Copy of Exam 2 for printing - Results

Exit Preview

Attempt 1 of 2

Written Feb 28, 2024 10:05 AM - Feb 28, 2024 10:05 AM

Attempt Score **0 / 53 - 0 %**

Question 1

strain is

- ◯ the relative force resisting deformation of a material due to an external load on the material
- ◯ the relative amount of deformation of a material
- ◯ the amount a material that can stretch before it breaks
- ◯ the force applied to a material
- ◯ the amount of energy that can be absorbed by a material before it breaks

Question 2

The cells that secrete osteoid into the ECM are

- osteoclasts
- fibroblasts
- osteocytes
- osteoblasts
- chondrocytes

Question 3

I've just contracted my biceps muscle to lift my coffee mug to my mouth. I want the biceps tendon that transmits the force from the muscle to my radius with little deformation and loss of energy. I want this tendon to be

- compliant in tension
- extensible in tension
- stiff in tension
- tough in tension
- strong in tension

Question 4

Storing and retrieving new memories is a major function of

- premotor cortex
- limbic structures
- somatosensory cortex
- prefrontal cortex
- Wernicke's area

Question 5

The part of the brain with a major role in planning and decision making is

- cerebellum
- basal nuclei
- occipital cortex
- diencephalon
- prefrontal cortex

Question 6

nociception refers to the system of receptors that send information to the brain and reconstructs this information as

- light
- position of limbs in space
- pain
- acceleration
- touch

Question 7

which equation is a measure of stiffness?

$$stress_{max}$$

$$\frac{\ell_{max} - \ell_0}{\ell_0}$$

$$\frac{F}{A}$$

$$\frac{1}{2} stress_{max} \cdot strain_{max}$$

$$\frac{\Delta stress}{\Delta strain}$$

Question 8

Strength training stimulates muscles to grow stronger by

- conversion of adipose cells to muscle cells, which increases the density of cells that can contract and generate active force.
- mitochondrial division (biogenesis) - the increased mitochondrial count increases the ATP available for crossbridge cycling.
- conversion of type I muscle fibers to type II muscle fibers, which increases the density of the "high power" fiber type
- muscle fiber hypertropy -- muscle satellite cells fuse to mature cells and donate their nucleus - the duplicate DNA increases the amount of contractile protein that can be synthesized
- muscle cell division. The increased cell count increases the number of fibers that contribute to whole muscle force

Question 9

What is incorrect in this definition of a cranial fontanel from https://www.medicinenet.com/fontanel_fontanelle/definition.htm: "The medical term fontanel is a 'soft spot' of the skull. The soft spot is soft precisely because the cartilage there has not yet hardened into bone between the skull bones."

- the soft spot hardens into calcifed cartilage, not bone
- the soft spot is called an ossification center, not a "fontanel"
- the soft spot never hardens
- the soft spot occurs in the middle of a bone, not in between bones
- the soft spot is composed of dense connective tissue, not cartilage

Question 10

Type I fibers express a different myosin isoform than Type II fibers. What

does **isoform** mean

- the myosin tails
- a bundle of myosin proteins
- versions of the same protein, but with slightly different amino-acid sequence due to being encoded by a different gene
- the instructions for how to make a myosin protein
- the myosin heads

Question 11

Textbooks chapters on the Respiratory System cover Lung Compliance, an important measure of lung function. Lung compliance is

$$\frac{\Delta Volume}{\Delta Pressure}$$

which is equivalent to what using the concept of a stress-strain curve?

$$\frac{\Delta stress}{\Delta strain}$$

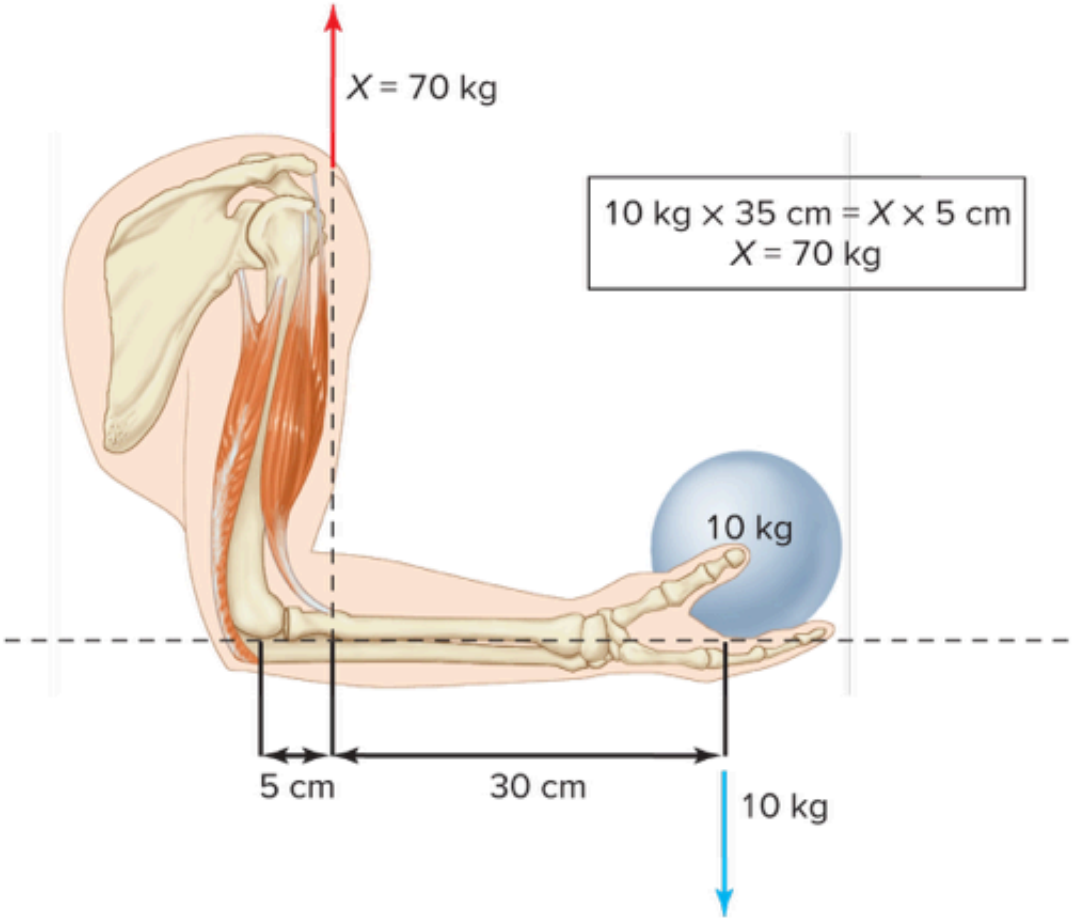
$$\frac{\Delta strain}{\Delta stress}$$

$$\Delta stress \Delta strain$$

$$\frac{1}{\Delta strain}$$

$$\frac{1}{\Delta stress}$$

Question 12



in this image from your textbook, the principal learning outcome is

- our muscles have to generate much more force than the weight of an object, if we want to lift the object
- the weight of the ball is 10 kg
- the biceps brachii muscle is used to lift heavy balls in our hands
- our muscles are geared in a way that we can lift much more weight than the maximum contractile force of our muscles
- our biceps brachii can contract with a maximum force of 70 kg.

Question 13

The cranial nerves of the embryonic pharyngeal arches are

- Pharyngeal N of the Maxillary, Pharyngeal N of the Vagus
- Accessory, Hypoglossal
- Opthalmic, Maxillary, Mandibular branches of the Trigeminal
- Trigeminal, Facial, Glossopharyngeal, Vagus
- Oculomotor, Trochlear, Abducens nerves

Question 14

motor neuron axons exit the spinal cord in the

- ventral ramus
- ventral root
- dorsal root ganglion
- dorsal root
- ascending tract

Question 15

water, ground substance, mineral, and protein are the major components of

- the plasma membrane
- the cytoskeleton
- the cytoplasm
- the extracellular matrix
- the basement membrane

Question 16

The gray matter of the brain and spinal is composed of

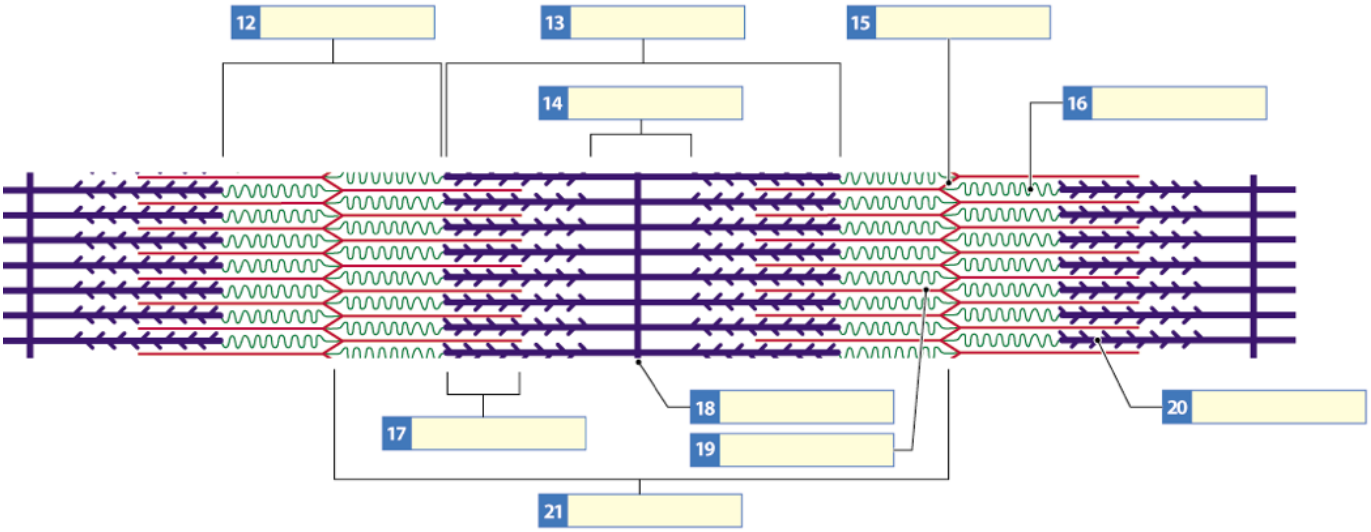
- all the glial cells of the CNS (the neurons are in the gray matter)
- clusters of neuron cell bodies
- tracts containing the axons of CNS neurons
- nerves
- adipose cells

Question 17

The cone cells that sense specific wavelengths of visible light are located in

- the lens of the eye
- the retina of the eye
- the iris of the eye
- the cornea of the eye
- the optic nerve

Question 18



In the image above, label 19 points to

- a sarcomere
- t-tubules
- a thick filament
- a thin filament
- the A band

Question 19

what keeps the shoulder joint stable?

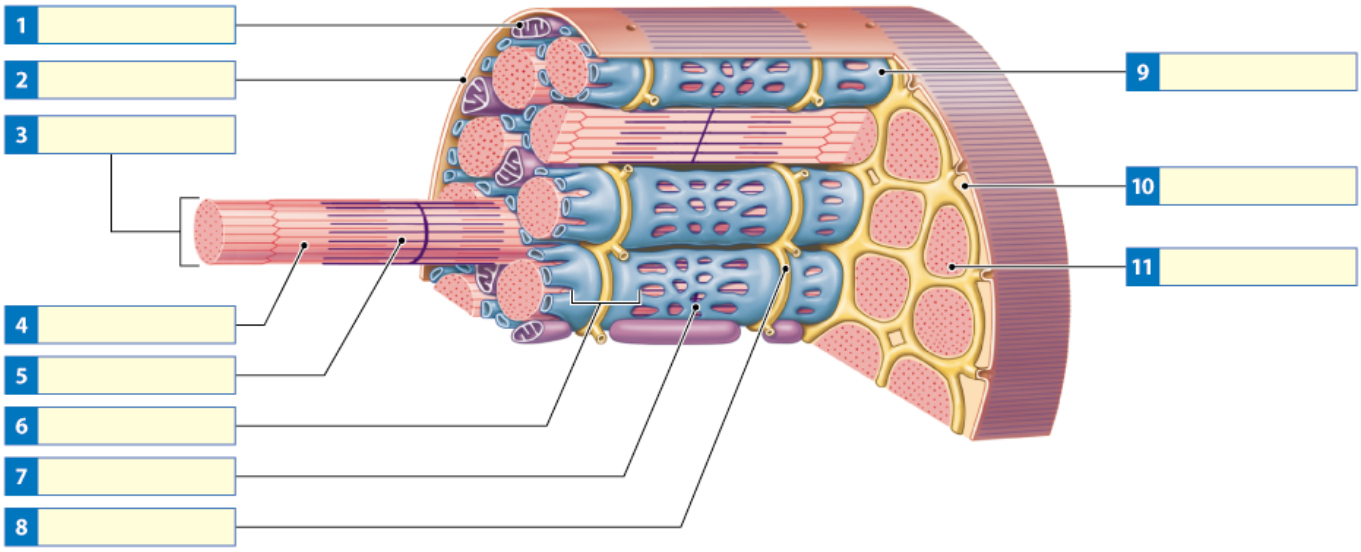
- articular shape that limits motion to the sagittal plane
- thick intracapsular ligaments
- muscle bodies that cross the joint
- ossification of the joint
- thick extracapsular ligaments

Question 20

During intense exercise,

- lactate is sufficient to cause acute muscle soreness
- lactate, drop in pH, and ATP are sufficient to cause acute muscle soreness
- lactic acid is sufficient to cause acute muscle soreness
- drop in pH and ATP are sufficient to cause acute muscle soreness
- the drop in pH is sufficient to cause acute muscle soreness

Question 21



In the image above, label 1 points to

- sarcoplasmic reticulum
- myofilament
- myofibril
- a mitochondrion
- a t-tubule

Question 22

Collagen

- is a major component of the cell wall of skeletal cells
- is a major component of the plasma membrane of skeletal cells
- is secreted into the extracellular matrix of skeletal tissue
- is inserted onto the mitochondrial membrane in skeletal cells
- is a cytoskeletal molecule in the cytoplasm of skeletal cells

Question 23

The maximum force generated by a muscle fiber is proportional to

- the cross sectional area of the myofilaments
- the number of mitochondria in the fiber
- the number of myofibrils recruited to contract in the fiber
- the total number of thick filaments in the fiber
- the length of the fiber

Question 24

The brainstem includes ALL of the following EXCEPT

- the midbrain, pons and medulla
- the thalamus
- the fourth ventricle
- nuclei of cranial nerves III through XII
- tracts passing axons between the spinal cord and forebrain

Question 25

Bones break easily in both osteogenesis imperfecta and osteoporosis, but the reason differs. Which set of material property / amount of ECM for each of the conditions correctly explains this difference?

- Osteogenesis Imperfecta: stiff material / low amount
  Osteoporosis: weak material / normal amount
- Osteogenesis Imperfecta: compliant material / normal amount
  Osteoporosis: brittle material / normal amount
- Osteogenesis Imperfecta: strong material / low amount
  Osteoporosis: compliant material / normal amount
- Osteogenesis Imperfecta: weak material / normal amount
  Osteoporosis: brittle material / low amount
- Osteogenesis Imperfecta: brittle material / normal amount
  Osteoporosis: tough material / low amount

Question 26

Compared to Type II muscle fibers, Type I muscle fibers

- have a higher density of capillaries
- are more white I color
- have less myoglobin
- are bigger in diameter
- have more myofibrils per cross section area

Question 27

The Trigeminal nerve has branches that are

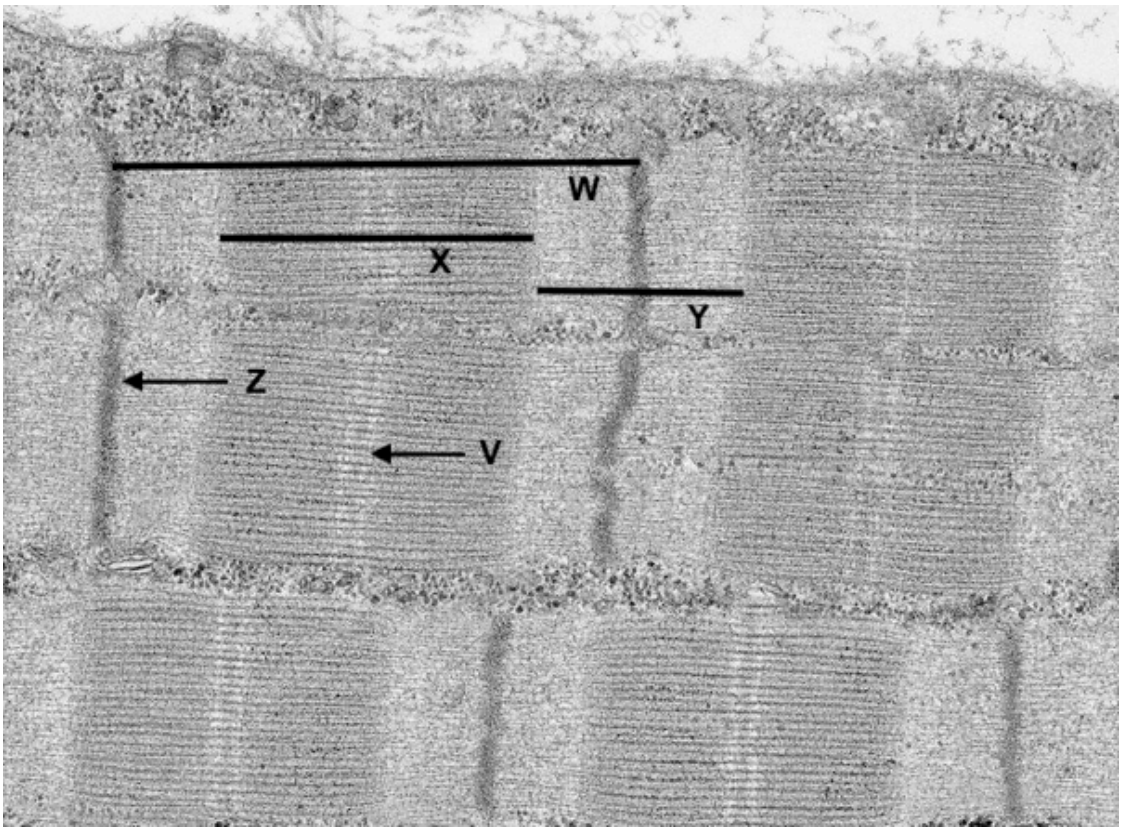
- sensory to the anterior part of the tongue and motor to the intrinsic tongue muscles
- sensory to the face and motor to the muscles of mastication
- sensory to the posterior part of the tongue and motor to the pharyngeal muscles
- sensory to the teeth and gums (but not tongue) and motor to the pharyngeal muscles
- sensory to the face and motor to the muscles of facial expression

Question 28

In excitation-contraction coupling, what couples excitation to contraction?

- hydrolysis of ATP by myosin heads
- myosin heads binding to actin
- release of Ca++ from the sarcoplasmic reticulum and the binding of this Ca++ to troponin
- the action potential traveling along the plasma membrane and t-tubules
- acetylcholine binding to ligand-gated Na+ channels on the motor endplate

Question 29



In muscle contraction (using the image above),

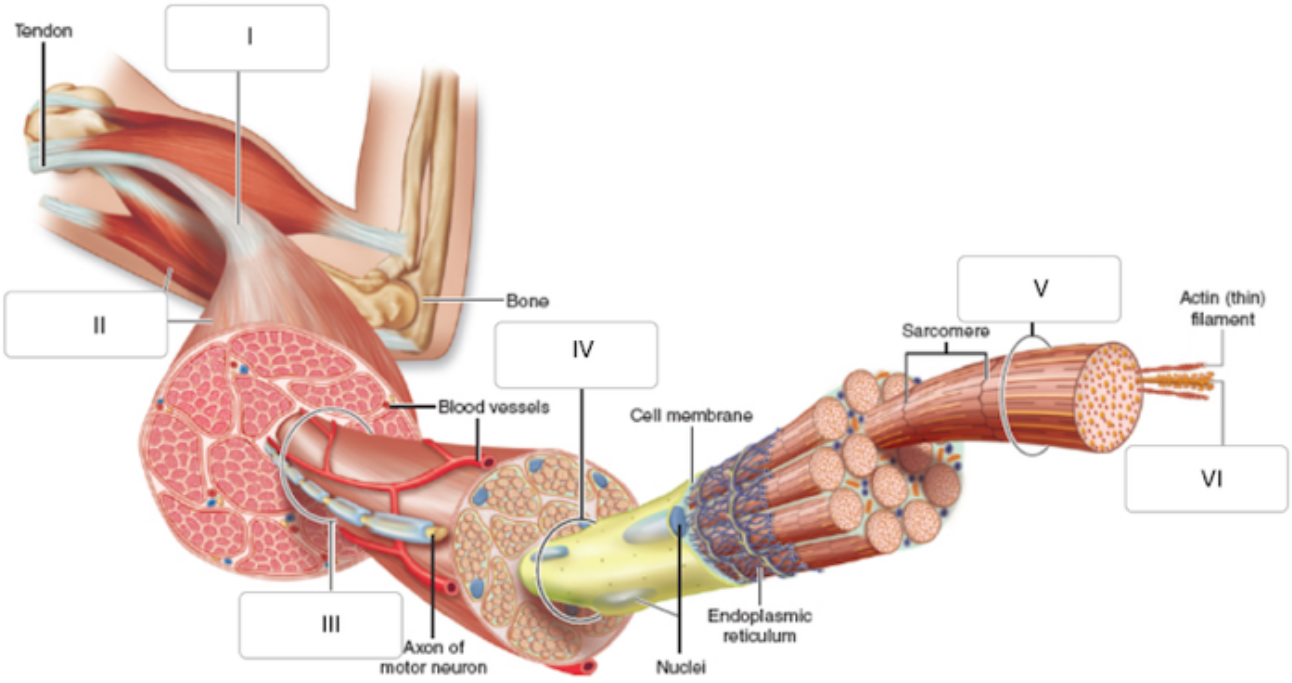
- the Z on each side of W is pulled toward V
- The structure labeled X splits at V, with everything to the left of V sliding to the left, and everything on the right of V sliding to the right
- The width of X shortens
- the width of X lengthens
- the width of Y lengthens

Question 30

how many senses do humans have?

- more than 5
- five

Question 31

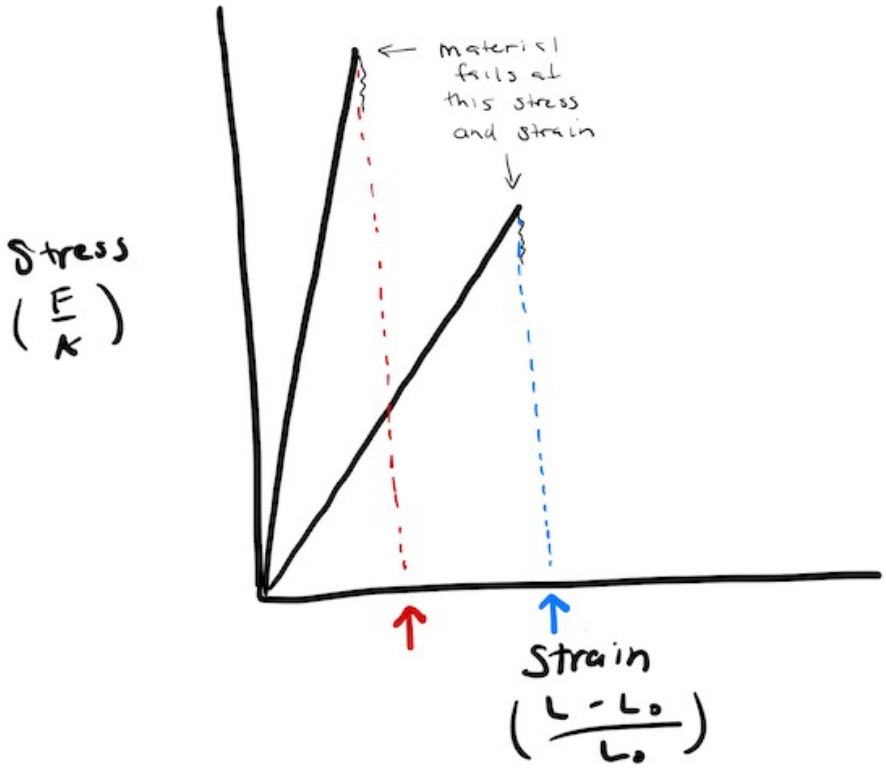


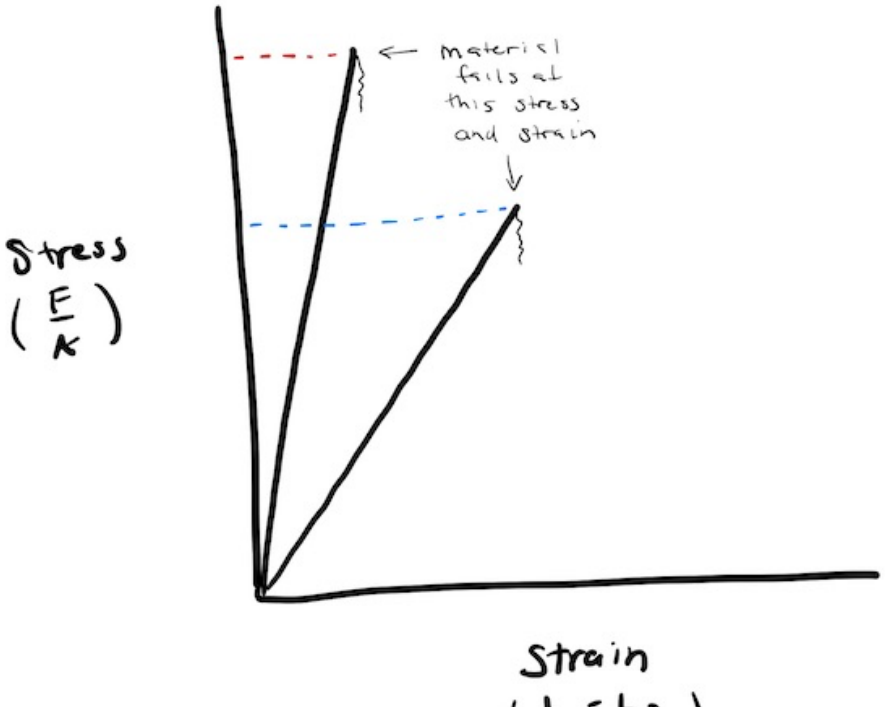
In the image above, the structure labeled "II" is a

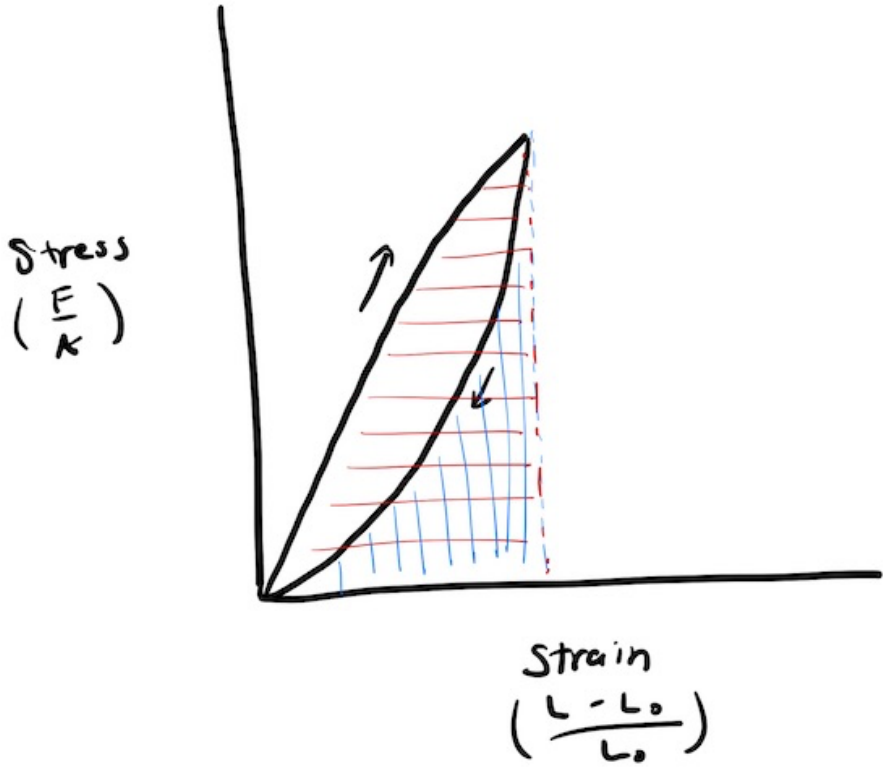
- muscle
- tendon
- myofibril
- thick filament
- fiber

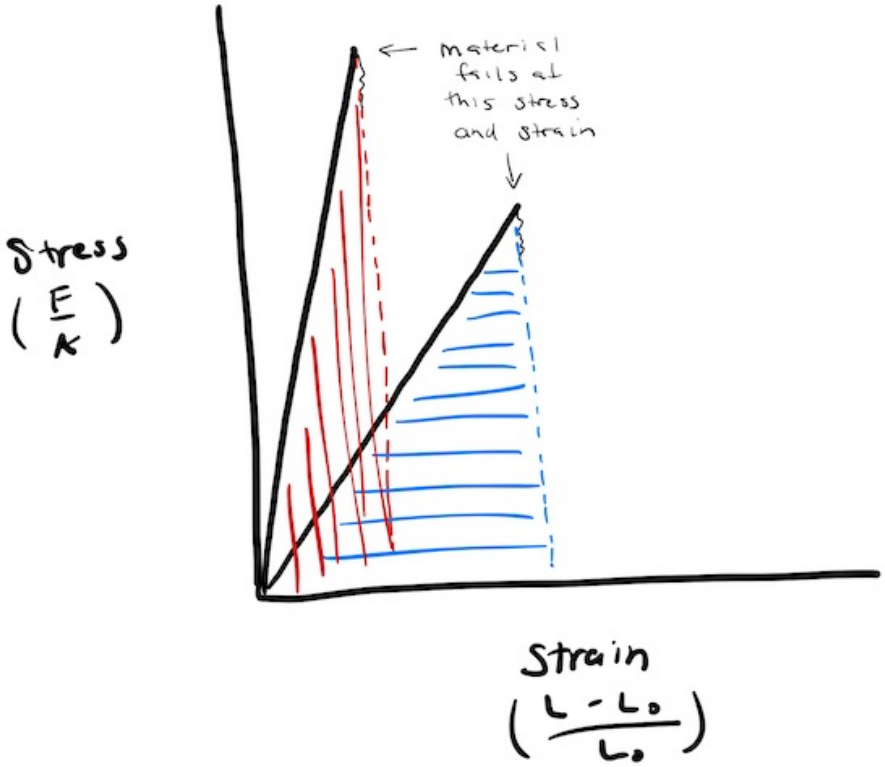
Question 32

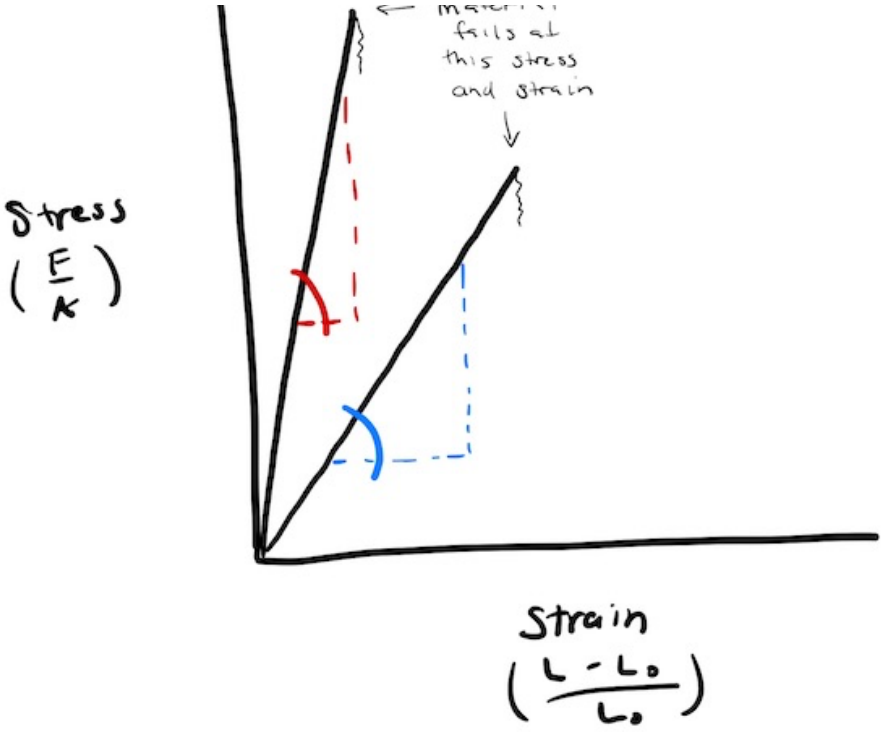
Ligaments of our foot and tendons in our calf store and release elastic strain energy, which reduces the energy that we need from our muscles to walk and run. The red and blue colors capture the property of elastic energy storage and release in which image?






Stress
(F/A)
Strain
((L - L0)/L0)


material fails at this stress and strain
Stress
(F/A)
Strain
((L - L0)/L0)



Question 33

In long bone growth, what hormone signals the stopping of cell division and the ossification of the epiphyseal plate IN FEMALES?

- cortisol
- calcitonin
- parathyroid hormone
- testosterone
- estrogen

Question 34

This view of the brain is

- the ventral side
- the left side
- the right side
- the anterior side
- the dorsal side

Question 35

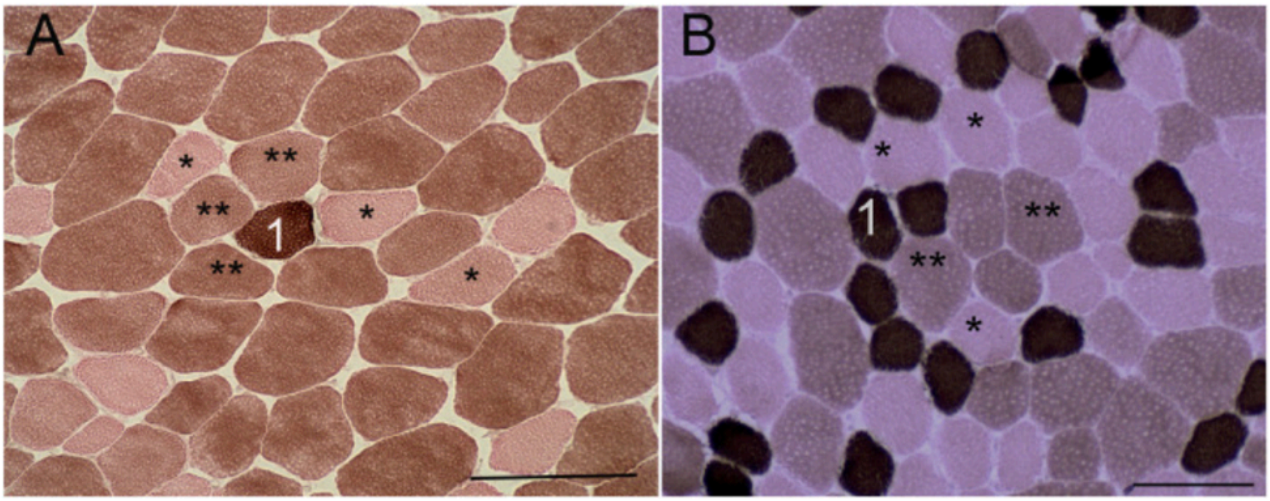


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Fig. 1. Cross section of gluteal muscle from a Quarter Horse and a Thoroughbred stained with myosin ATPase pH 4.4 and counterstained with eosin. A. The Quarter Horse has a low proportion of type 1 (1) and 2A (*) fibers and a high proportion of type 2X (**) fibers. B. The Warmblood has a high proportion of type 1 (1) and 2A (*) fibers and a low proportion of type 2X (**) fibers.

The word *fiber* in the caption above refers to labeled structures in the two images. What are these labeled structures?

- muscle fascicles
- myofibrils
- individual muscle cells
- thick filaments
- large aggregates of collagen

Question 36

Bone is tough. What does "tough" mean?

- it easily remodels
- it does not contain cavities
- it takes a large force to deform
- it can be stretched a long amount before breaking
- it takes a large amount of energy to break

Question 37

By definition, a muscle contraction

- moves the skeleton
- generates compression
- shortens the muscle
- lengthens the muscle
- generates active force

Question 38

The image above is from the Tea dance in the Nutcracker. This dancer's lower limbs are in extreme (ouch!)

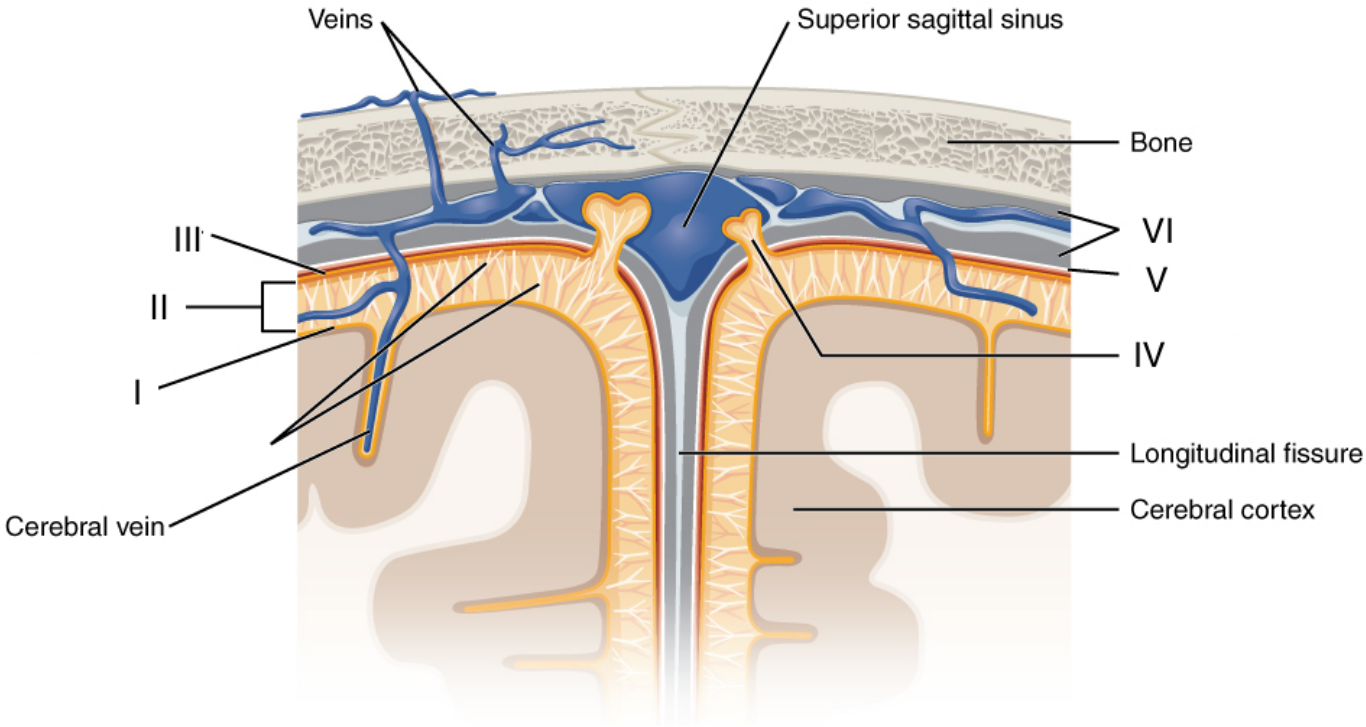
- adduction
- pronation
- abduction
- extension
- flexion

Question 39

We control muscle activity by controlling the force that the muscle generates. What is happening at the organ/cell/molecular level when we generate more force *at a specific muscle length*?

- more myofibrils within a muscle cell are activated
- more Ca++ is released into the cyoplasm of the muscle cell
- more muscle cells are excited
- the rate of crossbridge cycling is increased
- the number of myosin heads bound to actin within a muscle cell is increased

Question 40



The Subarachnoid space is labeled

- II
- V
- I
- IV
- III
- VI

Question 41

The cells that remove old bone tissue during bone remodeling are

- osteocytes
- osteoclasts
- osteoblasts
- chondrocytes
- fibroblasts

Question 42

A common exercise to strengthen the quadriceps muscle is shown in the image above. As the patient/client rises to a standing position, the quadriceps muscle undergoes

- plyometric contraction
- eccentric contraction
- isometric contraction
- acentric contraction
- concentric contraction

Question 43

The cartilaginous junction between the diaphysis and epiphysis is the

- trabeculae
- marrow cavity
- spongy bone
- epiphyseal plate
- compact bone

Question 44

a bundle of axons in the CNS is known as a

- gray matter
- nucleus
- thalamus
- ganglion
- tract

Question 45

the major cell type of the connective tissue in tendon and ligament is the

- osteoblast
- myocyte
- osteocyte
- chondrocyte
- fibroblast

Question 46

Elite sprinters have locomotory muscles that generate more power, compared to elite distance runners. All of these contibute to increased power EXCEPT

- myosin heads that pull on thin filaments with more force
- hypertrophied fibers
- higher concentration of glycolytic enzymes
- more myofibrils per cross-sectional area
- higher rate of crossbridge cycling

Question 47

the thalamus contains nuclei that function in

- the relay of sensory information from the periphery to the primary cortical areas
- the conscious processing of planning the future, deliberation, and decision making
- reflexive processing of visual and audtory stimuli and control of fundamental processes like breathing rate and heart rate
- "muscle memory" -- the creation and implementation of the muscle patterns necessary for complex motor activitates
- emotional processing, such as the response to fear

Question 48

Which of the following statements about control of skeletal muscle fiber

excitation is TRUE?

- endplate potentials from all over the fiber sum and an action potential is generated only if the sum reaches threshold potential
- a single endplate potential on a muscle fiber is typically large enough to depolarize the membrane to threshold potential and generate an action potential
- at most neuromuscular junctions, a motor neuron passes the action potential to the motor fiber using an electrical synapse
- both inhibitory and excitatory neurons synapse with muscle fibers

Question 49

Thermoceptors sense what

- force
- electrical fields
- temperature
- specific chemicals
- light

Question 50

In the context of aerobic ATP synthesis, the **major** function of the electron transport chain is to

- generate CO_2
- generate molecules that shuttle energy (in the form of electrons) to the citric acid cycle
- generate a battery composed of a proton gradient
- transfer electrons from enzyme to enzyme
- generate most of the ATP of glucose or fatty acid oxidation

Question 51

What is the primary reason a 60 year old female is at higher risk of osteoporosis than a 60 year old male?

- lower cortisol levels following menopause
- lower levels of weight bearing activty
- lower estrogen levels following menopause
- lower vitamin D in the diet
- lower levels of Calcium in the diet

Question 52

Which is FALSE about glycolysis

- glycolysis occurs in the cytoplasm
- glycolysis generates only a small amount of ATP given the amount of chemical energy in the substrate entering the reactions
- the initial substrate (fuel) for glycolysis is fat
- glycolysis oxidizes glucose to pyruvate or lactate
- glycolysis is anaerobic

Question 53

When standing, a person loads their femur in

- tension
- compression
- toughness
- stiffness
- shear

Done