

Name _____

Multiple Choice – choose the one correct answer.

1. What comes next in the following sequence: Subatomic particles → atoms → molecules → organelles → _____
A. tissues B. cells C. organ systems D. organs E. organism
2. Fluid connective tissue
A. has a solid matrix. D. is found in between vertebrae.
B. has a watery matrix. E. is further classified as loose and dense
C. is also known as adipose tissue.
3. Which of the following is considered a “subatomic particle”?
A. molecule B. mitochondria C. epithelial tissue D. protons E. the liver
4. The chemical properties of an atom are determined by the:
A. number of protons D. number of hydrogen atoms
B. number of neutrons in the orbitals E. number of neutrons and electrons
C. number of electrons
5. Which of the following is a functional property of enzymes?
A. Enzymes raise activation energy.
B. Enzymes are consumed by the reactions they catalyze.
C. Enzymes are substrate-specific.
D. Enzymes are temperature, but **not** pH sensitive.
E. Enzymes are irreversibly inhibited.
6. Which of the following is true regarding nucleic acids?
A. DNA is single stranded and RNA is double stranded.
B. RNA contains the genetic information for the cell.
C. RNA is confined to the nucleus.
D. Uracil is one of the purines for DNA
E. Without RNA, the message of DNA cannot be translated
7. In the primary structure of a protein, the amino acids are held together by what type of bonds?
A. sulfide B. non-covalent C. ionic D. peptide E. covalent
8. Which of the following is an organic compound?
A. CO₂ B. NH₄ C. NO₂ D. H₂O E. None of these

9. Why is cartilage avascular?
- The matrix is too solid for blood vessels to grow into it
 - The perichondrium is not complete
 - Chondrocytes secrete anti-angiogenesis factor
 - It wouldn't be strong enough to perform its functions if it had blood vessels
 - All connective tissues, including cartilage, are vascular
10. A patient is admitted to the hospital, and an analysis of his blood reveals a pH of 7.25. The doctor should suggest
- nothing because this is within the normal range for physiological pH
 - administering a slightly acidic solution to raise the patient's pH.
 - administering a slightly acidic solution to lower the patient's pH.
 - administering a slightly basic solution to raise the patient's pH.
 - administering a slightly basic solution to lower the patient's pH.
11. Hydrogen bonding
- occurs between the nitrogenous bases of the DNA double helix.
 - is the weakest of the main types of bonds in the body.
 - occurs between two atoms of hydrogen
 - A and B are correct
 - All of the above are correct

Use the following information for questions 12 and 13.

A section of a strand of the DNA double helix has the base sequence: CCT-GGA-TAT-CGA.

12. What is the sequence for the complementary strand of the helix?
- | | |
|--------------------|--------------------|
| A. TTC-AAG-CGC-TAG | D. GGA-CCU-AUA-GCU |
| B. GGA-CCT-ATA-GCT | E. GGC-AAT-CTC-GAT |
| C. CCA-GGT-ATA-CGT | |
13. How many amino acids would this section code for?
- | | | | | |
|------|------|------|-------|-------|
| A. 2 | B. 4 | C. 8 | D. 12 | E. 24 |
|------|------|------|-------|-------|
14. Saturated fatty acids are
- | | |
|---|--------------------------------------|
| A. filled with double covalent bonds. | D. are found in animal products. |
| B. filled with triple covalent bonds. | E. can be mono- or poly- fatty acids |
| C. help reduce overall blood cholesterol. | |
15. The following are steps of protein synthesis.
- DNA is transcribed to mRNA
 - tRNA molecules bring amino acids to the appropriate triplets of the mRNA strand
 - mRNA molecule leaves the nucleus
 - Gene activation occurs
 - Complementary DNA strands separate
- The correct order is
- | | | | | |
|--------------|--------------|--------------|--------------|--------------|
| A. 3,4,2,1,5 | B. 4,5,1,3,2 | C. 4,3,1,2,5 | D. 1,3,5,4,2 | E. 5,4,1,3,2 |
|--------------|--------------|--------------|--------------|--------------|

16. Which of the following is a concept in the cell theory?
 A. Cells come from non-living matter
 B. Tissue is the simplest structural and functional unit of life
 C. All organisms are composed of cells
 D. The cells of all species are significantly different
 E. All of these are true
17. Osteoblasts that have become trapped in the matrix are called:
 A. osteomas B. osteoclasts C. osteocytes D. osteoglycans E. osteoprogenitor
18. Which of the following does NOT affect the rate of diffusion?
 A. molecule size D. distance
 B. temperature E. gradient size
 C. number of carrier proteins
19. In order for polysaccharides to be used by the body, which of the following must occur?
 A. Hydrolysis must occur. D. A heptose must be formed.
 B. Dehydration synthesis must occur. E. None of the above.
 C. Nothing needs to happen.
20. Synovial fluid is important for
 A. shock absorption D. protecting the ends of bones
 B. nutrient delivery E. All of the above
 C. lubrication of the joint
21. What is the main component of micelles?
 A. steroids D. disaccharides
 B. enzymes E. phospholipids
 C. saturated fatty acids

Match the following organelles with their functions:

22. ____ Golgi apparatus A. has a large surface area for more enzymatic reactions within the matrix
 23. ____ Lysosomes B. responsible for renewing or modifying the cell membrane
 24. ____ Centrioles C. provides the internal framework for strength and flexibility of the cell
 25. ____ Mitochondria D. contain digestive enzymes to “clean up” a cell or defend against a pathogen
 26. ____ Cytoskeleton E. not found in RBCs and other cells that cannot divide
27. Substances that enter or leave the body must cross a(n) _____ tissue.
 A. muscle B. nervous C. glandular D. epithelial E. connective

28. A 49 year old woman comes to the doctor's office complaining of loss of height and loose teeth. The doctor's diagnosis is
- A. the woman has osteopenia and must receive bed rest to prevent further injury
 - B. the woman has osteopenia and this is a normal part of aging
 - C. the woman has osteoporosis and should get an x-ray for possible broken limbs
 - D. the woman has rickets
 - E. the woman has a cancer that secretes osteoclast-activating factor
29. Goblet cells are
- A. endocrine glands.
 - B. unicellular glands.
 - C. multicellular glands.
 - D. technically part of connective tissue.
 - E. found only in pseudostratified columnar epithelium.
30. The cytoplasm consists of
- A. a fluid cytosol
 - B. structures called organelles
 - C. a high concentration of potassium compared with the extracellular fluid
 - D. A and B
 - E. All of the above
31. Transport of a specific molecule that is dependent on the presence of receptors on the cell membrane, the expenditure of energy, and the formation of endosomes is called
- A. diffusion
 - B. facilitated diffusion
 - C. receptor-mediated endocytosis
 - D. primary active transport
 - E. phagocytosis
32. The sternum is considered to be a(n) _____ bone.
- A. long
 - B. short
 - C. flat
 - D. irregular
 - E) sesamoid
33. Which of the following synthesize the organic matter of the bone matrix to help mineralize bone?
- A. osteogenic cells
 - B. osteoblasts
 - C. osteoclasts
 - D. osteocytes
 - E. None of these
34. The lightest element is:
- A. hydrogen
 - B. helium
 - C. oxygen
 - D. nitrogen
 - E. neon
35. The fontanelles of an infant's skull
- A. harden by means of spicules forming around blood vessels and replacing fibrous connective tissue
 - B. form the ethmoid bone
 - C. become bone by endochondral ossification
 - D. form by replacing hyaline cartilage
 - E. are also known as the alveolar margins

36. The nucleus
- A. is the control center for cellular activities
 - B. stores all the information for protein synthesis
 - C. is surrounded by a double membrane
 - D. has pores to allow communication between the nucleus and the cytoplasm
 - E. All of the above
37. Women tend to be shorter than men because
- A. men get more vitamin C in their diets
 - B. men's kidneys produce more calcitriol, which allows more calcium absorption
 - C. estrogens increase the rate of endochondral ossification faster than androgens
 - D. androgens decrease the rate of intramembranous ossification more so than estrogens
 - E. men participate in more weight-bearing exercises than women

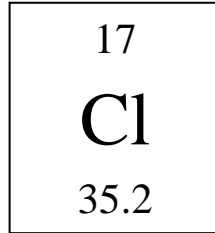
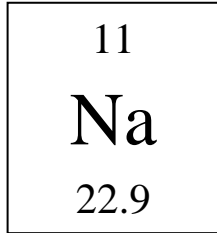
For the following questions, use these answer choices to describe what the eventual outcome will be:

- A. Blood calcium levels will increase
 - B. Blood calcium levels will decrease
 - C. Blood calcium levels will stay the same
38. Osteoclast activity increases.
39. Parathyroid hormone is released
40. Osteoblast activity increases.
41. The rate of calcium excretion by the kidneys is increased.
42. Equal amounts of parathyroid hormone and calcitonin are released.
43. Protective measures for diarthroses include
- A. casts
 - B. ligaments and fat pads
 - C. vitamin C
 - D. bed rest
 - E. circumduction
44. Ligaments
- A. heal much faster than bone
 - B. connect muscle to bone
 - C. are continuous with the perichondrium
 - D. are stretched and parts may be torn in a sprain
 - E. None of the above

Midterm - Short Answer

Name _____

45. Given the two following elements, draw a representative atom of each with the subatomic particles in their proper places. Describe the bonding these two atoms will undergo when they are put together, and explain what these atoms become after they bond. Be sure to include the numbers and charges of the subatomic particles for each atom.



46. Movement of the amino acid, alanine, into a cell occurs by secondary active cotransport with sodium. Explain how this secondary active transport works, where the energy is expended, and how the concentration gradient of sodium is maintained.