GROUP NO: 1
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I. SIMPLE MUSCLE TWITCH

A. Define the following terms:

Irritability –
It is defined as the ability of a muscle to respond to stimuli. it may also be the abnormal or excessive sensitivity to stimuli. Myotatic irritabilty is theabilty of a muscle to contract in response to stimuli.

Recruitment –
It is defined as the gradual increase to a maximum in a reflex when a stimulusof unaltered intensity is prolonged. It may also be the ability to recruit additional motor units into action as the need to overcome resistance increases.

Muscle Twitch –
Muscle twitch is the fine movement of a small area of muscle or the uncontrollable twitching of a muscle group that is served by a single motor nerve fiber.

Threshold Stimulus –
Threshold stimulus is a type of stimulus that is applied to a muscle which is strong enough to allow movement or elicit a response.

Maximal Stimulus -
Maximal stimulus is just like threshold stimulus except that it is strong enough to elicit or evoke maximal response from the muscle.

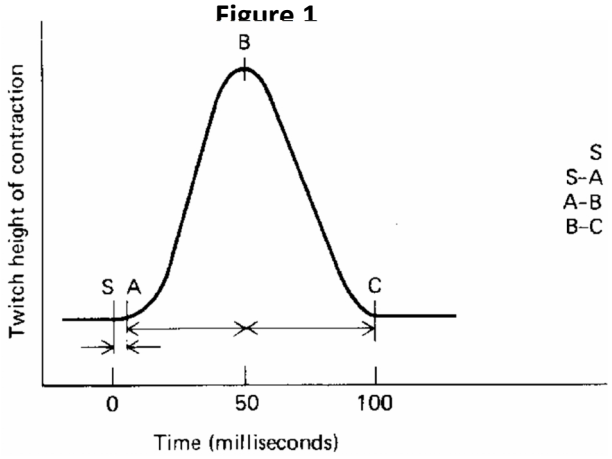
Latent Period –
The first stage in muscle twitch. It is the period between the application of stimulus and the obvious response. It may also refer to the time of delay between muscle stimulation and muscle contraction.

Contraction Period –
This is the second stage in muscle twitch. It is the period when cross bridges are active. It is when muscle fibers are generating tension which causes muscle fibers to shorten.

Relaxation Period –
The last stage in muscle twitch. it is the period when the muscle goes back to its original state of relaxation and the muscle will lengthen.

B. Label the figure below:

Figure 1



S	Stimulus
S–A	Latent Period
A–B	Contraction Period
B–C	Relaxation Period

II. SUMMATION

A. Define the following terms:

Summation –

Summation occurs when a muscle fiber is exposed to a series of stimuli with increasing frequency and intensity and is therefore unable to relax completely before the next stimulus is applied.

Absolute Refractory Period –

Absolute refractory period is a period when a nerve or muscle does not respond to stimuli especially after the first stimulus was given.

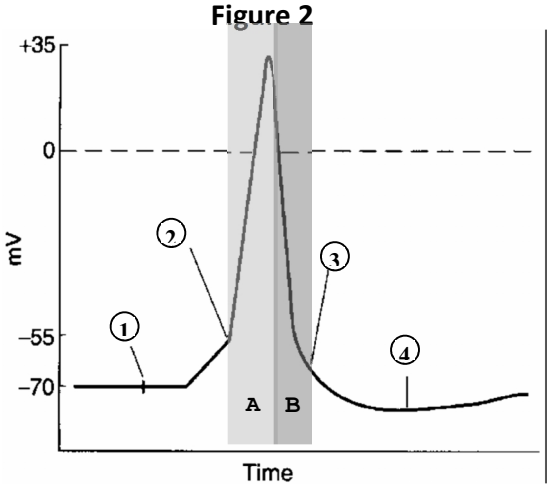
Relative Refractory Period –

Relative refractory period is a period when a nerve or muscle may respond to stimuli only if the following stimuli given is stronger than the first.

_____
_____
_____
_____

B. Label the following figure:

Figure 2



1. _____
2. _____
3. _____
4. _____
A. absolute refractory period
B. relative refractory period

C. Answer the following questions

Consider Figure 1 in the 1st part of this exercise:

1. What do you think will happen in the graph if another stimulus is applied at 70 milliseconds? Why?

if another stimulus is applied at 70milliseconds, there will be a second contraction. this is called temporal or wave summation. it occurs when another stimulus is applied before the completion of the relaxation period fron the first contraction. and the second contraction will have a higher amplitude.

2. How about at 75 milliseconds? Why?

a reponse will still be elicited due to temporal summation. the height of the second contraction will be a bit lower then when the second stimuli is applied at 70ms.

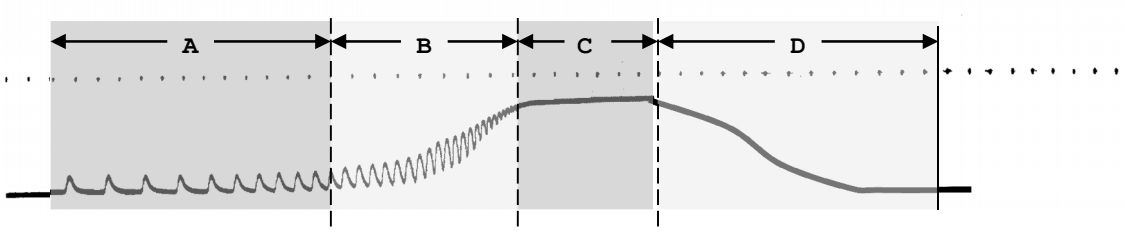
3. How about at 100 milliseconds? Why?

at 100 millisecond, a stimulus can be elicited but the amplitude of the contraxtion may be only as high as the first becase the muscle already reached the complete relaxation period where cross bridge cycling has stopped and the clcium ions from the first contraction were already transported back to the termink cisternae.

III. TETANUS AND FATIGUE

A. Label (and define) the figure below:

Figure 3



A. Treppe

treppe is defined as the occurence of of successive increase in amplitud of the first few contractions of a muscle which received a number of stimuli with the same intensity following a period of relaxation.

B. Temporal Summation

also known as wave summation which occurs when a second stimulus with the same intensity is applied to a muscle before the completion of th relaxation period of the first stimulus which results in an increased muscl tension.

C. Complete Tetanus
complete tetanus is when the frequency of stimulation becomes fast enough, the contractions fuse into a smooth continuous total contraction with no apparent relaxation. this state is due to a continual deppsition of calcium ions in the cytosol which results to the continuous exposure of the binding sites on actin.

D. Fatigue
muscle fatigue is the prolonged and strong contraction of a muscle. it is the result of the inability of the contractile and metabolic processes of muscle fibers to supply the same work output. depletion of oxygen or thw nutrient supply from the blood may also lead to complete muscle fatigue.

IV. DETERMINATION OF WORKED PERFORMED

A. Define the following terms:

1. Afterloading –
afterload is defined as the arrangement of a muscle so it lifts a weight from ar adjustable support or work against a constant opposing force to which it is no exposed when at rest. in the cardiac muscle, it is the force aginst which cardiac muscle shortens. in isolated muscle, the force which resists shortenin after the muscle is stimulated to contract. in the intact heart, it is the pressure against which the ventricle ejects blood.

2. Pre-Loading –
preloading is defined as the load to which a muscle is subjected before shortening. in cardiac muscle, it is the mechanical state of the heart atthe end of diastole. it is te magnitude of the maximal ventricular volume or the end-diastolic pressure stretching the ventricles.

B. Answer the following questions:

1. Which muscle conformation will more likely contract, the stretched or the unstretched? Why do you think so?

the stretced muscle is more likely to contract because it is already stretched. it needs to return to its original length.

2. If you pre-load a gastrocnemius muscle preparation of an average 500g-toad with about 50g of weight and give it a threshold stimulus, will the muscle contract or not? Why or why not?