Virtual Lab: Frog Muscle Physiology

Go to http://highered.mcgraw-hill.com/sites/0035456775/student_view0/virtual_labs.html
Select "Ch. 39- Muscle Stimulation" then select "Laboratory Exercise"
Follow the scrolling lab procedure on the left of the page.
Record your data and answer the questions below:

Table I: Threshold Stimulus (V)

Load	Lower Forelimb Muscle	Upper Forelimb Muscle	Calf Muscle	Thigh Muscle
0g				
5g				
10g				
20g				
40g				
80g				

Based on the results of your investigation, what conclusions can you draw about the relationship between a muscle's workload and its threshold of stimulation?

Why would a muscle's threshold of stimulation change as its workload changes?

Which muscles were able to contract under the greatest loads? What does this suggest about the role these muscles play in frog movement?

Describe an experiment you might perform to determine which leg muscles of a frog are important for jumping long distances.

Post-laboratory Questions:

1. Smooth muscle:
   a. Is voluntary
   b. Is found in the heart
   c. Is found in lining the intestines
   d. All of the above

2. Skeletal muscle:
   a. Is involuntary
   b. Is made up of muscle fibers
   c. Is attached to bone via ligaments
   d. All of the above

3. In skeletal muscle:
   a. The greater the number of muscle fibers responding to a stimulus, the greater the strength of the contraction
   b. the fewer the number of muscle fibers responding to a stimulus, the greater the strength of the contraction
   c. the actual number of muscle fibers responding to a stimulus has no effect on the strength of the contraction

4. An oscilloscope:
   a. Provides stimulus to a tested muscle
   b. Adds weight (load) to a tested muscle
   c. Measures a twitch response of a tested muscle
   d. A and C
   e. All of the above

5. At the point of muscle overload:
   a. Skeletal muscle contracts steadily (tetany)
   b. Skeletal muscle contracts and relaxes repeatedly
   c. Skeletal muscle does not contract at all

6. A skeletal muscle's "threshold of stimulation":
   a. Is determined by the lowest voltage stimulus needed to elicit a muscle twitch
   b. Varies with muscle type
   c. Is not altered by the application of muscle load
   d. B and C

7. In response to a stimulus, skeletal muscle fibers:
   a. Always contract to 25% of their potential ability
   b. Always contract to 50% of their potential ability
   c. Always contract 100% of their potential ability
   d. None of the above

8. Based upon your experimental data, which muscle type exhibited the lowest threshold of stimulation in all conditions tested?
   a. Lower forelimb muscle
   b. Upper forelimb muscle
   c. Calf muscle
   d. Thigh muscle

9. Based upon your experimental data, which muscle type(s) did not reach the point of muscle overload?
   a. Lower forelimb muscle
   b. Upper forelimb muscle
   c. Calf muscle
   d. Thigh muscle

10. Based upon your experimental data, which muscle tested appears most capable to provide the contraction strength needed for a frog to jump?
   a. Lower forelimb muscle
   b. Upper forelimb muscle
   c. Calf muscle
   d. Thigh muscle