

Name \_\_\_\_\_

Matching

Choices may be used more than once or not at all.

1-5. Matching (in the context of a homeostatic control system)

- |                       |   |          |
|-----------------------|---|----------|
| A) Internal Condition | Produces relevant responses                                       | 1) _____ |
| B) Controller         | Measures the internal condition                                   | 2) _____ |
| C) Set Point          | The optimal value for the internal condition                      | 3) _____ |
| D) Receptor           | The variable to be maintained within an acceptable range          | 4) _____ |
| E) Effector           | Determines the difference between the measured and optimal values | 5) _____ |

6-10. Place the following in order, step by step, in response to consuming glucose.

- |  |        |           |
|--|--------|-----------|
| A) Insulin binds to receptors on muscle/liver cells and stimulates uptake of glucose | first  | 6) _____  |
| B) Cells in the pancreas compare the blood glucose to normal levels                  | second | 7) _____  |
| C) Glucose receptors in the pancreas measure the blood glucose                       | third  | 8) _____  |
| D) Beta cells in the pancreas secrete insulin  | fourth | 9) _____  |
| E) The level of blood sugar increases  | fifth  | 10) _____ |

11-15. Matching.

- |          |                                   |           |
|----------|-----------------------------------|-----------|
| A) 1.05  | Quarts in a liter (L)             | 11) _____ |
| B) 1.09  | Yards in a meter (m)              | 12) _____ |
| C) 2.20  | Pounds in a kilogram (kg)         | 13) _____ |
| D) 2.54  | Centimeters (cm) in an inch       | 14) _____ |
| E) 29.57 | Milliliters (mL) in a fluid ounce | 15) _____ |

16-20. Matching

- |          |   |           |
|----------|---|-----------|
| A) 0.1   | Grams (g) in a kilogram (kg)            | 16) _____ |
| B) 1.    | Milligrams (mg) in a gram (g)           | 17) _____ |
| C) 10.   | Centimeters (cm) in a meter (m)         | 18) _____ |
| D) 100.  | Millimeters (mm) in a centimeter (cm)   | 19) _____ |
| E) 1000. | Grams (g) in a milliliter (mL) of water | 20) _____ |

21-25. Matching

- |                            |   |           |
|----------------------------|---|-----------|
| A) Non-polar Covalent bond | Electrons are shared equally                            | 21) _____ |
| B) Polar Covalent bond     | Electrons are shared, but not equally                   | 22) _____ |
| C) Hydrogen bonds          | Responsible for attraction between water molecules      | 23) _____ |
| D) Ionic bonds             | Hydrogen is attracted to oxygen, nitrogen, or fluorine  | 24) _____ |
|                            | Electrons are not shared, but are either lost or gained | 25) _____ |

26-30. Matching (pick closest value)

- |        |  |           |
|--------|--|-----------|
| A) 140 | fluid volume (L) in vascular space                 | 26) _____ |
| B) 28  | fluid volume (L) in interstitial space             | 27) _____ |
| C) 15  | fluid volume (L) in intracellular space            | 28) _____ |
| D) 11  | sodium concentration (mM/L) in intracellular fluid | 29) _____ |
| E) 3   | sodium concentration (mM/L) in extracellular fluid | 30) _____ |

31-35. Place in order from most concentrated (first) to least concentrated (fifth) in extracellular fluid.

- |              |        |              |
|--------------|--------|--------------|
| A) Potassium | first  | 31) _____    |
| B) Albumin   | second | 32) _____    |
| C) Glucose   | third  | 33) _____    |
| D) Sodium    | fourth | 34) <u>C</u> |
| E) Water     | fifth  | 35) _____    |

36-40. Matching

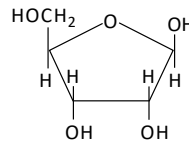
- |                         |  |           |
|-------------------------|--|-----------|
| A) Amino acid / Protein | One (C) : two (H) : one (O)                                      | 36) _____ |
| B) Nitrogenous base     | Single or double rings with (C) (N)                              | 37) _____ |
| C) Carbohydrate         | Nitrogenous base : sugar : phosphate(s)                          | 38) _____ |
| D) Nucleotide           | One (C) : more than two (H) : less than one (O)                  | 39) _____ |
| E) Lipid                | One (C) : one (NH <sub>2</sub> ) : one (COOH) : one(H) : one (R) | 40) _____ |

41-45. Matching

- |                 |  |           |
|-----------------|--|-----------|
| A) Glycerol     | A chain of three carbons each with hydrogen atom(s) and a hydroxyl | 41) _____ |
| B) Glyceride    | Four carbon rings with side chains of carbon and hydrogens         | 42) _____ |
| C) Fatty acid   | A carboxyl followed with carbons atoms with hydrogen atoms         | 43) _____ |
| D) Cholesterol  | Glycerol with one, two or three fatty acids                        | 44) _____ |
| E) Phospholipid | A diglyceride with phosphate attached                              | 45) _____ |

46. The chemical structure to the right is

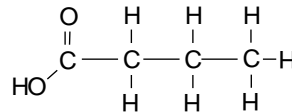
- A) Ribose  
B) Lactose  
C) Fructose  
D) Deoxyribose  
E) none of the above



46) \_\_\_\_\_

47. The chemical structure to the right is a(n)

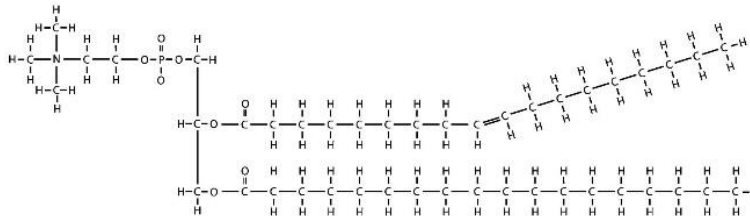
- A) Unsaturated fatty acid  
B) Saturated fatty acid  
C) Ribose molecule  
D) Glyceraldehyde  
E) none of the above



47) \_\_\_\_\_

48. The chemical structure to the right is a

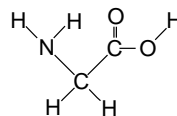
- A) Protein  
B) Phospholipid  
C) Carbohydrate  
D) none of the above



48) \_\_\_\_\_

49. The chemical structure to the right is (a)

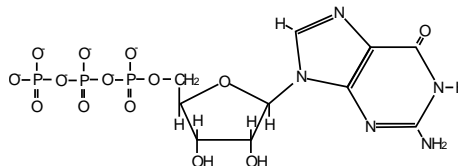
- A) Glycine  
B) Glucose  
C) Guanine  
D) Glutamate  
E) none of the above



49) \_\_\_\_\_

50. The chemical structure to the right is

- A) ATP  
B) CTP  
C) GTP  
D) TTP  
E) None of the above



50) \_\_\_\_\_

51-55. Matching

- |                        |                       |           |
|------------------------|-----------------------|-----------|
| A) Anabolic reactions  | Hydrolysis            | 51) _____ |
| B) Catabolic reactions | Decomposition         | 52) _____ |
|                        | Phosphorylation       | 53) _____ |
|                        | Dephosphorylation     | 54) _____ |
|                        | Dehydration synthesis | 55) _____ |

56-60. Matching

- |                          |   |           |
|--------------------------|---|-----------|
| A) Dehydration synthesis | Breaks down proteins to amino acids                 | 56) _____ |
| B) Hydrolysis            | Constructs proteins from amino acids                | 57) _____ |
| C) None of the above     | Breaks down carbohydrates to simpler sugars         | 58) _____ |
|                          | Breaks down glycerides to fatty acids and glycerol  | 59) _____ |
|                          | Constructs glycerides from glycerol and fatty acids | 60) _____ |

61-65.

- |                    |          |           |
|--------------------|----------|-----------|
| A) Is a pyrimidine | Uracil   | 61) _____ |
| B) Is a purine     | Adenine  | 62) _____ |
|                    | Guanine  | 63) _____ |
|                    | Cytosine | 64) _____ |
|                    | Thymine  | 65) _____ |

66-70. Matching

- |                                       |      |           |
|---------------------------------------|------|-----------|
| A) Contains deoxyribose nucleotide(s) | ATP  | 66) _____ |
| B) Contains ribose nucleotide(s)      | GTP  | 67) _____ |
| C) None of the above                  | RNA  | 68) _____ |
|                                       | sDNA | 69) _____ |
|                                       | cDNA | 70) _____ |

71-75. Matching

- |                      |  |           |
|----------------------|--|-----------|
| A) Guanine           | Uracil forms two hydrogen bonds with     | 71) _____ |
| B) Cytosine          | Thymine forms two hydrogen bonds with    | 72) _____ |
| C) Thymine           | Adenine forms two hydrogen bonds with    | 73) _____ |
| D) Adenine           | Guanine forms three hydrogen bonds with  | 74) _____ |
| E) None of the above | Cytosine forms three hydrogen bonds with | 75) _____ |

76-80. Place the following steps, in order, for transcribing the DNA of a gene into mRNA.

- |  |        |           |
|--|--------|-----------|
| A) Introns are removed   | first  | 76) _____ |
| B) RNA polymerase binds at the promoter region of the sDNA                     | second | 77) _____ |
| C) mRNA is formed by splicing together exons from the pRNA                     | third  | 78) _____ |
| D) pRNA is formed as a complement of the sDNA - includes introns and exons     | fourth | 79) _____ |
| E) Transcription factors (chemical messengers) bind to promoter region of gene | fifth  | 80) _____ |

81-85. Matching

- |  |                             |           |
|--|-----------------------------|-----------|
| A) Have(has) a double phospholipid bilayer | Vesicles                    | 81) _____ |
| B) Have(has) a single phospholipid bilayer | Mitochondria                | 82) _____ |
| C) Have(has) no phospholipid               | Endoplasmic reticulum       | 83) _____ |
|  | Golgi apparatus (body)      | 84) _____ |
|  | Nuclear membrane (envelope) | 85) _____ |

86-90. Matching.

- |  |   |           |
|--|---|-----------|
| A) Surface of plasma membrane facing extracellular fluid | Is hydrophilic  | 86) _____ |
| B) Surface of plasma membrane facing intracellular fluid | Is hydrophobic  | 87) _____ |
| C) Interior core of plasma membrane                      | Contains phosphates                                       | 88) _____ |
| D) none of the above                                     | Contains fatty acids and cholesterol                      | 89) _____ |
| E) A and B   | Water soluble ions and molecules cannot enter this region | 90) _____ |

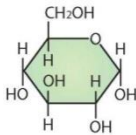
91-95. Matching (for typical cells; neurons at rest)

- |             |  |           |
|-------------|--|-----------|
| A) 140 mM/L | Sodium concentration in intracellular fluid    | 91) _____ |
| B) 105 mM/L | Sodium concentration in extracellular fluid    | 92) _____ |
| C) 20 mM/L  | Chloride concentration in extracellular fluid  | 93) _____ |
| D) 15 mM/L  | Potassium concentration in intracellular fluid | 94) _____ |
| E) 5 mM/L   | Potassium concentration in extracellular fluid | 95) _____ |

Fill in

- 10 mg equals \_\_\_\_\_ g.
- 10 mL of water weighs \_\_\_\_\_ g.
- A piece of string 10 inches long is \_\_\_\_\_ cm long.
- 500 mL of water is about \_\_\_\_\_ quart.
- Extracellular and intracellular fluids are composed predominantly of \_\_\_\_\_.
- $H^+$ ,  $Na^+$ ,  $Cl^-$ , and  $Ca^{2+}$  are all \_\_\_\_\_.
- \_\_\_\_\_ molecules are soluble in water.
- Water exhibits \_\_\_\_\_ solubility in lipids.

9..



Is \_\_\_\_\_.

- Glycerol contains \_\_\_\_\_ carbon, \_\_\_\_\_ hydrogen, and \_\_\_\_\_ oxygen atoms.
- Enzymes act as \_\_\_\_\_ and are usually made of \_\_\_\_\_.
- Covalent control of an enzyme is caused by \_\_\_\_\_ of that enzyme.
- Phosphorylation will change the \_\_\_\_\_ of a protein.
- The strands of the DNA double helix are held together laterally by hydrogen bonds between a \_\_\_\_\_ and a \_\_\_\_\_.
- The genetic code of a gene is made predominantly of \_\_\_\_\_.
- A primary function of genes is to provide a code for the synthesis of \_\_\_\_\_.
- The process of utilizing a gene is often called \_\_\_\_\_.
- In order to use a gene \_\_\_\_\_ must attach to the \_\_\_\_\_ region of the gene.
- Plasma membranes are made predominantly of \_\_\_\_\_.
- Ribosomes are made predominantly of \_\_\_\_\_ and \_\_\_\_\_.

Name \_\_\_\_\_

Matching

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- |                       |   |             |
|-----------------------|---|-------------|
| A) Internal Condition | Produces relevant responses                                       | 1) <u>E</u> |
| B) Controller         | Measures the internal condition                                   | 2) <u>D</u> |
| C) Set Point          | The optimal value for the internal condition                      | 3) <u>C</u> |
| D) Receptor           | The variable to be maintained within an acceptable range          | 4) <u>A</u> |
| E) Effector           | Determines the difference between the measured and optimal values | 5) <u>B</u> |

6-10. Place the following in order, step by step, in response to consuming glucose.

- |  |        |              |
|--|--------|--------------|
| A) Insulin binds to receptors on muscle/liver cells and stimulates uptake of glucose | first  | 6) <u>E</u>  |
| B) Cells in the pancreas compare the blood glucose to normal levels                  | second | 7) <u>C</u>  |
| C) Glucose receptors in the pancreas measure the blood glucose                       | third  | 8) <u>B</u>  |
| D) Beta cells in the pancreas secrete insulin  | fourth | 9) <u>D</u>  |
| E) The level of blood sugar increases  | fifth  | 10) <u>A</u> |

11-15. Matching.(rounded to 2 decimal points)

- |          |                                   |              |
|----------|-----------------------------------|--------------|
| A) 1.06  | Quarts in a liter (L)             | 11) <u>A</u> |
| B) 1.09  | Yards in a meter (m)              | 12) <u>B</u> |
| C) 2.20  | Pounds in a kilogram (kg)         | 13) <u>C</u> |
| D) 2.54  | Centimeters (cm) in an inch       | 14) <u>D</u> |
| E) 29.57 | Milliliters (mL) in a fluid ounce | 15) <u>E</u> |

16-20. Matching

- |          |   |              |
|----------|---|--------------|
| A) 0.1   | Grams (g) in a kilogram (kg)            | 16) <u>E</u> |
| B) 1.    | Milligrams (mg) in a gram (g)           | 17) <u>E</u> |
| C) 10.   | Centimeters (cm) in a meter (m)         | 18) <u>D</u> |
| D) 100.  | Millimeters (mm) in a centimeter (cm)   | 19) <u>C</u> |
| E) 1000. | Grams (g) in a milliliter (mL) of water | 20) <u>B</u> |

21-25. Matching

- |                            |   |              |
|----------------------------|---|--------------|
| A) Non-polar Covalent bond | Electrons are shared equally                            | 21) <u>A</u> |
| B) Polar Covalent bond     | Electrons are shared, but not equally                   | 22) <u>B</u> |
| C) Hydrogen bonds          | Responsible for attraction between water molecules      | 23) <u>C</u> |
| D) Ionic bonds             | Hydrogen is attracted to oxygen, nitrogen, or fluorine  | 24) <u>C</u> |
|                            | Electrons are not shared, but are either lost or gained | 25) <u>D</u> |

26-30. Matching (pick closest value)

- |        |  |              |
|--------|--|--------------|
| A) 140 | fluid volume (L) in vascular space                 | 26) <u>E</u> |
| B) 28  | fluid volume (L) in interstitial space             | 27) <u>D</u> |
| C) 15  | fluid volume (L) in intracellular space            | 28) <u>B</u> |
| D) 11  | sodium concentration (mM/L) in intracellular fluid | 29) <u>C</u> |
| E) 3   | sodium concentration (mM/L) in extracellular fluid | 30) <u>A</u> |

31-35. Place in order from most concentrated (first) to least concentrated (fifth) in extracellular fluid.

- |              |        |              |
|--------------|--------|--------------|
| A) Potassium | first  | 31) <u>E</u> |
| B) Albumin   | second | 32) <u>B</u> |
| C) Glucose   | third  | 33) <u>D</u> |
| D) Sodium    | fourth | 34) <u>C</u> |
| E) Water     | fifth  | 35) <u>A</u> |

36-40. Matching

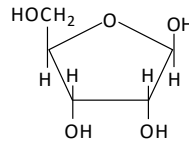
- |                         |  |              |
|-------------------------|--|--------------|
| A) Amino acid / Protein | One (C) : two (H) : one (O)                                      | 36) <u>C</u> |
| B) Nitrogenous base     | Single or double rings with (C) (N)                              | 37) <u>B</u> |
| C) Carbohydrate         | Nitrogenous base : sugar : phosphate(s)                          | 38) <u>D</u> |
| D) Nucleotide           | One (C) : more than two (H) : less than one (O)                  | 39) <u>E</u> |
| E) Lipid                | One (C) : one (NH <sub>2</sub> ) : one (COOH) : one(H) : one (R) | 40) <u>A</u> |

41-45. Matching

- |                 |  |              |
|-----------------|--|--------------|
| A) Glycerol     | A chain of three carbons each with hydrogen atom(s) and a hydroxyl | 41) <u>A</u> |
| B) Glyceride    | Four carbon rings with side chains of carbon and hydrogens         | 42) <u>D</u> |
| C) Fatty acid   | A carboxyl followed with carbons atoms with hydrogen atoms         | 43) <u>C</u> |
| D) Cholesterol  | Glycerol with one, two or three fatty acids                        | 44) <u>B</u> |
| E) Phospholipid | A diglyceride with phosphate attached                              | 45) <u>E</u> |

46. The chemical structure to the right is

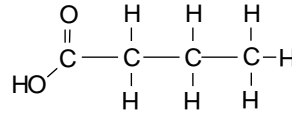
- A) Ribose  
B) Lactose  
C) Fructose  
D) Deoxyribose  
E) none of the above



46) A

47. The chemical structure to the right is a(n)

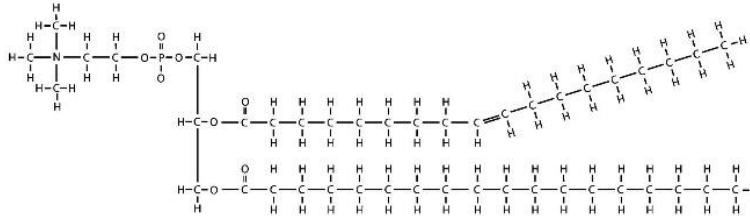
- A) Unsaturated fatty acid  
B) Saturated fatty acid  
C) Ribose molecule  
D) Glyceraldehyde  
E) none of the above



47) B

48. The chemical structure to the right is a

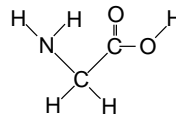
- A) Protein  
B) Phospholipid  
C) Carbohydrate  
D) none of the above



48) B

49. The chemical structure to the right is (a)

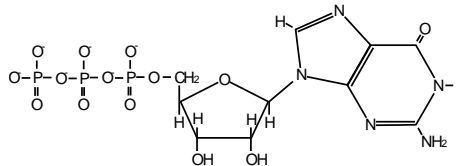
- A) Glycine  
B) Glucose  
C) Guanine  
D) Glutamate  
E) none of the above



49) A

50. The chemical structure to the right is

- A) ATP  
B) CTP  
C) GTP  
D) TTP  
E) None of the above



50) C

51-55. Matching

- |                        |                       |              |
|------------------------|-----------------------|--------------|
| A) Anabolic reactions  | Hydrolysis            | 51) <u>B</u> |
| B) Catabolic reactions | Decomposition         | 52) <u>B</u> |
|                        | Phosphorylation       | 53) <u>A</u> |
|                        | Dephosphorylation     | 54) <u>B</u> |
|                        | Dehydration synthesis | 55) <u>A</u> |

56-60. Matching

- |                          |   |                  |
|--------------------------|---|------------------|
| A) Dehydration synthesis | Breaks down proteins to amino acids                 | 56) <u>  B  </u> |
| B) Hydrolysis            | Constructs proteins from amino acids                | 57) <u>  A  </u> |
| C) None of the above     | Breaks down carbohydrates to simpler sugars         | 58) <u>  B  </u> |
|                          | Breaks down glycerides to fatty acids and glycerol  | 59) <u>  B  </u> |
|                          | Constructs glycerides from glycerol and fatty acids | 60) <u>  A  </u> |

61-65.

- |                    |          |                  |
|--------------------|----------|------------------|
| A) Is a pyrimidine | Uracil   | 61) <u>  A  </u> |
| B) Is a purine     | Adenine  | 62) <u>  B  </u> |
|                    | Guanine  | 63) <u>  B  </u> |
|                    | Cytosine | 64) <u>  A  </u> |
|                    | Thymine  | 65) <u>  A  </u> |

66-70. Matching

- |                                       |      |                  |
|---------------------------------------|------|------------------|
| A) Contains deoxyribose nucleotide(s) | ATP  | 66) <u>  B  </u> |
| B) Contains ribose nucleotide(s)      | GTP  | 67) <u>  B  </u> |
| C) None of the above                  | RNA  | 68) <u>  B  </u> |
|                                       | tDNA | 69) <u>  A  </u> |
|                                       | cDNA | 70) <u>  A  </u> |

71-75. Matching

- |                      |  |                  |
|----------------------|--|------------------|
| A) Guanine           | Uracil forms two hydrogen bonds with     | 71) <u>  D  </u> |
| B) Cytosine          | Thymine forms two hydrogen bonds with    | 72) <u>  D  </u> |
| C) Thymine           | Adenine forms two hydrogen bonds with    | 73) <u>  C  </u> |
| D) Adenine           | Guanine forms three hydrogen bonds with  | 74) <u>  B  </u> |
| E) None of the above | Cytosine forms three hydrogen bonds with | 75) <u>  A  </u> |

76-80. Place the following steps, in order, for transcribing the DNA of a gene into mRNA.

- |  |        |                  |
|--|--------|------------------|
| A) Introns are removed   | first  | 76) <u>  E  </u> |
| B) RNA polymerase binds at the promoter region of the cDNA                     | second | 77) <u>  B  </u> |
| C) mRNA is formed by splicing together exons from the pRNA                     | third  | 78) <u>  D  </u> |
| D) pRNA is formed as a complement of the tDNA - includes introns and exons     | fourth | 79) <u>  A  </u> |
| E) Transcription factors (chemical messengers) bind to promoter region of gene | fifth  | 80) <u>  C  </u> |

81-85. Matching

- |  |                             |                  |
|--|-----------------------------|------------------|
| A) Have(has) a double phospholipid bilayer | Vesicles                    | 81) <u>  B  </u> |
| B) Have(has) a single phospholipid bilayer | Mitochondria                | 82) <u>  A  </u> |
| C) Have(has) no phospholipid bilayer       | Endoplasmic reticulum       | 83) <u>  B  </u> |
|  | Golgi apparatus (body)      | 84) <u>  B  </u> |
|  | Nuclear membrane (envelope) | 85) <u>  A  </u> |

86-90. Matching.

- |  |   |                  |
|--|---|------------------|
| A) Surface of plasma membrane facing extracellular fluid | Is hydrophilic  | 86) <u>  E  </u> |
| B) Surface of plasma membrane facing intracellular fluid | Is hydrophobic  | 87) <u>  C  </u> |
| C) Interior core of plasma membrane                      | Contains phosphates                                       | 88) <u>  E  </u> |
| D) none of the above                                     | Contains fatty acids and cholesterol                      | 89) <u>  C  </u> |
| E) A and B   | Water soluble ions and molecules cannot enter this region | 90) <u>  C  </u> |

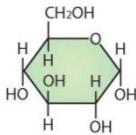
91-95. Matching (for typical cells; neurons at rest)

- |             |  |              |
|-------------|--|--------------|
| A) 140 mM/L | Sodium concentration in intracellular fluid    | 91) <u>D</u> |
| B) 105 mM/L | Sodium concentration in extracellular fluid    | 92) <u>A</u> |
| C) 20 mM/L  | Chloride concentration in extracellular fluid  | 93) <u>B</u> |
| D) 15 mM/L  | Potassium concentration in intracellular fluid | 94) <u>A</u> |
| E) 5 mM/L   | Potassium concentration in extracellular fluid | 95) <u>E</u> |

Fill in

- 10 mg equals 0.01 g.
- 10 mL of water weighs 10 g.
- A piece of string 10 inches long is 25.4 cm long.
- 500 mL of water is about 0.53 quart.
- Extracellular and intracellular fluids are composed predominantly of water.
- H<sup>+</sup>, Na<sup>+</sup>, Cl<sup>-</sup>, and Ca<sup>2+</sup> are all ions.
- Polar molecules are soluble in water.
- Water exhibits no solubility in lipids.

9..



Is alpha glucose.

- Glycerol contains 3 carbon, 8 hydrogen, and 3 oxygen atoms.
- Enzymes act as catalysts and are usually made of protein.
- Covalent control of an enzyme is caused by phosphorylation of that enzyme.
- Phosphorylation will change the shape of a protein.
- The strands of the DNA double helix are held together laterally by hydrogen bonds between a purine and a pyrimidine.
- The genetic code of a gene is made predominantly of DNA.
- A primary function of genes is to provide a code for the synthesis of proteins.
- The process of utilizing a gene is often called gene expression.
- In order to use a gene RNA polymerase must attach to the promoter region of the gene.
- Plasma membranes are made predominantly of phospholipids.
- Ribosomes are made of rRNA and protein.