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

**EXP-2 ELECTROCARDIOGRAPHY (ECG-1)**

* **Heart Rate**

**Table 1**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Recording: Condition | **Cardiac Cycle**  **1 2 3** | | | **Mean** (calculate) |
| Supine |  |  |  |  |
| Seated |  |  |  |  |
| Start of inhale |  |  |  |  |
| Start of exhale |  |  |  |  |
| After exercise |  |  |  |  |

* **Ventricular Systole and Diastole**

**Table 2**

|  |  |  |
| --- | --- | --- |
| Condition | **Duration (ms)** | |
| **Ventricular Systole** | **Ventricular Diastole** |
| Supine |  |  |
| After exercise |  |  |

* **Components of the ECG**

**Table 3**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Condition: Supine Recording (measurements taken from 3 cardiac cycles) | | | | | | | | | |
| **ECG Component** | **Normative Values**  Based on resting heart rate 75 bpm | | **Duration (ms)** | | | | | **Amplitude (mV)** | |
| **1** | **2** | **Mean (calc)** | **1** | **2** | | **Mean (calc)** | |
| *Waves* | Dur. (sec) | Amp. (mV) |  |  |  |  |  | |  | |
| P | .07 - .18 | < .20 |  |  |  |  |  | |  | |
| QRS Complex | .06 - .12 | .10 – 1.5 |  |  |  |  |  | |  | |
| T | .10 - .25 | < .5 |  |  |  |  |  | |  | |
| *Intervals* | Duration (seconds) | |  |  |  |  | | | |
| P-R | .12 - .20 | |  |  |  |
| Q-T | .32 - .36 | |  |  |  |
| R-R | .80 | |  |  |  |
| *Segments* | Duration (seconds) | |  |  |  |
| P-R | .02 - .10 | |  |  |  |
| S-T | < .20 | |  |  |  |
| T-P | 0 - .40 | |  |  |  |

**Table 4**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Condition: After Exercise Recording (measurements taken from 1 cardiac cycle) | | | | |
| **ECG Component** | **Normative Values**  Based on resting heart rate 75 bpm | | **Duration (ms)** | **Amplitude (mV)** |
| *Waves* | Dur. (sec) | Amp. (mV) |  |  |
| P | .07 - .18 | < .20 |  |  |
| QRS Complex | .06 - .12 | .10 – 1.5 |  |  |
| T | .10 - .25 | < .5 |  |  |
| *Intervals* | Duration (seconds) | |  |  |
| P-R | .12 - .20 | |  |
| Q-T | .32 - .36 | |  |
| R-R | .80 | |  |
| *Segments* | Duration (seconds) | |  |
| P-R | .02 - .10 | |  |
| S-T | < .20 | |  |
| T-P | 0 - .40 | |  |

**Questions**

**Using data from Table 1:**

1. Explain the changes in heart rate between conditions. Describe the physiological mechanisms causing these changes.
2. Are there differences in the cardiac cycle with the respiratory cycle (“Start of inhale-exhale” data)?

**Using data from Table 2:**

1. What changes occurred in the duration of systole and diastole between resting and post-exercise?

**Using data from Tables 3 and 4:**

1. Compared to the resting state, do the durations of the ECG intervals and segments decrease during exercise? Explain
2. In order to beat, the heart needs three types of cells. Describe the cells and their function.
3. List in proper sequence, starting with the normal pacemaker, elements of the cardiac conduction system.
4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
7. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
8. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
9. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
10. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
11. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
12. Describe three cardiac effects of increased sympathetic activity, and of increased parasympathetic activity.

1. In the normal cardiac cycle, the atria contract before the ventricles. Where is this fact represented in the ECG?
2. What is meant by “AV delay” and what purpose does the delay serve?
3. What is the isoelectric line of the ECG?