / No
2. Explain why the values might differ or be similar.
3. Referring to Table 2 data, how much did the amplitude of the QRS complex change between conditions?
   1. Extreme temp – Arm Resting? \_\_\_\_\_\_\_\_\_\_ mV
   2. Arm up – Arm Resting? \_\_\_\_\_\_\_\_\_\_\_\_ mV
4. Referring to Table 2 data, how much did the pulse amplitude change between arm positions?
   1. Extreme temp – Arm Resting? \_\_\_\_\_\_\_\_\_\_ mV
   2. Arm up – Arm Resting? \_\_\_\_\_\_\_\_\_\_\_\_ mV
5. Referring to Table 2 data, does the amplitude of the QRS complex change with the pulse amplitudes? Why or why not?
6. Describe one mechanism that causes changes in blood volume to your fingertip.
7. Referring to data from section Calculation of Pulse Speed of this report, how would you explain the difference in speed, if any?
8. Which components of the cardiac cycle (atrial systole and diastole, ventricular systole and diastole) are discernible in the pulse tracing?
9. Would you expect the calculated pulse wave velocities of other students to be very close if not the same as yours? Why or why not?
10. Explain any amplitude or frequency changes that occurred with arm position.