Matching Questions:

**Figure 3.1**

1) Produces ATP aerobically.
   Answer: B

2) Site of enzymatic breakdown of phagocytized material.
   Answer: C

3) Packages proteins for insertion in the cell membrane or for exocytosis.
   Answer: E

4) Site of synthesis of lipid and steroid molecules.
   Answer: A

5) Forms the mitotic spindle.
   Answer: D

6) Replicate for cell division.
   Answer: D

7) Source of cell autolysis.
   Answer: C
Figure 2.2 (which one of the above is:)

8) Thymine.
Answer: D

9) Guanine.
Answer: E

10) Hydrogen bonds.
Answer: A

11) Which of the following statements is the most correct regarding homeostatic imbalance?

A) It is considered the cause of most diseases.
B) The internal environment is becoming more stable.
C) Positive feedback mechanisms are overwhelmed.
D) Negative feedback mechanisms are functioning normally.
Answer: A
12) Select the most correct statement.

A) The immune system is closely associated with the lymphatic system.
B) Organ systems operate independently of each other to maintain life.
C) The endocrine system is not a true structural organ system.
D) Organ systems can be composed of cells or tissues, but not both.

Answer: A

Match the following chemical bonds to the correct description:

A) Ionic bond
B) Polar covalent bond
C) Hydrogen bond
D) Nonpolar covalent bond

13) A bond in which electrons are shared unequally. B

14) A bond in which electrons are completely lost or gained by the atoms involved. A

15) A bond in which electrons are shared equally. D

16) A type of bond important in tying different parts of the same molecule together into a three-dimensional structure. C

17) The anatomical position is used __________. B
A) rarely, because people don't usually assume this position
B) as a standard reference point for directional terms regardless of the actual position of the body
C) only when a body is lying down
D) as the most comfortable way to stand when dissecting a specimen

18) The genetic information is coded in DNA by the ________. B
A) regular alteration of sugar and phosphate molecules
B) sequence of the nucleotides
C) three-dimensional structure of the double helix
D) arrangement of the histones

Answer: B

19) Which of the following is not true of proteins?
A) They may be denatured or coagulated by heat or acidity.
B) Some types are called enzymes.
C) They appear to be the molecular carriers of the coded hereditary information.
D) Their function depends on the three-dimensional shape.

Answer: C

20) Carbohydrates are stored in the liver and muscles in the form of ________.
A) glucose
B) triglycerides
C) glycogen
D) cholesterol

Answer: C
21) Which of the following describes coenzymes?
A) organic molecules derived from vitamins
B) two enzymes that perform the same function
C) metal ions
D) enzymes that work together
Answer: A

22) A chemical reaction in which bonds are broken is usually associated with ________.  
A) the release of energy
B) the consumption of energy
C) a synthesis
D) forming a larger molecule  
Answer: A

23) Salts are always ________.  
A) ionic compounds
B) single covalent compounds
C) double covalent compounds
D) hydrogen bonded  
Answer: A

24) The numbers listed represent the number of electrons in the first, second, and third energy levels, respectively, of an atom or ion. On this basis, which of the following is an unstable or reactive atom?  
A) 2, 8, 8
B) 2, 8
C) 2
D) 2, 8, 1  
Answer: D

25) A solution that has a pH of 2 could best be described as being ________.  
A) acidic
B) basic
C) neutral
D) slightly acidic  
Answer: A

26) Which of the following is the major positive ion outside cells?  
A) nitrogen
B) hydrogen
C) potassium
D) sodium  
Answer: D
27) Which of the following would be regarded as an organic molecule?
A) H₂O
B) NaCl
C) NaOH
D) CH₄
Answer: D

28) What is a chain of 25 amino acids called?
A) polypeptide
B) nucleotide
C) protein
D) starch
Answer: A

29) Which of the following constitutes a long chain of simple sugars?
A) monosaccharide
B) polysaccharide
C) protein
D) nucleic acid
Answer: B

30) What level of protein synthesis is represented by the coiling of the protein chain backbone into an alpha helix?
A) primary structure
B) secondary structure
C) tertiary structure
D) quaternary structure
Answer: B

31) The chemical symbol O=O means ________.
A) zero equals zero
B) both atoms are bonded and have zero electrons in the outer orbit
C) the atoms are double bonded
D) this is an ionic bond with two shared electrons
Answer: C

32) Which of the following is not an electrolyte?
A) HCl
B) Ca₂CO₃
C) H₂O
D) NaOH
Answer: C

33) Which property of water is demonstrated when we sweat?
A) high heat capacity
B) high heat of vaporization
C) polar solvent properties
D) reactivity
E) cushioning
Answer: B
34) In a DNA molecule, the phosphate serves ________.
A) as a code
B) to hold the molecular backbone together
C) to bind the sugars to their bases
D) as nucleotides
Answer: B

35) A red blood cell placed in pure water would ________.
A) shrink
B) swell initially, then shrink as equilibrium is reached
C) neither shrinks nor swell
D) swell and burst (lyse)
Answer: D

36) Which of the following describes the plasma membrane?
A) a single-layered membrane that surrounds the nucleus of the cell
B) a double layer of protein enclosing the plasma
C) the phospholipid bilayer surrounding the cell
D) a membrane composed of tiny shelves or cristae
Answer: C

Match the following:
A) Synthetase enzymes
B) Messenger RNA (mRNA)
C) ATP
D) Ribosomal RNA (rRNA)
E) Transfer RNA (tRNA)

37) Forms part of the protein synthesis site in the cytoplasm. D

38) Act as "interpreter" molecules that recognize specific amino acids and nucleotide base sequences. E

39) Attaches the correct amino acid to its transfer RNA. A

40) Provides the energy needed for synthesis reactions. C

41) Found in the cytoplasm, this structure specifies the exact sequence of amino acids of the protein to be made. B

42) May be attached to the ER or scattered in the cytoplasm. D
Match the following:

A) Late prophase  
B) Anaphase  
C) Telophase  
D) Early prophase  
E) Metaphase  

43) Chromosomes decoil to form chromatin.  **C**  

44) Chromosomal centromeres split and chromosomes migrate to opposite ends of the cell.  **B**  

45) Nuclear membrane and nucleolus disintegrate.  **A**  

46) Chromosomes align on the spindle equator.  **E**  

47) Centrioles move to opposite ends of the cell.  **D**

Match the following:

A) Nucleus  
B) Nucleoli  
C) Microtubules  
D) Endoplasmic reticulum  
E) Ribosomes  

48) Plays a role in the synthesis of steroid-based hormones and proteins.  **D**  

49) The actual site of protein synthesis.  **E**  

50) Hollow cytoskeletal elements that act as organizers for the cytoskeleton.  **C**  

51) Dense spherical bodies in the nucleus that are the synthesis site for ribosomal RNA.  **B**  

52) Houses DNA and RNA.  **A**  

53) The RNA responsible for bringing the amino acids to the "factory" site for protein formation is ________.

A) rRNA  
B) mRNA  
C) tRNA  
D) ssRNA  
Answer  **C**  

(Extra credit: Name the site [organelle] of protein formation: **Ribosomes**)

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Figure 3.2

Using Figure 3.2, match the following:
54) Nonpolar region of phospholipid.
Answer: C

55) Glycocalyx.
Answer: A

56) Polar region of phospholipid.
Answer: B

57) Peripheral protein.
Answer: E

58) Integral protein.
Answer: D

59) Identification "tags" for the cell.
Answer: A

60) Hydrophilic portion.
Answer: B
More Matching Questions:

![Diagram of human body with labeled cavities A, B, C, D.]

**Figure 1.1**

*Using Figure 1.1, match the following cavities:*

61) Thoracic cavity.  
Answer: C

62) Cranial cavity.  
Answer: A

63) Abdominal cavity.  
Answer: D

64) Vertebral cavity.  
Answer: B
True/False Questions

65) Each daughter cell resulting from mitotic cell division has exactly as many chromosomes as the parent cell.
Answer: T

66) Apoptosis is programmed cell suicide, but cancer cells fail to undergo apoptosis.
Answer: T

67) Final preparation for cell division is made during the cell life cycle subphase called G2.
Answer: T

68) Chromatin consists of DNA and RNA.
Answer: F

69) In osmosis, movement of water occurs toward the solution with the lower solute concentration.
Answer: F

70) The genetic information is coded in DNA by the regular alternation of sugar and phosphate molecules.
Answer: F

71) A process by which large particles may be taken into the cell for food, protection of the body, or for disposing of old or dead cells is called phagocytosis.
Answer: T

72) The orderly sequence of the phases of mitosis is prophase, metaphase, anaphase, and telophase.
Answer: T “PMAT”

73) Interstitial fluid represents one type of extracellular material.
Answer: T

74) The cell (plasma) membrane normally contains substantial amounts of cholesterol.
Answer: T

Fill-in-the-Blank/Short Answer Questions

75) ________ have a bitter taste, feel slippery, and are proton acceptors.
Answer: Base

76) In a DNA molecule, guanine would connect to ________.
Answer: cytosine Diff: 1 Page Ref: 54

77) The ________ molecule directly provides energy for cellular work.
Answer: ATP
78) Starch is the stored carbohydrate in plants, while ________ is the stored carbohydrate in animals. Glycogen
Answer:

79) Name at least four things you know about enzymes. (4 points + 2 extra credit)
Answer: (Some of the primary possible answers)
1. (Nearly) all are proteins
2. There are specific binding sites for specific substrates
3. They lower activation barrier for specific rxns. (= catalysts)
4. The names end in ase
5. They can be denatured (e.g. high temperatures, low pH)
6. They can be used repeatedly (i.e., not used up in rxns.)

80) Explain the term genetic code. For what does it code? What are the letters of the code? (5 points)
The 3 nucleotide sequence that codes for a given amino acid stored in DNA. It comes from an individual’s parents. (Heredity) A, C, G, T (U in RNA)
Adenine, cytosine, guanine, thymine, (uracil)

81) Other than the nucleus, which organelle has its own DNA? Why might this be? (2 points)
The mitochondria. (OK to mention chloroplasts.) It is thought that billions of years ago, a bacterium was "engulfed" in a larger cell and became symbiotic. Eventually the mutualism became "so close" no longer separate individuals. (Evidence: the DNA & plasma membrane of mitochondria & their similarity of bacterial counterparts.)

82) Why must a normal body temperature be maintained in order for chemical reactions to be continued at life-sustaining rates? (5 points)
Enzymes function optimally in narrow temperature ranges. Esp. at high temperature, enzymes denature and cease functioning. (Too cold & biochemical rxns. may cease.) If not corrected quickly, can cause cell and even organism death.

83) What is the function of the serous membranes? (Explain how!) (4 points)
Serous membranes (or serosa) protect and cushion the internal organs they surround. Found in double layers, one along the body cavity, and the other along the organ(s). Serous fluid is in-between these layers and lubricates, preventing friction (& pain).

84) Describe two important functions of the Golgi apparatus. (2 points)
Finish synthesis of proteins, steroids, lipids (any products) from ER and package into vesicles for delivery where needed in the cell or for exocytosis. Lipids delivered for repair, replacement or extension of the plasma membrane.