Name: _____

**Anatomy Summer Assignment**
**Lindenwood College Credit**

**Chapter 2: Chemical Basis of Life**

**Complete this summer packet before the first day of class. We will discuss any questions you may have and take a test over the following material within the first few classes of the semester. Answer the following questions**:

1. Why is the knowledge of chemistry essential to understanding physiology?
_____
_____

2. What is biochemistry? _____
_____

3. What is the relationship between matter and elements? _____
_____

4. Which elements are most common in the human body? _____
_____

5. How are electrons, protons, and neutrons positioned within an atom? _____
_____

6. What is an isotope? _____
_____

7. What is atomic radiation? _____
_____

8. Distinguish between a molecule and a compound? _____
_____
_____

9. What is an ion? _____

10. Describe two ways that atoms may combine with other atoms. _____
_____
_____

11. What is a molecular formula? A structural formula? _____
_____
_____

12. Distinguish between an ion and polar molecule. _____

13. Describe the three types of chemical reactions. _____

14. Compare the characteristics of an acid, a base, and a salt. _____

15. What does the pH scale measure? _____

16. What are the general differences between an organic molecule and an inorganic molecule?

17. What is the difference between an electrolyte and a nonelectrolyte?

18. Define electrolyte balance. _____

19. Compare the chemical composition of carbohydrates, lipids, proteins, and nucleic acids.

20. How does an enzyme affect a chemical reaction? _____

21. What is likely to happen to a protein molecule that is exposed to intense heat or radiation?

22. What are the functions of DNA and RNA? _____

23. Define differentiated cell: _____
_____

24. What are the general functions of the cytoplasm and nucleus?
Cytoplasm: _____
Nucleus: _____

25. What is a selectively permeable membrane? _____
_____
_____

26. Describe the chemical structure of a cell membrane. _____
_____
_____

27. What are some functions of cell membrane proteins? _____
_____
_____

28. What are the functions of the endoplasmic reticulum? _____
_____

29. Describe how the Golgi apparatus functions. _____
_____
_____

30. Why are mitochondria called the "powerhouse" of the cell? _____
_____

31. How do lysosomes function? _____
_____

32. Describe the functions of microfilaments and microtubules. _____
_____
_____

33. How are nuclear contents separated from the cytoplasm? _____
_____

34. What is the function of the nucleolus? _____
_____

35. What is chromatin? _____
_____

36. What kinds of substances most readily diffuse through a cell membrane?

_____

_____

37. Explain the difference among diffusion, facilitated diffusion and osmosis.

Diffusion: _____

Facilitated Diffusion: _____

_____

Osmosis: _____

38. Distinguish between isotonic, hypertonic, and hypotonic solutions:

Isotonic: _____

_____

Hypertonic: _____

_____

Hypotonic: _____

_____

39. How does a cell maintain unequal concentrations of ions on opposite sides of a cell membrane?

_____

_____

40. How are facilitated diffusion and active transport similar? How are they different?

Similar: _____

_____

Different: _____

_____

41. What is the difference between pinocytosis and phagocytosis? _____

_____

_____

_____

42. Why is the precise division of nuclear materials during mitosis important?

_____

_____

43. Describe the events of mitosis:

| Stage | Description of Events |
|---|---|
| | |
| | |
| | |
| | |

44. How do cells vary in their rate of division? _____
_____
_____

45. Which factors control the number of times and the rate at which cells divide?
_____
_____
_____

46. What is the difference between a benign and a cancerous tumor?
_____
_____

47. What are two ways that genes cause cancer? _____
_____
_____

48. Distinguish between a stem cell and a progenitor cell? _____
_____
_____

49. Distinguish between totipotent and pluripotent?
Totipotent: _____
_____
Pluripotent: _____
_____

50. How do cells differentiate? _____
_____
_____

51. What are the general functions of anabolism and catabolism?

_____

_____

## Chapter 4: Cellular Metabolism

52. What substance does the anabolism of monosaccharides form? Of glycerol and fatty acids? Of amino acids?

Monosaccharides: _____

Glycerol and Fatty Acids: _____

Amino Acids: _____

53. Distinguish between dehydration synthesis and hydrolysis: _____

_____

_____

54. What is an enzyme? _____

55. How can an enzyme control the rate of a metabolic reaction? _____

_____

_____

56. How does an enzyme "recognize" its substrate? _____

_____

57. What is the role of a cofactor? _____

_____

58. What factors can denature enzymes? _____

_____

59. Define cellular respiration: _____

_____

60. What is meant by anaerobic reactions? Aerobic reactions? _____

_____

61. What are the final products of cellular respiration? _____

_____

62. What is the function of ATP molecules? _____

_____

63. Define genetic code. _____

_____

64. Define gene. _____

65. What is the structure of DNA? _____

66. Explain why DNA must replicate. _____
_____
_____

67. List the steps of DNA replication. _____
_____
_____
_____

68. How is information carried from the nucleus to the cytoplasm? _____
_____

69. List the steps of protein synthesis _____
_____
_____
_____

70. Explain how gene expression is controlled. _____
_____

71. What is a mutation? _____

72. How do mutations arise? _____
_____
_____

73. How do mutations affect health or appearance? _____
_____
_____

74. Describe protections against mutation
_____
_____
_____