

This exam consists of 50 questions over five (5) pages. Please check to see that all the pages are present before you begin. Use a #2 pencil and bubble in all answers. If you use pen, I will laugh at you! Your score will be posted on the UIC Blackboard site as soon as they are in. Good Luck!

1. Which of the following questions about science is FALSE?
 - A. Hypotheses can be tested
 - B. An experiment can prove your hypothesis to be false
 - C. Theories and hypothesis can be modified over time
 - D. Data collection is an important component of science
 - E. All of the above statements about science are TRUE**

2. Order the bonds from strongest to weakest

I. Covalent Bonds	II. Hydrogen Bonds	III. Ionic Bonds
A. I, II, III	B. I, III, II	C. II, III, I
		D. II, I, III

3. Which of the following statements about water is FALSE?
 - A. Water possesses a strong dipole with a partial positive charge on the oxygen end and a partial negative charge on the hydrogen end**
 - B. Water has strong adhesive and cohesive properties
 - C. Water has a high heat of fusion and a high heat of vaporization
 - D. Water covers about 75% of the earth's surface
 - E. All of the above statements about water are TRUE

4. Which of the following biomolecules is not a polymer?

A. Starch (polysaccharide)	B. Hemoglobin (protein)
C. Cholesterol (lipid)	D. mRNA (nucleic acid)
E. All of the above are polymers	

5. A membrane-spanning protein possesses seven alpha-helices. These alpha helices are examples of protein _____ structure.

A. Primary	B. Secondary	C. Tertiary	D. Quaternary
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6. On an RNA nucleotide, the phosphate group is bound to which carbon?

A. 2'	B. 3'	C. 4'	D. 5'
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7. Which of the following is unique to eukaryotes?

A. mRNA	B. ribosomes
C. electron transport systems	D. ATP
E. None of the above are unique to eukaryotes	

8. Which of the following would you not expect to be associated with a plasma membrane?

A. Glycoproteins	B. Phospholipids
C. Cholesterol	D. mRNA
E. All of the above are associated with the plasma membrane	

9. Mitochondria and chloroplast are thought to have arisen through

A. Infolding of the plasma membrane	B. Endosymbiosis
C. Parasitism	D. Spontaneous generation

10. Rough ER has what associated with it?
A. Ribosomes B. Proteins C. Lipid D. Peroxisomes
11. Which of the following is NOT a component of the fluid-mosaic model of the plasma membrane?
 A. The plasma membrane is composed of varying amounts of phospholipids and proteins
 B. The distribution of proteins is variable on both faces (inside and outside)
C. Phospholipids may easily move laterally and may just as easily flip-flop from inside to outside
 D. Proteins may also move laterally in the plasma membrane
 E. All of the above are components of the fluid-mosaic model of the plasma membrane
12. Solution A has 0.1 M glucose. Solution B is 0.2 M sucrose. They are separated by a semi-permeable membrane that does not allow either sugar to pass, but water may freely cross. Which of the following statements about this system is TRUE?
 A. Glucose and sucrose will cross the membranes until they are equal in concentration
 B. After the solutions come to equilibrium, there will be equal volumes of water on each side of the membrane
 C. Solution A is hypertonic to solution B
D. All of the above statements are FALSE
13. Turgor pressure is created because there is opposing forces in a plant cell - water is trying to flow in due to osmosis and the plant cell wall is resisting this flow
A. True B. False
14. Which of the below is capable of moving molecules across a plasma membrane down their concentration gradient?
 A. Diffusion B. Facilitated Diffusion
 C. Active Transport D. A & B
E. A, B, & C
15. What is the difference between Na and Na⁺
 A. The number of protons B. The number of neutrons
C. The number of electrons D. All of the above
16. Which of the following statements about the Na⁺/K⁺ pump is FALSE?
 A. ATP energy is required to pump Na⁺ out of the cell
B. The pump is a symport
 C. The configuration of the protein comprising the pump is not static - it is capable of changing its shape under certain conditions
 D. K⁺ is pumped into the cell
 E. All of the above statements about the Na⁺/K⁺ pump are TRUE.
17. Which of the following statements about enzymes is FALSE?
 A. Enzymes lower the activation energy of a reaction
 B. Enzymes are not consumed in a chemical reaction
C. Enzyme activity is not affected by their environmental conditions
 D. Enzymes are usually constructed by ribosomes
 E. All of the above statements are TRUE
18. ATP:
 A. has several high-energy phosphate bonds
 B. is used by both prokaryotes and eukaryotes
 C. is created in glycolysis
 D. A & C
E. A, B, & C

19. Feedback inhibition is a commonly used mechanism of enzyme regulation
A. True B. False
20. Which statement about the light-dependent reactions of photosynthesis is FALSE?
 A. Cyclic photophosphorylation does not produce NADPH
 B. Non-cyclic photophosphorylation utilizes both PS I and PS II
 C. A pH gradient is created in the thylakoids during both cyclic and non-cyclic photophosphorylation
 D. Electrons replacing the ones used in non-cyclic photophosphorylation are obtained from water molecules
E. All of the above statements are TRUE
21. When does photorespiration occur?
 A. When water is split to form H⁺, e⁻, and oxygen gas in the light-dependent reaction
 B. When oxygen is used in the mitochondria to break down sugars
C. When oxygen is fixed to RuBP, not carbon dioxide
 D. None of the above
22. Most of the gas exchange in a leaf takes place in the:
 A. Epidermis B. **Spongy mesophyll**
 C. Pallisade mesophyll D. Vascular tissue
 E. Respiratory tissue
23. CO₂ is produced in which of the following reaction sequences.
 I. Glycolysis II. Kreb's cycle
 III. Lactic acid fermentation IV. Alcohol fermentation
 V. Electron Transport Phosphorylation (chemiosmosis)
 A. II only B. I & II C. I, II, V **D. II, IV** E. II, IV, V
24. During electron transport phosphorylation in the mitochondria, what is the final electron acceptor?
 A. NADH B. NADPH **C. O₂** D. CO₂ E. H₂O
25. You cells can produce about how much more ATP aerobically than they do anaerobically (using lactic acid fermentation)?
 A. 2x B. 8x **C. 18x** D. 25x E. 100x
26. What stage of mitosis has all of the chromosomes lined up in the center of the cell?
 A. Interphase B. Prophase
C. Metaphase D. Anaphase
 E. Telophase
27. When does crossing over occur?
A. Prophase I B. Metaphase I
 C. Prophase II D. Metaphase II
 E. None of the above
28. After mitosis, you will have _____. After meiosis, you will have _____.
 A. Two genetically identical daughter cells; two genetically unique daughter cells
 B. Two genetically unique daughter cells; four genetically identical daughter cells
 C. Two genetically identical daughter cells; four genetically identical daughter cells
D. Two genetically identical daughter cells; four genetically unique daughter cells
 E. None of the above
29. DNA replication is
 A. Conservative B. Liberal C. Dispersive **D. Semi-conservative**

43. Deoxygenated blood first enters the heart in which chamber?
 A. Left Atrium **B. Right Atrium**
 C. Left Ventricle D. Left Ventricle
44. What are the small sacs found in the lungs where gas exchange occurs?
A. Alveoli B. Bronchioles
 C. Capillaries D. Diaphragm
45. This organ has villi and microvilli to aid in absorption of nutrients
 A. Mouth B. Stomach
C. Small Intestine D. Large Intestine
46. Why is the stomach acidic?
A. To kill bacteria B. To break down food
 C. To aid in absorption D. To break down water molecules
 E. None of the above
47. When a cell produces a hormone, releases it into the blood system, and triggers a response in an adjacent cell, we say that this is a(n):
 A. Autocrine action **B. Paracrine action** C. Endocrine action
48. Which lobe of the brain is involved in the reception and processing of sound?
 A. Frontal lobe B. Parietal lobe **C. Temporal lobe** D. Occipital lobe
49. What part of the brain has two hemispheres and is responsible for coordination of movement?
 A. Medulla Oblongata B. Pons
C. Cerebellum D. Cerebrum
 E. Hypothalamus
50. While at rest (resting potential), the inside of a neuron is _____ while the outside is _____.
 A. positive; positive **B. Positive; negative**
 C. negative; positive D. negative; negative

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51. What type of plant is least efficient in hot, dry environments
A. C3 plant B. C4 plant
 C. CAM plant D. They are all equally as efficient
52. What type of molecules carry a nervous impulse across the synaptic cleft?
A. Neurotransmitters B. Neuroconnectors
 C. Synaptozymes D. Na⁺/K⁺ pumps
53. The *lac* operon is
A. Inducible B. Repressible C. Not enough information to tell
54. When you exhale, your diaphragm is:
 A. Contracting **B. Relaxing** C. Not enough information to tell
55. Mike's father is a(n):
 A. FBI Agent **B. Engineer** C. Drag queen
 D. Chemistry professor E. Restaurant manager

