COMPETIFY HUB

BIOLOGY

GRADES 1-4

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Q1: Cell Surface Area and Volume

Compared with a smaller cell, a larger cell of the same shape has: A. less surface area. B. less surface area per unit of volume. C. the same surface-area-to-volume ratio. D. a smaller cytoplasm-to-nucleus ratio.

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Q2: Enzymes & Reaction Rate

A scientist increases the temperature of a reaction catalyzed by an enzyme from 20 degrees to 50 degrees Celsius. The reaction rate increases up to 37 degrees Celsius, then decreases above that temperature. What best explains the decrease in reaction rate above 37 degrees Celsius? A. The substrate concentration decreases B. The enzyme’s active site changes shape C. The enzyme becomes saturated with substrate D. The products inhibit the enzyme

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Q3: Heart Anatomy and Physiology

How would blood flow in a normal mammalian heart? A. Left atrium, right ventricle, right atrium, left ventricle B. Right atrium, left atrium, right ventricle, left ventricle C. Right atrium, left ventricle, left atrium, right ventricle D. Right atrium, right ventricle, left atrium, left ventricle

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Q4: Hemoglobin Function

Which would likely occur if hemoglobin levels were low? A. Faster digestion B. Reduced oxygen delivery to tissues C. Increased hormone production D. Increased CO_2 removal

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Q5: Organ Systems

The hormone epinephrine increases heart rate and breathing rate. This shows interaction between which organ systems? A. Digestive and immune B. Nervous and immune C. Endocrine, circulatory, and respiratory D. Endocrine and respiratory

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Q6: Hardy-Weinberg Equilibrium

A population in Hardy-Weinberg equilibrium must have: I. Random mating II. No mutation III. Small population A. I, II B. I, II, III C. II, III D. None of the above

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Q7: Enzymes & Activation Energy

An enzyme speeds up a reaction by: A. Increasing activation energy B. Raising temperature C. Lowering activation energy D. Increasing substrate concentration

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Q8: Types of Tissues

What type of tissue is used to line organs and cavities within the body? A. Nervous tissue B. Connective tissue C. Muscle tissue D. Epithelial tissue

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Q9: Homeostasis

What are homeostatic mechanisms usually based on, and what does their response do to the stimulus? A. Homeostatic mechanisms are usually based on negative feedback; the response reduces the stimulus B. Homeostatic mechanisms are usually based on negative feedback; the response increases the stimulus C. Homeostatic mechanisms are usually based on positive feedback; the response reduces the stimulus D. Homeostatic mechanisms are usually based on positive feedback; the response increases the stimulus

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Q10: Insulin & Blood Glucose Regulation

What does the release of insulin into the blood trigger in body cells? A. Insulin triggers uptake of glucose from the blood into body cells, decreasing blood glucose concentration B. Insulin triggers uptake of glucose from the blood into body cells, increasing blood glucose concentration C. Insulin inhibits the uptake of glucose from the blood into body cells, increasing blood glucose concentration D. Insulin inhibits the uptake of glucose from the blood into body cells, decreasing blood glucose concentration

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S1: B

Explanation:

Answer – B. Correct Answer: B As a cell gets bigger, its volume increases faster than its surface area, leading to a cell with less surface area compared to its volume.

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S2: B

Explanation:

Answer – B. Correct Answer: B As temperature increases, enzymes work faster because molecules move more quickly. However, above the optimal temperature, the enzyme denatures, changing the active site's shape and stopping the substrate from binding properly. This ultimately results in the reaction rate dropping.

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S3: D

Explanation:

Answer – D. Correct Answer: D The path of blood flow throughout the heart starts in the right atrium, which takes in deoxygenated blood, which then goes through the right ventricle and to the lungs. The oxygenated blood returns to the heart into the left atrium, then moves to the left ventricle, which pumps it to the rest of the body.

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S4: B

Explanation:

Answer – B. Correct Answer: B Hemoglobin carries oxygen throughout the blood to tissues. Without it, less oxygen would be delivered to tissues.

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S5: C

Explanation:

Answer – C. Correct Answer: C Hormones are involved in the endocrine system. Heart rate is involved in the circulatory system. Breathing rate is involved in the respiratory system.

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S6: A

Explanation:

Answer – A. Correct Answer: A Hardy-Weinberg equilibrium requires five conditions: no mutations, random mating, no gene flow, large population size, and no natural selection.

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S7: C

Explanation:

Answer – C. Correct Answer: C Enzymes catalyze a reaction by lowering the activation energy needed to start a reaction, stabilizing the transition state.

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S8: D

Explanation:

Answer – D. Correct Answer: D Epithelial tissue lines the surfaces of organs and body cavities and helps with protection, absorption, and secretion.

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S9: A

Explanation:

Answer – A. Correct Answer: A Most homeostatic mechanisms in the body rely on negative feedback loops. In negative feedback loops, the body reduces the stimulus, bringing itself back to homeostasis.

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S10: A

Explanation:

Answer – A. Correct Answer: A When blood glucose levels rise, the pancreas releases insulin into the bloodstream. Insulin then binds to receptors on body cells, causing them to open glucose channels and uptake glucose from the blood. As glucose moves out of the bloodstream and into cells, the blood glucose concentration decreases.

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