Exam

Name_____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

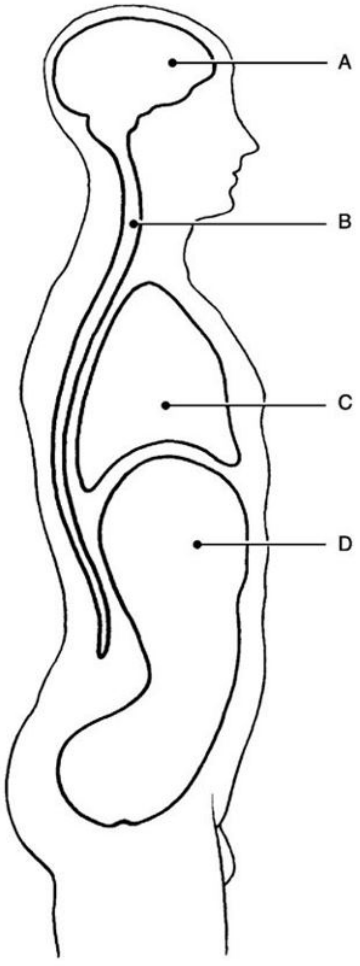

Figure 1.1

Using Figure 1.1, match the following cavities:

1) Thoracic cavity. 1) _____

2) Cranial cavity. 2) _____

3) Abdominal cavity. 3) _____

4) Vertebral cavity. 4) _____

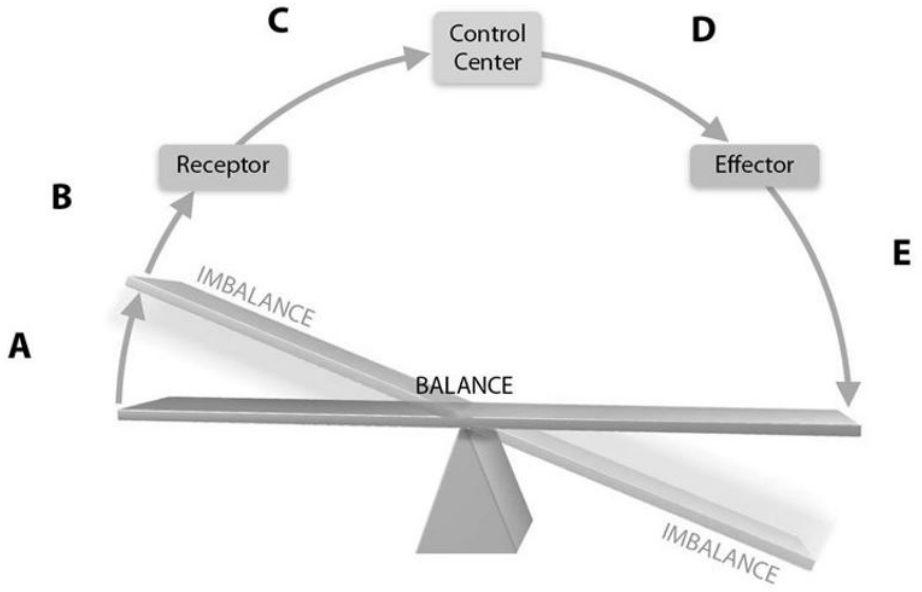

Figure 1.2

Using Figure 1.2, match the following descriptions to the most appropriate letter on the diagram:

5) Information about body temperature is sent through afferent pathways to the brain. 5) _____

6) Free nerve endings in the skin detect changes in skin temperature (getting warmer). 6) _____

7) Appropriate response information is sent through efferent pathways. 7) _____

8) A change in the temperature of the external environment (getting warmer). 8) _____

9) Sweat glands are stimulated as well as blood being distributed to the skin to allow cooling of the body to return the body's temperature to a physiological level. 9) _____

MATCHING. Choose the item in column 2 that best matches each item in column 1.

Match the following systems to their functions:

10) Provides the force to move bones about their joints. 10) _____

11) Responds to environmental changes by transmitting appropriate electrical impulses. 11) _____

12) Provides a ridged framework to support the body and stores minerals. 12) _____

13) Prevents water loss, entry of germs into the body and synthesizes vitamin D. 13) _____

A) Integumentary

B) Muscular

C) Skeletal

D) Nervous

Match the following systems to their functions:

14) Controls the body with chemical molecules called hormones.

15) Delivers oxygen and nutrients to the tissues.

16) A functional organ system which provides a means of protecting us from foreign invaders.

17) Picks up and cleans excess fluid from tissues.

A) Cardiovascular

B) Lymphatic

C) Immune

D) Endocrine

14) _____

15) _____

16) _____

17) _____

Match the following examples of feedback mechanisms:

18) Used for changes in blood glucose levels.

19) Used for changes in blood pressure.

20) Used for blood clotting.

21) Used for childbirth.

A) Positive feedback

B) Negative feedback

18) _____

19) _____

20) _____

21) _____

Match the following systems and organs:

22) Arteries, veins, heart.

23) Trachea, bronchi, alveoli.

24) Adrenal glands, pancreas, pituitary.

25) Esophagus, large intestine, rectum.

26) Kidneys, bladder, ureters.

A) Urinary

B) Endocrine

C) Respiratory

D) Cardiovascular

E) Digestive

22) _____

23) _____

24) _____

25) _____

26) _____

Match the following cavities and organs:

27) Stomach.

28) Heart.

A) Thoracic

B) Abdominal

27) _____

28) _____

29) Uterus.	A) Cranial	29) _____
30) Brain.	B) Thoracic	30) _____
31) Lungs.	C) Pelvic	31) _____

Match the following regional terms and common terms:

32) Arm.	A) Cephalic	32) _____
33) Buttock.	B) Gluteal	33) _____
34) Head.	C) Brachial	34) _____
35) Knee (anterior aspect).	D) Patellar	35) _____
36) Chest.	E) Thoracic	36) _____

Match the regional/directional terms and examples:

37) The bridge of the nose is _____ to the left eye.	A) Proximal	37) _____
38) The upper arm is _____ to the forearm.	B) Medial C) Anterior	38) _____
39) The lungs are _____ to the heart.	D) Distal	39) _____
40) The fingers are _____ to the wrist.	E) Lateral	40) _____
41) The stomach is _____ to the spine.		41) _____

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

42) Positive feedback mechanisms tend to enhance the original stimulus so that the response is accelerated. 42) _____

43) Digital Subtraction Angiography (DSA) imaging is most useful in discovering obstructed blood supplies in organs and tissues. 43) _____

44) The elbow is proximal to the shoulder. 44) _____

45) The part of the serous membrane that lines the peritoneal cavity wall is called visceral peritoneum. 45) _____

46) A major function of serous membranes is to decrease friction. 46) _____

47) The right hypochondriac region contains the majority of the stomach. 47) _____

48) Lungs carry out an excretory function. 48) _____

49) Embryology concerns the structural changes that occur in an individual from conception through old age. 49) _____

50) A tissue consists of groups of similar cells that have a common function. 50) _____

51) It is important for any organism to maintain its boundaries, so that its internal environment remains distinct from the external environment surrounding it. 51) _____

52) Without some sort of negative feedback mechanism, it would be impossible to keep our body chemistry in balance. 52) _____

53) Responsiveness or irritability is the ability to sense changes in the environment and then respond to them. 53) _____

54) The epigastric region is superior to the umbilical region. 54) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

55) Histology would be best defined as a study of _____. 55) _____
A) the gross structures of the body B) cell chemistry
C) cells D) tissues

56) The study of large body structures, visible to the naked eye, such as the heart is called _____ anatomy. 56) _____
A) developmental B) systemic C) microscopic D) gross

57) Expiration (breathing out) is how the body removes excessive carbon dioxide from the blood. This is an example of _____. 57) _____
A) excretion of metabolic waste B) metabolism
C) maintaining boundaries D) responsiveness

58) Generally, what is the result of the negative feedback process? 58) _____
A) to maintain homeostasis B) to keep the body's blood sugar level high
C) to control body movement D) to regulate excretion via the kidneys

59) The coxal joint is most likely found in the _____ region of the body. 59) _____
A) foot B) groin C) hip D) hand

60) A structure that is composed of two or more tissue types that work together to perform specific functions for the body is a(n) _____. 60) _____
A) organ B) complex tissue C) complex cell D) organ system

61) The anatomical position is characterized by all of the following EXCEPT _____. 61) _____
A) thumbs pointed laterally B) arms at sides
C) palms turned posteriorly D) body erect

62) A good example of a positive feedback mechanism would be _____. 62) _____
A) body temperature regulation B) enhancement of labor contractions
C) regulating glucose levels in the blood D) blood calcium level regulation

63) Which of the following describes a parasagittal plane? 63) _____
A) any cut dividing the body into anterior and posterior portions
B) any sagittal plane except in the midline
C) a transverse cut just above the knees
D) two cuts dividing the body into left and right halves

64) Which of the following organs or structures would be found in the left iliac region? 64) _____
A) liver B) appendix C) stomach D) intestines

65) The parietal pleura would represent a serous membrane _____. 65) _____
A) lining the thoracic cavity B) covering individual lungs
C) covering the heart D) lining the abdominal cavity

66) Which one of the following systems responds fastest to environmental stimuli? 66) _____
A) immune B) nervous C) muscular D) lymphatic

67) Choose the anatomical topic and definition that is NOT correctly matched. 67) _____
A) Embryology: study of the changes in an individual from conception to birth.
B) Gross anatomy: study of structures visible to the eye.
C) Cytology: study of the structures in a particular region.
D) Microscopic anatomy: study of structures too small to be seen by the naked eye.

68) Homeostasis is the condition in which the body maintains _____. 68) _____
A) the lowest possible energy usage
B) a dynamic state within an unlimited range, depending on circumstances
C) a static state with no deviation from preset points
D) a relatively stable internal environment, within limits

69) In which body cavities are the lungs located? 69) _____
A) mediastinal, thoracic, and ventral B) pleural, dorsal, and abdominal
C) pericardial, ventral, and thoracic D) pleural, ventral, and thoracic

70) Choose the following statement that is NOT completely correct regarding serous membranes. 70) _____
A) Serous membranes are divided into parietal and visceral membranes with a virtual space between the two.
B) Serosa are very thin, double-layered structures.
C) Visceral pericardium covers the outer surface of the heart, and parietal pericardium lines the internal walls of the heart.
D) Serous membranes secrete a watery lubricating fluid.

71) Place the following in correct sequence from simplest to most complex: 71) _____

1. molecules
2. atoms
3. tissues
4. cells
5. organs

A) 1-2-4-3-5 B) 2-1-4-3-5 C) 1-2-3-4-5 D) 2-1-3-4-5

72) Which of the following imaging devices would best localize a tumor in a person's brain? 72) _____

A) DSA B) MRI C) X-ray D) PET

73) Which of these is NOT part of the dorsal cavity? 73) _____

A) thoracic cavity B) cranial cavity C) vertebral cavity D) spinal cord

74) In which quadrant of the abdominopelvic cavity is the stomach located? 74) _____

A) left upper quadrant B) left lower quadrant
C) right lower quadrant D) right upper quadrant

75) Which of the following statements is the most correct regarding homeostatic imbalance? 75) _____

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

76) The term pollex refers to the _____. 76) _____

A) calf B) great toe C) fingers D) thumb

77) The dorsal body cavity is the site of which of the following? 77) _____

A) brain B) lungs C) liver D) intestines

78) Select the most correct statement. 78) _____

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

79) One of the functional characteristics of life is excitability or responsiveness. This refers to _____. 79) _____

A) sensing changes in the environment and then reacting or responding to them
B) the nervous system causing all living things to sometimes experience anger
C) indigestible food residues stimulating the excretory system
D) the necessity for all organisms to reproduce

80) Which of the following are survival needs of the body? 80) _____

A) water, atmospheric pressure, growth, and movement
B) nutrients, water, atmospheric pressure, and oxygen
C) nutrients, water, growth, and reproduction
D) nutrients, water, movement, and reproduction

81) What is a vertical section through the body, dividing it into left and right, called? 81) _____
A) regional B) sagittal C) frontal D) transverse

82) What is a vertical section through the body, dividing it into anterior and posterior regions called? 82) _____
A) sagittal B) transverse C) frontal D) median

83) The body cavities that protect the nervous system are located in the _____ cavity. 83) _____
A) dorsal B) thoracic C) vertebral D) ventral E) cranial

84) Which of the following describes the operation of the heart and blood vessels? 84) _____
A) systemic anatomy B) cardiovascular physiology
C) cardiovascular anatomy D) systemic physiology

85) It is wise to study anatomy alongside with physiology because _____. 85) _____
A) physiology is only explainable in terms of the underlying anatomy
B) to understand anatomy requires complete understanding of physiology
C) anatomy and physiology are practically the same thing
D) it makes for more efficient use of students' and teachers' time

86) The study of anatomy and physiology assumes and describes a healthy body. Select the description below that does NOT explain why this approach is useful. 86) _____
A) A healthy body provides a common standard to compare to.
B) A healthy body establishes what "normal" is.
C) Study of a healthy body provides a foundation for a more complete understanding of all human bodies.
D) Study of a healthy body is less intimidating and more familiar to new students.

87) One of the descriptions below is from the perspective of anatomical study, the rest are from a physiological perspective. Select the description below that comes from an anatomical perspective. 87) _____
A) The extremely thin tissue (simple squamous epithelium) of the lungs allows for the quick diffusion of respiratory gases into and out of the body.
B) The cell-to-cell connections between heart (cardiac) muscle cells are strong. They hold the tissue together for a life time of forceful contractions.
C) The innermost lining of the lungs is composed primarily of a thin tissue called simple squamous epithelium.
D) The direction of blood flow through the heart is directed by one way valves.

88) One of the descriptions below is from the perspective of physiological study, the rest are from an anatomical perspective. Select the description below that comes from physiological perspective. 88) _____
A) The pancreas lies deep to the stomach within the abdominal cavity.
B) The skull is formed by 22 facial and cranial bones.
C) The contraction of smooth muscle in blood vessels (vasoconstriction) can reduce the flow of blood through the vessel.
D) The chambers of the heart and blood vessels leading to and from the heart are separated by valves composed of fibrous connective tissue.

89) Which of the following is the best explanation for why cells are considered the smallest units of living things. 89) _____

A) Cells have the ability to reproduce identical copies of themselves in a process called mitosis.
B) Cells cannot be seen with the naked eye and are considered microscopic.
C) Cells are the simplest structure to fit all of the characteristics necessary to be considered alive.
D) Cells are highly ordered and complex.

90) Prevention of water loss is a necessary function for life that would best fit in the category of _____. 90) _____

A) metabolism
B) maintaining boundaries
C) responsiveness
D) excretion

91) Anabolic reactions are chemical reactions of the body that build things, make them bigger or more complex. Catabolic reactions break things down making them smaller or less complex. If the rate of anabolic reaction in the body is much faster than the rate of catabolic reactions, which of the following necessary life function will be accomplished? 91) _____

A) movement B) growth C) responsiveness D) digestion

92) Anatomical position is important because _____. 92) _____

A) it allows diagrams within textbooks to display a greater surface area of the body with one simple diagram
B) it allows a common point of reference for body position to help communicate anatomical relationships
C) it provides the greatest circulation to the extremities
D) it is the position most comfortable to hospital patients

93) Positive feedback differs from negative feedback because _____. 93) _____

A) positive feedback tends to enhance the triggering stimulus while negative feedback tends to return the body to a homeostatic balance or "ideal" level
B) positive feedback is critical to health while negative feedback serves only to alert us to potential health threats
C) positive feedback provides moment-to-moment wellbeing while negative feedback causes a cascade effect
D) positive feedback is generally beneficial while negative feedback is typically harmful

94) When a baby suckles at its mother's breast the stimulus at the breast is sent to the mother's brain (a region called the hypothalamus). The brain responds by releasing hormones to stimulate the production and the ejection of milk from the breast. This helps the newborn to receive nourishment and encourages more suckling. This example is best described as a _____. 94) _____

A) positive feedback
B) negative feedback
C) necessary life function
D) loss of homeostasis

95) Some of the nerve endings in the skin are sensitive to changes in temperature. They are part of a negative feedback mechanism regulating body temperature. These nerve endings represent a(n) _____ in the negative feedback mechanism. 95) _____

A) homeostatic balance or "ideal" value
B) receptor
C) effector
D) control center

96) You are asked to take a person's heart rate at the popliteal pulse point. You will look for this pulse _____. 96) _____

A) at the posterior side of the wrist
B) in the distal end of the lower leg
C) on the posterior side of the knee
D) on the palmar side of the hand

97) You are told to take an axillary temperature on a small child. You will place the thermometer _____. 97) _____

A) in the armpit
B) under the tongue
C) on the forehead
D) in the rectum

98) You are asked to draw blood from the median cubital vein. You will search for this vein in the _____. 98) _____

A) proximal arm
B) lateral side of the foot
C) anterior side of the elbow
D) hand

99) The thoracic cavity contains the _____. It is found _____ to the vertebral cavity. 99) _____

A) digestive viscera; inferior
B) kidneys and spleen; deep
C) stomach and liver; superficial
D) heart and lungs; anterior

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

100) Similar cells that have a common function are called _____. 100) _____

101) What does the "principle of complementarity of structures and function" mean? 101) _____

102) The term that describes the back of the elbow is _____. 102) _____

103) The term that describes the neck region is _____. 103) _____

104) The heart is _____ to the lungs. 104) _____

105) _____ is explained by chemical and physical principles and is concerned with the function of specific organs or organic systems. 105) _____

106) What is a dynamic equilibrium of your internal environment termed? 106) _____

107) Which cavity contains the bladder, some reproductive organs, and the rectum? 107) _____

108) What is the serous membrane that covers the intestines called? 108) _____

109) What broad term covers all chemical reactions that occur within the body cells? 109) _____

110) What is the function of the serous membranes? 110) _____

111) Can lungs carry out excretory functions? Explain your answer. 111) _____

112) Why is anatomical terminology necessary? 112) _____

113) The ability to sense changes in the environment and respond to them is called _____. 113) _____

114) What is the single most abundant chemical substance in the body? 114) _____

115) Why must a normal body temperature be maintained in order for chemical reactions to be continued at life-sustaining rates? 115) _____

116) What is the pathway between the receptor and the control center in the reflex pathway called? 116) _____

117) What type of homeostatic feedback reflex is the withdrawal reflex? 117) _____

118) Why are the abdominopelvic cavity organs the most vulnerable to blunt deceleration in an automobile accident with seat belts? 118) _____

119) What is the action of all of the negative feedback mechanisms of the body? 119) _____

120) Which feedback mechanism causes the variable to deviate further and further from its original value or range? 120) _____

121) What can happen when the usual negative feedback mechanisms are overwhelmed and destructive positive feedback mechanisms take over? 121) _____

122) Which body system would be most affected by a lower than normal atmospheric pressure? 122) _____

123) Describe the overlap in function between the cardiovascular system and respiratory system. In other words, describe how they work together. 123) _____

124) Describe the overlap in function between the muscular system and skeletal system. In other words, describe how they work together. 124) _____

125) The integumentary system helps to maintain a boundary between the internal and external environment. Give an example of something that is prevented entry to the body and an example of something prevented from escaping the body by the integumentary system. 125) _____

126) Describe the opposing ways that the muscular system and integumentary system act as effectors in the regulation of body temperature. 126) _____

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

127) A small family was traveling in its van and had a minor accident. The children in the back seats were wearing lap belts, but still sustained numerous bruises about the abdomen, and had some internal organ injuries. Why is this area more vulnerable to damage than others?

128) Steve was injured in a football accident. X-ray examination showed a fracture underlying his left brachial deformity. What part of his body was injured?

129) Judy is 16 years old and collapses on the gym floor with severe pain in her chest wall every time she takes a deep breath. She is rushed by ambulance to the emergency room. Judy is diagnosed with pleurisy and is given an anti-inflammatory drug through the intravenous route. Explain why an anti-inflammatory drug would be prescribed for someone with pleurisy.

130) Sara is giving birth to her first child. She is concerned that her labor is taking longer than she thought it would. Why does giving birth usually take time for the contractions to proceed to the point when the child is born?

131) The nurse charted: "Patient has an open wound located on lateral aspect of leg." Describe where the wound is located.

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

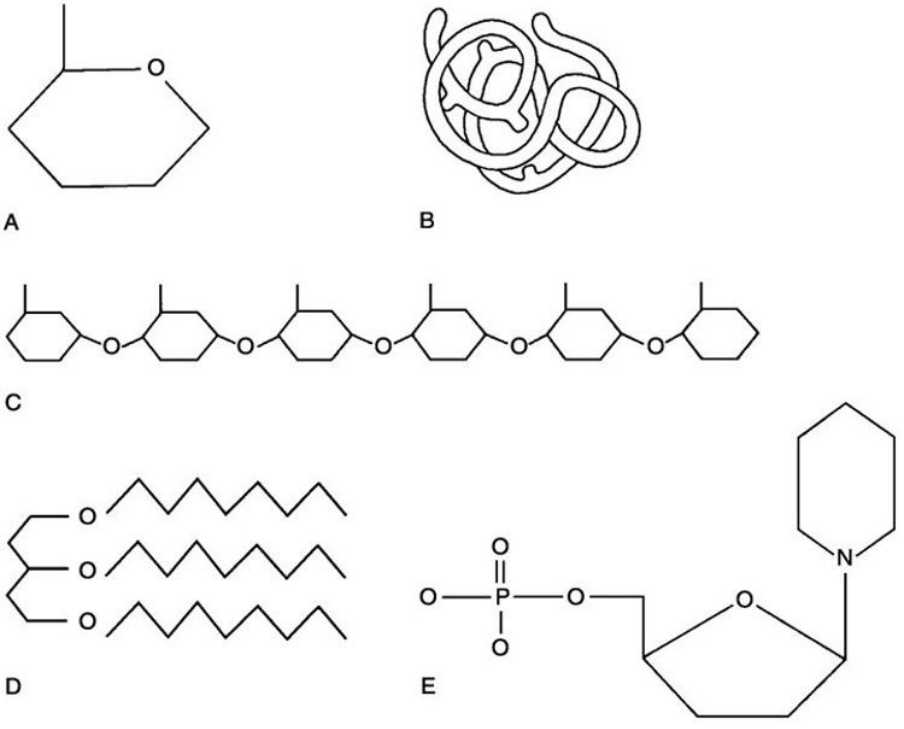

Figure 2.1

Using Figure 2.1, match the following:

132) Lipid. 132) _____

133) Functional protein. 133) _____

134) Nucleotide. 134) _____

135) Polysaccharide. 135) _____

136) Monosaccharide. 136) _____

137) Polymer. 137) _____

138) Tertiary (protein) structure. 138) _____

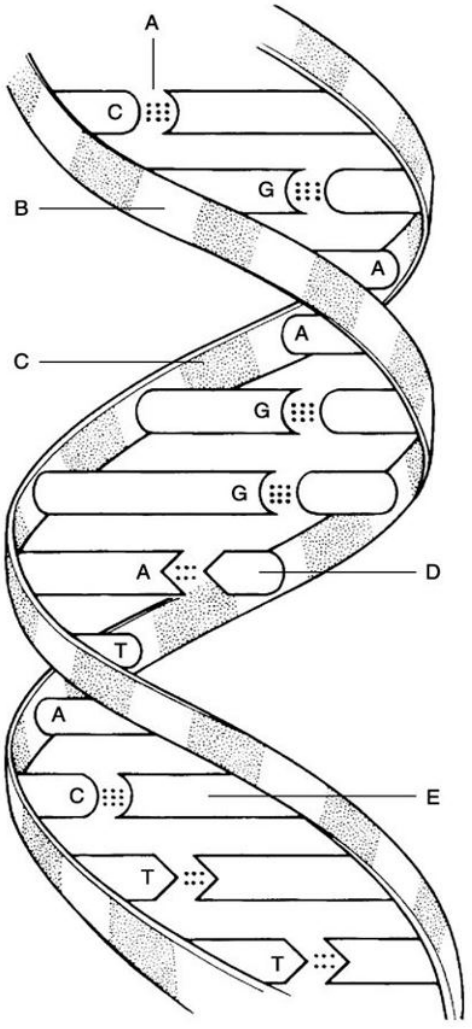

Figure 2.2

Using Figure 2.2, match the following:

139) Deoxyribose sugar. 139) _____

140) Thymine. 140) _____

141) Guanine. 141) _____

142) Phosphate. 142) _____

143) Hydrogen bonds. 143) _____

MATCHING. Choose the item in column 2 that best matches each item in column 1.

Match the following chemical bonds to the correct description:

144) A bond in which electrons are shared unequally. 144) _____

145) A bond in which electrons are completely lost or gained by the atoms involved. 145) _____

146) A bond in which electrons are shared equally. 146) _____

147) A type of bond important in tying different parts of the same molecule together into a three-dimensional structure. 147) _____

A) Hydrogen bond

B) Polar covalent bond

C) Ionic bond

D) Nonpolar covalent bond

Match the following particles to the correct description:

148) Negatively charged subatomic particle. 148) _____

149) Neutral subatomic particle. 149) _____

150) Smallest particle of an element that retains its properties. 150) _____

151) Positively charged subatomic particle. 151) _____

152) Subatomic particle having an AMU (Atomic Mass Unit) of zero. 152) _____

A) Atom

B) Proton

C) Neutron

D) Electron

Match the following:

153) Water. 153) _____

154) Saline. 154) _____

155) Dry ice (frozen carbon dioxide). 155) _____

156) Blood. 156) _____

A) Solution

B) Suspension

C) Compound

Match the following:

157) Can be measured only by its effects on matter. 157) _____

158) Anything that occupies space and has mass. 158) _____

159) Although a man who weighs 175 pounds on Earth would be lighter on the moon and heavier on Jupiter, his _____ would not be different. 159) _____

160) Is a function of, and varies with, gravity. 160) _____

A) Weight

B) Matter

C) Mass

D) Energy

Match the following:

161) Legs moving the pedals of a bicycle. 161) _____

162) When the bonds of ATP are broken, energy is released to do cellular work. 162) _____

163) Energy that travels in waves. Part of the electromagnetic spectrum. 163) _____

164) Represented by the flow of charged particles along a conductor, or the flow of ions across a membrane. 164) _____

A) Mechanical energy

B) Electrical energy

C) Radiant energy

D) Chemical energy

Match the following:

165) Protein structure achieved when alpha-helical or beta-pleated regions of the polypeptide chain fold upon one another to produce a compact ball-like, or *globular*, molecule. 165) _____

166) The sequence of amino acids that form the polypeptide chain. 166) _____

167) Protein structure represented by alpha-helices and beta-sheets. 167) _____

168) Two or more polypeptide chains, each with its own tertiary structure. 168) _____

A) Tertiary

B) Primary

C) Quaternary

D) Secondary

Match the following:

169) Usually, the first one or two letters of an element's name.

170) Number of protons in an atom.

171) Combined number of protons and neutrons in an atom.

A) Atomic symbol

B) Mass number of an element

C) Atomic number

169) _____

170) _____

171) _____

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

172) The atomic number of any atom is equal to the number of electrons in its nucleus and is written as a subscript to the left of its atomic symbol. 172) _____

173) It is the difference in the R group that makes each amino acid chemically unique. 173) _____

174) Chemical properties are determined primarily by neutrons. 174) _____

175) A charged particle is generally called an ion or electrolyte. 175) _____

176) Isotopes differ from each other only in the number of electrons the atom contains. 176) _____

177) About 60% to 80% of the volume of most living cells consists of organic compounds. 177) _____

178) Triglycerides are a poor source of stored energy. 178) _____

179) Omega-3 fatty acids appear to decrease the risk of heart disease. 179) _____

180) Glucose is an example of a monosaccharide. 180) _____

181) Glycogen, the storage form of glucose, is primarily stored in skeletal muscle and liver cells. 181) _____

182) The lower the pH, the higher the hydrogen ion concentration. 182) _____

183) The sharing of electrons in covalent bonds makes them stronger than ionic and hydrogen bonds. 183) _____

184) Hydrogen bonds are too weak to bind atoms together to form molecules, but they do hold different parts of a single large molecule in a specific three-dimensional shape. 184) _____

185) The fact that no chemical bonding occurs between the components of a mixture is the chief difference between mixtures and compounds. 185) _____

186) The acidity of a solution reflects the concentration of free hydrogen ions in the solution. 186) _____

187) A chemical bond is an energy relationship between outer electrons and neighboring atoms. 187) _____

188) All organic compounds contain carbon except CO_2 and CO. 188) _____

189) A dipeptide can be broken into two amino acids by dehydration synthesis. 189) _____

190) The pH of body fluids must remain fairly constant for the body to maintain homeostasis. 190) _____

191) Mixtures are combinations of elements or compounds that are physically blended together but are not bound by chemical bonds. 191) _____

192) Buffers resist abrupt and large changes in the pH of body fluids by releasing or binding ions. 192) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

193) Which of the following elements is necessary for proper conduction of nerve impulses? 193) _____
A) P B) Fe C) Na D) I

194) The basic structural material of the body consists of _____. 194) _____
A) lipids B) nucleic acids C) proteins D) carbohydrates

195) In general, the lipids that we refer to as oils at room temperature have _____. 195) _____
A) long fatty acid chains B) unsaturated fatty acids
C) a high water content D) saturated fatty acids

196) The genetic information is coded in DNA by the _____. 196) _____
A) arrangement of the histones
B) three-dimensional structure of the double helix
C) sequence of the nucleotides
D) regular alteration of sugar and phosphate molecules

197) Which of the following does NOT characterize proteins? 197) _____
A) Their function depends on their three-dimensional shape.
B) They have both functional and structural roles in the body.
C) They may be denatured or coagulated by heat or acidity.
D) They appear to be the molecular carriers of coded hereditary information.

198) The single most abundant protein in the body is _____. 198) _____
A) glucose B) hemoglobin C) collagen D) DNA

199) Carbohydrates are stored in the liver and skeletal muscles in the form of _____. 199) _____
A) glycogen B) glucose C) triglycerides D) cholesterol

200) Which of the following does NOT describe enzymes? 200) _____
A) Each enzyme is chemically specific.
B) Some enzymes are purely protein.
C) Enzymes work by raising the energy of activation.
D) Some enzymes are protein plus a cofactor.

201) Which of the following is a general function for a fibrous protein? 201) _____
A) structural framework
B) catalysis
C) protein management
D) transport
E) body defense

202) A chemical reaction in which bonds are created is usually associated with _____. 202) _____
A) forming a smaller molecule
B) the consumption of energy
C) the release of energy
D) degradation

203) Salts are always _____. 203) _____
A) single covalent compounds
B) hydrogen bonded
C) double covalent compounds
D) ionic compounds

204) The numbers listed represent the number of electrons in the first, second, and third energy levels, respectively. On this basis, which of the following is an unstable or reactive atom? 204) _____
A) 2
B) 2, 8, 8
C) 2, 8, 1
D) 2, 8

205) Which of the following statements is FALSE? 205) _____
A) The pH of blood is slightly basic.
B) The more hydrogen ions in a solution, the more acidic the solution.
C) When acids and bases are mixed, they react with each other to form water and a salt.
D) When the hydrogen ion concentration decreases, the hydroxyl ion concentration also decreases.

206) Which of the following is the major positive ion outside cells? 206) _____
A) hydrogen
B) sodium
C) potassium
D) magnesium

207) Which of the following would be regarded as an organic molecule? 207) _____
A) NaOH
B) H_2O
C) CO_2
D) CH_4

208) What is a chain of more than 50 amino acids called? 208) _____
A) triglyceride
B) polysaccharide
C) nucleic acid
D) protein

209) What structural level is represented by the sequence of amino acids in a polypeptide chain? 209) _____
A) primary structure
B) secondary structure
C) tertiary structure
D) quaternary structure

210) Carbohydrates and proteins are built up from their basic building blocks by the _____. 210) _____
A) removal of a carbon atom between each two units
B) addition of a water molecule between each two units
C) removal of a water molecule between each two units
D) addition of a carbon atom between each two units

211) Which statement about enzymes is FALSE? 211) _____
A) Enzymes may use coenzymes derived from vitamins or cofactors from metallic elements.
B) Enzymes may be damaged by high temperature.
C) Enzymes require contact with substrate in order to assume their active form.
D) Most enzymes can catalyze millions of reactions per minute.

212) Which of the following statements is FALSE? 212) _____

A) Catalysts increase the rate of chemical reactions, sometimes while undergoing reversible changes in shape.
B) Chemical reactions proceed more quickly at higher temperatures.
C) Larger particles move faster than smaller ones and thus collide more frequently and more forcefully.
D) Chemical reactions progress at a faster rate when the reacting particles are present in higher numbers.

213) Choose the answer that best describes HCO_3^-. 213) _____

A) a bicarbonate ion
B) a weak acid
C) common in the liver
D) a proton donor

214) Select which reactions will usually be irreversible regarding chemical equilibrium in human bodies. 214) _____

A) glucose molecules joined to make glycogen
B) glucose to CO_2 and H_2O
C) $H_2O + CO_2$ to make H_2CO_3
D) ADP + Pi to make ATP

215) What happens in redox reactions? 215) _____

A) the reaction is uniformly reversible
B) the organic substance that loses hydrogen is usually reduced
C) both decomposition and electron exchange occur
D) the electron acceptor is oxidized

216) Which type of proteins can function as chemical messengers or as receptors in the plasma membrane? 216) _____

A) defensive B) enzyme C) transport D) communication

217) Which of the following does NOT describe uses for the ATP molecule? 217) _____

A) transport down their concentration gradient
B) mechanical work
C) chemical work
D) pigment structure

218) Select the most correct statement regarding nucleic acids. 218) _____

A) DNA is a long, double-stranded molecule made up of A, T, G, and C bases.
B) tDNA is considered a "molecular slave" of DNA during protein synthesis.
C) RNA is a long, single-stranded molecule made up of the bases A, T, G, and C.
D) Three forms exist: DNA, RNA, and tDNA.

219) Which of the following is an example of a suspension? 219) _____

A) salt water B) blood C) cytosol D) rubbing alcohol

220) If the atomic mass of an element is 14 and the atomic number is 6, which of the following would describe this element? 220) _____

A) atom B) isotope C) neutral D) ion

221) The four elements that make up about 96% of body weight are _____. 221) _____

A) sodium, potassium, hydrogen, oxygen
B) carbon, oxygen, hydrogen, nitrogen
C) carbon, oxygen, phosphorus, calcium
D) nitrogen, hydrogen, calcium, sodium

222) _____ is fat soluble, produced in the skin on exposure to UV radiation, and necessary for normal bone growth and function. 222) _____

A) Vitamin A B) Vitamin D C) Cortisol D) Vitamin K

223) You notice that you cannot read your book through a test tube of patient fluid held against the print, making it so blurred as to be unreadable. There is no precipitant in the bottom of the beaker, though it has been sitting for several days in a rack. What type of liquid is this? 223) _____

A) suspension B) mixture C) colloid D) solution

224) Atom X has 17 protons. How many electrons are in its valence shell (outermost energy level)? 224) _____

A) 7 B) 10 C) 5 D) 3

225) A high fever causes an enzyme to lose its three-dimensional structure and function. Which bonds are broken when a protein denatures? 225) _____

A) hydrogen bonds
B) ionic bonds
C) polar covalent bonds
D) non-polar covalent bonds

226) If atom X has an atomic number of 74 it would have which of the following? 226) _____

A) 74 protons
B) 37 protons and 37 electrons
C) 37 protons and 37 neutrons
D) 37 electrons

227) What does the formula $C_6H_{12}O_6$ mean? 227) _____

A) The substance is a colloid.
B) The molecular weight is 24.
C) There are 6 calcium, 12 hydrogen, and 6 oxygen atoms.
D) There are 6 carbon, 12 hydrogen, and 6 oxygen atoms.

228) An atom with 3 electrons in its outermost (valence) shell may have a total of _____ electrons altogether. 228) _____

A) 8 B) 3 C) 13 D) 17

229) Which of the following is a neutralization reaction? 229) _____

A) $NaOH \rightarrow Na^+ + OH^-$
B) $HCl \rightarrow H^+ + Cl^-$
C) $NH_3 + H^+ \rightarrow NH_4^{+2}$
D) $HCl + NaOH \rightarrow NaCl + H_2O$

230) The chemical symbol O=O means _____. 230) _____

A) both atoms are bonded and have zero electrons in the outer orbit
B) zero equals zero
C) the atoms are double bonded
D) this is an ionic bond with two shared electrons

231) What is a cation? 231) _____

A) a molecule that has both positive and negative charges
B) an atom that shares its valence electrons
C) an atom that gains one or more electrons and acquires a net negative charge
D) an atom that loses one or more electrons and acquires a net positive charge

232) What does CH_4 mean? 232) _____

A) There are four carbon and four hydrogen atoms.
B) This is an inorganic molecule.
C) This was involved in a redox reaction.
D) There is one carbon and four hydrogen atoms.

233) Amino acids joining together to make a peptide is a good example of a(n) _____ reaction. 233) _____

A) reversible B) synthesis C) exchange D) decomposition

234) Which of the following is NOT considered a factor in influencing a reaction rate? 234) _____

A) concentration of reactants B) time
C) temperature D) particle size

235) Which property of water is demonstrated when we sweat? 235) _____

A) polar solvent properties
B) high heat capacity
C) high heat of vaporization
D) reactivity
E) cushioning

236) Starch is a _____. 236) _____

A) monosaccharide B) disaccharide
C) triglyceride D) polysaccharide

237) What is the ratio of fatty acids to glycerol in triglycerides (neutral fats)? 237) _____

A) 2:1 B) 4:1 C) 3:1 D) 1:1

238) In a DNA molecule, the phosphate serves _____. 238) _____

A) to hold the molecular backbone together B) as nucleotides
C) as a code D) to bind the sugars to their bases

239) When frying an egg, the protein albumin denatures and maintains only its _____ structure. 239) _____

A) tertiary B) quaternary C) primary D) secondary

240) Which of the following is chemically inert (unreactive)? 240) _____

A) carbon (atomic number 6) B) sodium (atomic number 11)
C) oxygen (atomic number 8) D) neon (atomic number 10)

241) An atom with an atomic number of 10 and a mass number of 24 would have _____. 241) _____

A) 14 electrons B) 10 neutrons C) 24 protons D) 14 neutrons

242) When DNA is replicated, it is necessary for the two strands to "unzip" temporarily. Choose which bonding type is most appropriate for holding the strands together in this way. 242) _____

A) hydrogen bonding
B) ionic bonding
C) non-polar covalent bonding
D) polar covalent bonding

243) Lithium has an atomic number of 3. How many electrons are there in the outermost (valence) shell? 243) _____

A) one B) two C) three D) zero

244) ATP $\rightarrow$ADP + Pi is an example of a(n) _____ reaction. 244) _____

A) reversible B) decomposition C) synthesis D) exchange

245) An acid with a pH of 6 has _____ hydrogen ions than pure water. 245) _____

A) 100-fold fewer B) 10-fold fewer C) 100-fold more D) 10-fold more

246) A patient is hyperventilating. The "blowing off" of excessive carbon dioxide causes a decrease in blood H^+ concentration. How can the carbonic acid-bicarbonate buffer system function to correct this imbalance? 246) _____

$CO_2 + H_2O \leftrightarrow H_2CO_3 \leftrightarrow H^+ + HCO_3^-$

A) H_2CO_3 dissociates to form more H^+ and lower pH
B) HCO_3^- binds with H^+ to form H_2CO_3 and lower pH
C) H_2CO_3 dissociates to form more H^+ and raise pH
D) HCO_3^- binds with H^+ to form H_2CO_3 and raise pH

247) Forming glycogen as energy storage in the liver is an example of _____. 247) _____

A) oxidation B) exergonic C) anabolism D) catabolism

248) Salivary amylase is an enzyme produced by the salivary glands that breaks down carbohydrates. What will happen to this enzyme as it follows the food into the stomach where the pH drops to 2.5? 248) _____

A) The enzyme will assume an alternate form and catalyze additional reactions.
B) The enzyme will denature and become inactive.
C) The enzyme will continue to function as it remains unchanged in chemical reactions.
D) The enzyme will denature but retain its function.

249) With a family history of cardiovascular disease, which toast spread would be considered the most "heart healthy"? 249) _____

A) butter containing butterfat
B) lard (pig fat)
C) olive oil
D) margarine containing trans fats

250) Which of the following is *incorrectly* matched? 250) _____

A) amino acid; protein
B) nucleotide; nucleic acid
C) eicosanoid; triglyceride
D) monosaccharide; carbohydrate

251) Starch is the stored carbohydrate in plants, while _____ is the stored carbohydrate in animals. 251) _____

A) cellulose B) triglyceride C) glucose D) glycogen

252) How many phosphates would ADP have attached to it? 252) _____

A) two B) none C) one D) three

253) Tendons are strong, rope-like structures that connect skeletal muscle to bone. Which of the following proteins would provide strength to a tendon? 253) _____

A) albumin B) collagen
C) molecular chaperone D) actin

254) Phospholipids make up most of the lipid part of the cell membrane. Since water exists on both the outside and inside of a cell, which of the following phospholipid arrangements makes the most sense? 254) _____

A) a single layer of phospholipids with the polar heads facing inside the cell
B) two back-to-back phospholipid layers with the non-polar tails facing out on both sides
C) two back-to-back phospholipid layers with the polar heads facing out on both sides
D) a single layer of phospholipids with the polar heads facing outside the cell

255) What type of chemical bond can form between an atom with 11 protons and an atom with 17 protons? 255) _____

A) ionic B) hydrogen
C) polar covalent D) non-polar covalent

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

256) What happens when globular proteins are denatured? 256) _____

257) Explain the difference between potential and kinetic energy. 257) _____

258) How can phospholipids form a film when mixed in water? 258) _____

259) What properties does water have that make it a very versatile fluid? 259) _____

260) What advantages does ATP have in being the energy currency molecule? 260) _____

261) Explain why water is considered to have partial charges even though it is sharing electrons in a polar covalent bond. 261) _____

262) When a set of electrodes connected to a light bulb is placed in a solution of dextrose and a current is applied, the light bulb does not light up. When the same unit is placed in HCl, it does. Why? 262) _____

263) Describe the factors that affect chemical reaction rates. 263) _____

264) Protons and electrons exist in every atom nucleus except hydrogen. Is this statement true or false and why? 264) _____

265) A chemical bond never occurs between components of a mixture. Discuss this. 265) _____

266) All chemical reactions are theoretically reversible. Comment on this statement. 266) _____

267) What is the major difference between polar and nonpolar covalent bonds? 267) _____

268) An amino acid may act as a proton acceptor or donor. Explain. 268) _____

269) Name at least four things you know about enzymes. 269) _____

270) In the compound H_2CO_3, what do the numbers 2 and 3 represent? 270) _____

271) Are all chemical reactions reversible? If not, why aren't they all reversible? 271) _____

272) If all protons, electrons, and neutrons are alike, regardless of the atom considered, what determines the unique properties of each element? 272) _____

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

273) Mrs. Mulligan goes to her dentist and, after having a couple of cavities filled, her dentist strongly suggests that she reduce her intake of sodas and increase her intake of calcium phosphates in the foods she eats. Why?

274) Although his cholesterol levels were not high, Mr. Martinez read that cholesterol was bad for his health, so he eliminated all foods and food products containing this molecule. He later found that his cholesterol level dropped only 20%. Why did it not drop more?

275) How can DNA be used to "fingerprint" a suspect in a crime?

276) Why is it possible for us to drink a solution that contains a mixture of equal concentration of a strong acid and a strong base, either of which, separately, would be very caustic?

277) A 65-year-old patient came to the emergency room with complaints of severe heartburn unrelieved by taking a "large handful" of antacids. Would you expect the pH to be high or low? Explain why.

278) A 22-year-old female college student is stressed out due to final exams and begins to hyperventilate. This means she is exhaling too much carbon dioxide. As a result, the pH of the blood will become too basic creating a homeostatic imbalance. Her friend hands her a paper bag and instructs her to inhale and exhale into the bag. Breathing in the bag helps to replace the lost carbon dioxide lowering the pH back to normal levels. Which buffer system in the body will be involved in this reaction?

279) Brenda is a 26-year-old female who is being discharged from the hospital after a vaginal delivery of an 8-pound healthy infant. Brenda is instructed by the nurse to eat a diet high in fiber and to drink 8 glasses of water per day to prevent constipation. Explain the role of fiber and water to promote defecation.

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

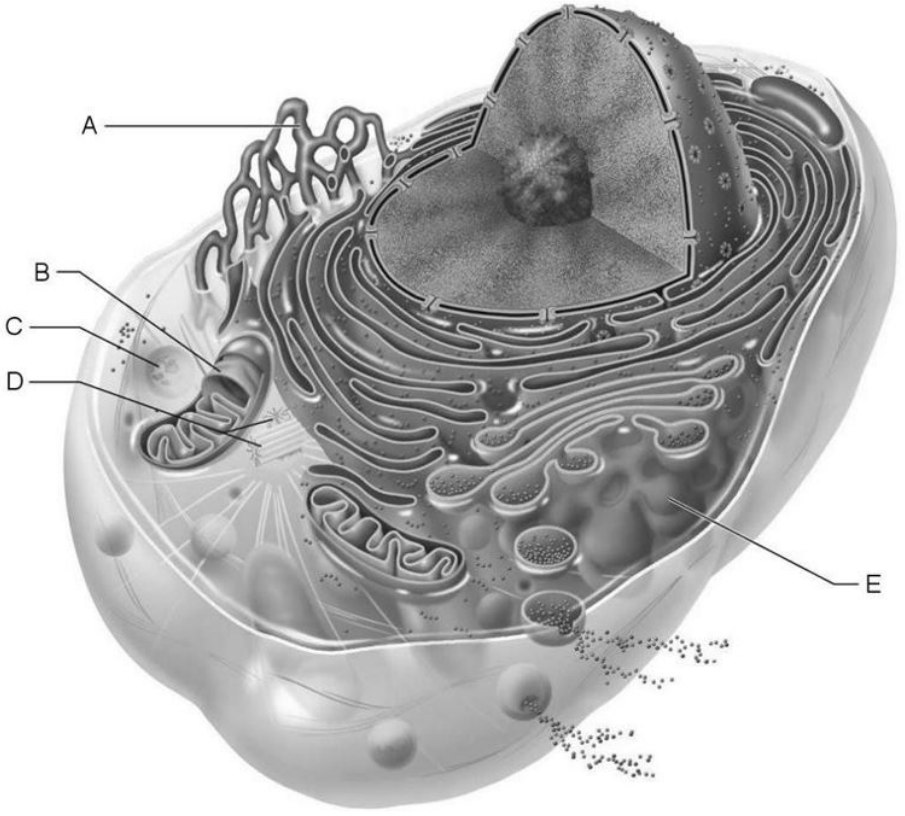

Figure 3.1

Using Figure 3.1, match the following:

280) Produces ATP aerobically. 280) _____

281) Site of enzymatic breakdown of phagocytized material. 281) _____

282) Packages proteins for insertion in the cell membrane or for exocytosis. 282) _____

283) Site of synthesis of lipid and steroid molecules. 283) _____

284) Forms the mitotic spindle. 284) _____

285) Replicate for cell division. 285) _____

286) When ruptured it releases the enzymes responsible for autolysis. 286) _____

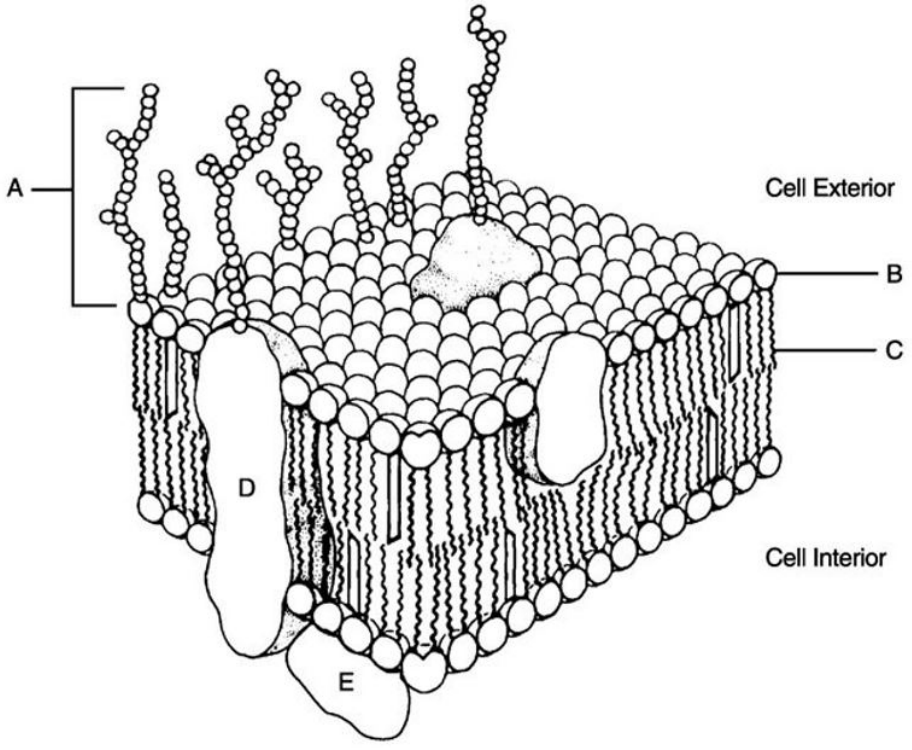

Figure 3.2

Using Figure 3.2, match the following:

287) Nonpolar region of phospholipid. 287) _____

288) Glycocalyx. 288) _____

289) Polar region of phospholipid. 289) _____

290) Peripheral protein. 290) _____

291) Integral protein. 291) _____

292) Unique glycoproteins and glycolipids involved in cell recognition. 292) _____

293) Hydrophilic portion of phospholipid. 293) _____

MATCHING. Choose the item in column 2 that best matches each item in column 1.

Match the following:

294) Forms part of the subunits for the protein synthesizing organelle. 294) _____

295) A molecule that binds to a specific codon and specific amino acid simultaneously. 295) _____

296) Attaches the correct amino acid to its transfer RNA. 296) _____

297) Provides the energy needed for synthesis reactions. 297) _____

298) Produced in the nucleus, this molecule specifies the exact sequence of amino acids of the protein to be made. 298) _____

299) May be attached to the ER or scattered in the cytoplasm. 299) _____

A) Messenger RNA

B) Synthetase enzymes

C) ATP

D) Transfer RNA

E) Ribosomal RNA

Match the following:

300) Chromosomes uncoil to form chromatin. 300) _____

301) Chromosomal centromeres split and chromosomes migrate to opposite ends of the cell. 301) _____

302) Nuclear membrane and nucleolus disintegrate. 302) _____

303) Chromosomes align on the spindle equator. 303) _____

304) Centrioles move to opposite ends of the cell. 304) _____

A) Late prophase

B) Metaphase

C) Telophase

D) Early prophase

E) Anaphase

Match the following:

305) This organelle modifies, concentrates, and packages the proteins and lipids made at the RER for domestic use or export. 305) _____

306) The organelle that facilitates peptic bond formation between amino acids. 306) _____

307) This organelle contains oxidases and catalases. 307) _____

308) This is an elaborate network of rods and accessory proteins found in the cytosol that support cellular structures and provide the machinery to generate various cell movements, as well as provide the "roads" for vesicular trafficking. 308) _____

309) The vast majority of the cell's genetic material is housed here. 309) _____

A) Cytoskeleton

B) Peroxisomes

C) Golgi apparatus

D) Nucleus

E) Ribosomes

Match the following:

310) Help prevent molecules from passing through the extracellular space between adjacent cells. 310) _____

311) Type of anchoring junction. 311) _____

312) Allows ions and small molecules to pass through from one cell to another. 312) _____

313) Present in electrically excitable tissues. 313) _____

314) Abundant in tissues subjected to great mechanical stress. 314) _____

A) Tight junctions

B) Gap junctions

C) Desmosomes

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

315) Each daughter cell resulting from mitotic cell division has exactly the same genetic composition. 315) _____

316) Apoptosis is programmed cell death; cancer cells do not undergo this process. 316) _____

317) Introns represent a genome scrap yard that provides DNA segments for genome evolution and a variety of small RNA molecules. 317) _____

318) Enzymes and proteins needed for cell division are synthesizes and put into place during G_2 phase. 318) _____

319) Phagocytosis is used by the cells to secrete intracellular substances to the outside of the cell. 319) _____

320) Osmosis is the passive movement of water, but it follows almost completely opposite laws of physics when compared to the diffusion of ions or other small particles. 320) _____

321) DNA replication requires an enzyme called RNA polymerase and results in a semi-conserved new molecule of DNA. 321) _____

322) Dividing cells must pass through the phases of mitosis in the following order: Prophase, Metaphase, Anaphase, and Telophase. 322) _____

323) DNA transcription is another word for DNA replication. 323) _____

324) The glycocalyx is composed of glycolipids, glycoproteins, and cholesterol molecules that are displayed on the outside surface of the plasma membrane. 324) _____

325) Microfilaments are thin strands of the contractile protein composed of myosin. 325) _____

326) Interstitial fluid represents one type of extracellular material. 326) _____

327) Aquaporins are believed to be present in red blood cells and kidney tubules, but not in any other cells in the body. 327) _____

328) Microtubules are hollow tubes made of subunits of the protein tubulin. 328) _____

329) Telomeres are the regions of chromosomes that code for the protein ubiquitin. 329) _____

330) The speed of individual particle diffusion is influenced by temperature and particle size, not by concentration. 330) _____

331) Concentration differences cause ionic imbalances that polarize the cell membrane, and active transport processes. 331) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

332) Which of the following is FALSE regarding the membrane potential? 332) _____
A) The resting membrane potential is determined mainly by the concentration gradients and differential permeability of the plasma membrane to K^+ and Na^+ ions.
B) The resting membrane potential is maintained solely by passive transport processes.
C) In their resting state, all body cells exhibit a resting membrane potential.
D) The resting membrane potential occurs due to active transport of ions across the membrane due to the sodium-potassium pump.

333) Which vesicular transport process occurs primarily in some white blood cells and macrophages? 333) _____
A) pinocytosis
B) phagocytosis
C) intracellular vesicular trafficking
D) exocytosis

334) In certain kinds of muscle cells, calcium ions are stored in _____. 334) _____
A) the rough ER
B) both smooth and rough ER
C) the smooth ER
D) the cytoplasm

335) The RNA responsible for bringing the amino acids to the ribosome for protein formation is _____. 335) _____
A) ssRNA B) rRNA C) tRNA D) mRNA

336) A red blood cell placed in pure water would _____. 336) _____
A) swell initially, then shrink as equilibrium is reached
B) neither shrink nor swell
C) swell and burst
D) shrink

337) Which of the following describes the plasma membrane? 337) _____
A) a phospholipid bilayer surrounding the cell
B) a membrane composed of tiny shelves or cristae
C) a single-layered membrane that surrounds the nucleus of the cell
D) a double layer of protein enclosing the plasma

338) Which of the following structures would aid a cell in allowing more nutrients to be absorbed by the cell? 338) _____
A) flagella B) primary cilia C) stereocilia D) microvilli

339) Which of the following statements is correct regarding net diffusion? 339) _____
A) The rate is independent of temperature.
B) Molecular weight of a substance does not affect the rate.
C) The lower the temperature, the faster the rate.
D) The greater the concentration gradient, the faster the rate.

340) In a tissue type that undergoes a relatively great deal of mechanical stress, like the tissue that lines the intestine, you would expect to see an abundance of _____ between the individual cells of the tissue. 340) _____
A) connexons B) tight junctions C) gap junctions D) desmosomes

341) If cells are placed in a hypotonic solution containing a solute to which the membrane is impermeable, what could happen? 341) _____
A) The cells will show no change due to diffusion of both solute and solvent.
B) The cells will lose water and shrink.
C) The cells will swell and ultimately burst.
D) The cells will shrink at first, but will later reach equilibrium with the surrounding solution and return to their original condition.

342) Riboswitches are folded RNAs that act as switches to turn protein synthesis on or off in response to _____. 342) _____
A) the presence or absence of ubiquitins
B) specific codes from the DNA
C) specific tRNAs
D) changes in the environment

343) Which of the following is a function of a plasma membrane protein? 343) _____
A) forms a lipid bilayer
B) molecular transport through the membrane
C) oxygen transport
D) circulating antibody

344) Which of the following statements is correct regarding RNA? 344) _____
A) There is exactly one specific type of mRNA for each amino acid.
B) Messenger RNA, transfer RNA, and ribosomal RNA play a role in protein synthesis.
C) If the base sequence of DNA is ATTGCA, the messenger RNA template will be UCCAGU.
D) rRNA is always attached to the rough ER.

345) Which of the following would NOT be a constituent of a plasma membrane? 345) _____
A) glycoproteins B) glycolipids
C) messenger RNA D) phospholipids

346) Mitosis _____. 346) _____
A) is the formation of sex cells
B) is division of the genetic material within the nucleus
C) is always a part of the cell cycle
D) creates diversity in genetic potential

347) The electron microscope has revealed that one of the components within the cell consists of pinwheel array of 9 triplets of microtubules arranged to form a hollow tube. This structure is a _____. 347) _____
A) centriole B) centrosome C) chromosome D) ribosome

348) Which of these is an inclusion, not an organelle? 348) _____
A) lysosome B) cilia C) melanin D) microtubule

349) Which of the following is NOT a factor that binds cells together? 349) _____
A) special membrane junctions
B) glycoproteins in the glycocalyx
C) wavy contours of the membranes of adjacent cells
D) glycolipids in the glycocalyx

350) If the nucleotide or base sequence of the DNA strand used as a template for messenger RNA synthesis is ACGTT, then what would be the sequence of bases in the corresponding mRNA? 350) _____
A) UGCAA B) ACGTT C) GUACC D) TGCAA

351) Which transport process is the main mechanism for the movement of most macromolecules by body cells? 351) _____
A) phagocytosis B) secondary active transport
C) receptor-mediated endocytosis D) pinocytosis

352) Passive membrane transport processes include _____. 352) _____
A) consumption of ATP
B) the use of transport proteins when moving substances from areas of low to high concentration
C) movement of a substance down its concentration gradient
D) movement of water from an area of high solute concentration to an area of low concentration

353) Which of the following is NOT a function of the smooth endoplasmic reticulum? 353) _____
A) breakdown of stored glycogen to form free glucose
B) steroid-based hormone synthesis
C) lipid metabolism and cholesterol synthesis
D) protein synthesis in conjunction with ribosomes

354) Mitochondria _____. 354) _____
A) synthesize proteins for use outside the cell
B) are single-membrane structures involved in the breakdown of ATP
C) contain some of the DNA and RNA code necessary for their own function
D) contain digestive enzymes called acid hydrolyses

355) Peroxisomes _____. 355) _____
A) sometimes function as secretory vesicles
B) are able to detoxify substances by enzymatic action
C) are functionally the same as lysosomes
D) function to digest particles ingested by endocytosis

356) Which of the following is NOT a function of lysosomes? 356) _____
A) breaking down bone to release calcium ions into the blood
B) digesting particles taken in by endocytosis
C) degrading worn-out or nonfunctional organelles
D) help in the formation of cell membranes

357) In which stage of mitosis do the identical sets of chromosomes line up along the midline or equator of the cell? 357) _____
A) metaphase B) anaphase C) telophase D) prophase

358) Which of the following is a principle of the fluid mosaic model of cell membrane structure? 358) _____
A) The lipid bilayer is a solid at body temperature, thus protecting the cell.
B) Phospholipids form a bilayer that is largely impermeable to water-soluble molecules.
C) Phospholipids consist of a polar head and a nonpolar tail made of three fatty acid chains.
D) All proteins associated with the cell membrane are contained in a fluid layer on the outside of the cell.

359) Which of the following statements is most correct regarding the intracellular chemical signals known as "second messengers"? 359) _____
A) Second messengers usually inactivate protein kinase enzymes.
B) Second messengers usually act to remove nitric oxide (NO) from the cell.
C) Second messengers act through receptors called K-proteins.
D) Cyclic AMP and calcium may be second messengers.

360) Which organelle is responsible for processing and packaging proteins destined for export from the cell? 360) _____
A) peroxisomes B) lysosomes
C) Golgi apparatus D) endoplasmic reticulum

361) The functions of centrioles include _____. 361) _____
A) serving as the site for ribosomal RNA synthesis
B) producing ATP
C) organizing the mitotic spindle in cell division
D) providing a whiplike beating motion to move substances along cell surfaces

362) A gene can best be defined as _____. 362) _____
A) noncoding segments of DNA up to 100,000 nucleotides long
B) a segment of DNA that carries the instructions for one polypeptide chain
C) an RNA messenger that codes for a particular polypeptide
D) a three-base triplet that specifies a particular amino acid

363) Crenation (shrinking) is likely to occur in blood cells immersed in _____. 363) _____
A) blood plasma B) a hypotonic solution
C) a hypertonic solution D) an isotonic solution

364) Some hormones enter cells via _____. 364) _____
A) pinocytosis B) primary active transport
C) receptor-mediated endocytosis D) exocytosis

365) If a tRNA had an AGC anticodon, it could attach to a(n) _____ mRNA codon. 365) _____
A) UCG B) TCG C) UGA D) AUG

366) Which of the following is NOT one of the concepts collectively known as the cell theory? 366) _____
A) Cells only arise from other cells.
B) All cells must be motile and divide.
C) All organisms are made of one or more cells.
D) The cell is the smallest unit of life.

367) If a human cell were to increase the amount of cholesterol embedded within its plasma membrane, which of the following would most likely happen? 367) _____
A) The cell would form a plaque that could potentially block a blood vessel.
B) The plasma membrane would become more stable, less fluid, and less permeable.
C) The plasma membrane would become more fluid and the phospholipids less stable.
D) The plasma membrane would become more permeable to ions and less permeable to lipids.

368) Cancerous cells can divide so rapidly that they will often produce a glycocalyx that is different than the other cells in the body. This may result in _____. 368) _____
A) allowing the cancer cells to bind to their healthy, neighboring cells
B) the cancer cells conserving energy for more growth
C) cells of the immune system recognizing the tumorous cells as foreign and destroying them
D) a decrease in the permeability of the tumor cell's plasma membrane preventing the uptake of chemotherapy drugs

369) The myocardium (cardiac muscle tissue) undergoes a significant amount of physical stress due to its contractions. You would expect to see relatively large numbers of which of the following embedded within their plasma membrane? 369) _____
A) glycolipids B) transport proteins
C) desmosomes D) tight junctions

370) Which of the following will NOT speed up the net rate of diffusion for glucose into a cell? 370) _____
A) Increasing the concentration of glucose outside of the cell.
B) Increasing the number of glucose transport proteins within the plasma membrane.
C) Decreasing the concentration of glucose within the cell.
D) Decreasing the number of phospholipids in the plasma membrane.

371) The lungs deliver a regular supply of oxygen to the blood, which is in turn circulated to most all the cells of the body. At the same time oxygen is consumed during aerobic cellular respiration within these cells. This implies that _____. 371) _____
A) oxygen requires active transport to enter most cells
B) oxygen will passively diffuse into the cells
C) the rate of oxygen diffusion is independent of concentration
D) the concentration gradient for oxygen is steepness inside of the cell

372) The movement of water across the plasma membrane can be described by all of the following EXCEPT _____. 372) _____
A) passive membrane transport
B) simple diffusion
C) facilitated diffusion through aquaporins
D) carrier-mediated facilitated diffusion

373) If active transport establishes a concentration gradient with the use of ATP, then the concentration gradient can be looked at as _____. 373) _____
A) potential energy that can be harnessed when molecules passively diffuse down the concentration gradient
B) an unusable byproduct of active transport that will simply diffuse away
C) a byproduct of active transport that will be alleviated by pinocytosis
D) unwanted pressure that will be alleviated by channel mediated facilitated diffusion

374) Which of the following would NOT be restricted (limited) by low levels of ATP? 374) _____
A) osmosis
B) pinocytosis
C) exocytosis
D) phagocytosis

375) A cell engulfing a relatively large particle will likely utilize _____. 375) _____
A) receptor-mediated endocytosis
B) phagocytosis
C) pinocytosis
D) exocytosis

376) If a cell is non-selectively engulfing samples of extracellular fluid, for example to absorb nutrients, it will likely utilize _____. 376) _____
A) phagocytosis
B) exocytosis
C) receptor-mediated endocytosis
D) pinocytosis

377) If a cell is selectively reducing the concentration of a particular enzyme in the extracellular fluid it will likely utilize _____. 377) _____
A) pinocytosis
B) phagocytosis
C) exocytosis
D) receptor-mediated endocytosis

378) A type of transport protein found in the plasma membrane of cells lining the inside of the intestine allows sodium ions to diffuse down their concentration gradient. The ions move through the transport protein, and into the cell. These transport proteins will use the kinetic energy of the diffusing sodium ions to bring glucose into the cells as well. This transport protein would best be described as _____. 378) _____

A) a pump
B) a symporter
C) a channel
D) a carrier protein

379) A type of transport protein found in the plasma membrane of cells lining the inside of the intestine allows sodium ions to diffuse down their concentration gradient. The ions move through the transport protein, and into the cell. These transport proteins will use the kinetic energy of the diffusing sodium ions to bring glucose into the cells as well. Which of the following would stop transport of glucose through this transport protein? 379) _____

A) Lowering the energy of activation.
B) Increasing the number of digestive enzymes in the digestive tract.
C) Increasing the concentration of glucose outside of the cell.
D) Stopping the activity of the sodium potassium pump.

380) Which of the following would NOT assist in establishing a resting membrane potential? 380) _____

A) Selective diffusion allowing fewer positively charged ions to diffuse into the cell.
B) Selective diffusion allowing more uncharged particles into the cell.
C) Having greater concentration of glycolipids on the outside surface of the membrane.
D) Selective diffusion allowing more positively charged ions to diffuse out of the cell.

381) When tissues are injured or infected, chemical signals can be releases that affect the plasma membrane of cells that line the nearby blood vessels. These blood vessels' cells (endothelial cells) respond to the chemical signals by displaying a type of glycoproteins on their surface. These proteins will attach to circulating white blood cells bringing them to the site of injury or infection. These glycoproteins would best be described as _____. 381) _____

A) desmosomes
B) Cell Adhesion Molecules (CAMs)
C) transport proteins
D) G-proteins

382) Myocardium (cardiac muscle tissue) must rhythmically contract for a lifetime. This requires a considerable amount of energy production by the cells. You would expect to see a relatively high amount of which organelle in these cells? 382) _____

A) lysosomes
B) cytoskeleton
C) mitochondria
D) smooth endoplasmic reticulum

383) Beta cells in the pancreas produce and secrete the protein hormone insulin. You would expect to see a relatively large amount of which organelles in these cells? 383) _____

A) cytoskeleton, and peroxisomes
B) mitochondria, and cilia
C) Golgi apparatus, rough endoplasmic reticulum
D) smooth endoplasmic reticulum, and lysosomes

384) Colchicine is a drug that can prevent the formation of microtubules. Which is the most likely effect colchicine would have on cell division? 384) _____

A) It will arrest mitosis by preventing the formation of spindle microtubules.
B) It will enhance mitosis by moving chromosome toward the spindle equator.
C) It would have little or no effect on mitosis.
D) It would delay mitosis by preventing S phase.

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

385) The RNA that has an anticodon and attaches to a specific amino acid is _____ RNA. 385) _____

386) Water may move through membrane pores constructed by transmembrane proteins called _____. 386) _____

387) _____ is the division of the cytoplasmic mass into two parts. 387) _____

388) The phase of a cell life cycle in which the DNA is replicated is called _____. 388) _____

389) Aerobic cellular respiration occurs in the _____. 389) _____

390) The most common intracellular cation is _____. 390) _____

391) The process of discharging particles from inside a cell to the outside is called _____. 391) _____

392) A red blood cell would swell if its surrounding solution were _____. 392) _____

393) Describe two important functions of the Golgi apparatus. 393) _____

394) Why can we say that a cell without a nucleus will ultimately die? 394) _____

395) Are random moments of particles, diffusion, and osmosis seen only in living tissue? 395) _____

396) What processes maintain a steady state "resting" membrane potential? 396) _____

397) Briefly describe the glycocalyx and its functions. 397) _____

398) If a sequence of nucleotides on one strand of DNA is CCGATT, what would the complementary sequence look like on the other strand? 398) _____

399) In all living cells hydrostatic and osmotic pressures exist. Define these pressures and explain how they are used in the concept of tonicity of the cell. 399) _____

400) Other than the nucleus, which organelle has its own DNA? 400) _____

401) How are the products of free ribosomes different from membrane-bound ribosomes? 401) _____

402) How are peroxisomes different from lysosomes? 402) _____

403) Briefly name the subphases of interphase and tell what they do. 403) _____

404) What are nucleolar organizer regions? 404) _____

405) How is the resting potential formed? How is it maintained? 405) _____

406) List possible causes of aging. 406) _____

407) What factors contribute to the fragility of the lysosome and subsequent cell autolysis? 407) _____

408) Why can we say that cells are protein factories? 408) _____

409) What are cell exons and introns? 409) _____

410) What are lipid rafts? What are their functions? 410) _____

411) Follow the pathway that a typical protein, destined for exocytosis will make as it passes from the ribosome, into the rough endoplasmic reticulum. In your answer, be sure to describe role that ribosomes play, and the events that take place in the Rough Endoplasmic reticulum. 411) _____

412) Describe the events that take place within the Golgi apparatus to a protein that is destined for secretion by the cell into the extracellular fluid. 412) _____

413) Compare a gap junction to a channel protein, how are they alike and how are the different? 413) _____

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

414) A patient was admitted to the hospital for severe dehydration. Explain what changes occur in extracellular and intracellular fluid compartments during dehydration.

415) Your patient is sitting in your office for a pre-operative appointment and asks you why he will be given a saline IV rather than one containing pure sterile water. What is your response?

416) At the age of 6 months, Caleb was diagnosed with Tay-Sachs disease. As his primary care physician, what would you tell his parents about this disease?

417) Your patient has a respiratory disease that has literally paralyzed the cilia. Explain why this patient would be at an increased risk for a respiratory infection.

418) Describe the difference in cell division between normal cells and cancer cells.

419) Research shows that neurofibrillary tangles associated with the disintegration of microtubules are the primary cause of Alzheimer's disease. If microtubules disintegrate, what then might happen to brain cells?

Answer Key
Testname: UNTITLED1

1) C
2) A
3) D
4) B
5) C
6) B
7) D
8) A
9) E
10) B
11) D
12) C
13) A
14) D
15) A
16) C
17) B
18) B
19) B
20) A
21) A
22) D
23) C
24) B
25) E
26) A
27) B
28) A
29) C
30) A
31) B
32) C
33) B
34) A
35) D
36) E
37) B
38) A
39) E
40) D
41) C
42) TRUE
43) TRUE
44) FALSE
45) FALSE
46) TRUE
47) FALSE
48) TRUE
49) FALSE
50) TRUE

51) TRUE
52) TRUE
53) TRUE
54) TRUE
55) D
56) D
57) A
58) A
59) C
60) A
61) C
62) B
63) B
64) D
65) A
66) B
67) C
68) D
69) D
70) C
71) B
72) B
73) A
74) A
75) C
76) D
77) A
78) A
79) A
80) B
81) B
82) C
83) A
84) B
85) A
86) D
87) C
88) C
89) C
90) B
91) B
92) B
93) A
94) A
95) B
96) C
97) A
98) C
99) D
100) tissues

101) Structure is specific to meet the needs of it's function.
102) olecranal
103) cervical
104) medial
105) Physiology
106) homeostasis
107) pelvic
108) visceral peritoneum
109) metabolism
110) They act to reduce friction and allow the organs to slide across cavity walls.
111) Yes, carbon dioxide is a metabolic waste the lungs excrete.
112) Anatomical terms are precise words that have limited usage, which prevents confusion when describing the location of body parts.
113) responsiveness or excitability
114) water
115) If body temperature is too low, chemical reactions slow and eventually stop. If body temperature is too high, chemical reactions speed up and body proteins lose their normal shape, resulting in loss of function.
116) afferent pathway
117) negative
118) The walls of the abdominal cavity are formed only by trunk muscles and are not reinforced by bone. The pelvic organs receive a somewhat greater degree of protection from the bony pelvis.
119) They provide a mechanism to maintain levels of substances within physiological limits.
120) positive feedback
121) Homeostatic imbalances increase our risk for disease processes and produce the changes we associate with aging.
122) respiratory system
123) The blood is provided a consistent supply of oxygen from the lungs while the circulatory system delivers carbon dioxide which will be removed from the body by the respiratory system.
124) The skeleton provides the ridged frame work (levers) for muscles to attach to. Muscles provide the force to move the bones about the joints.
125) The integument prevents entry of pathogens (germs, viruses, bacteria) OR harmful chemicals. The integumentary system prevents water (body fluid) loss.
126) The integument cools the body through sweat while the muscular system warms the body by shivering.
127) The abdominal organs are the least protected in the body because they are not surrounded by a bony covering such as the ribs, pelvis, or cranium.
128) His left upper arm
129) The pleural space contains a small amount of fluid that acts as a lubricant, allowing the pleurae to slide smoothly over each other as the lungs expand and contract. Pleurisy is an inflammation of the pleura around the lungs. When inflammation occurs in the pleural space, the pleurae do not slide smoothly and this causes severe pain that is more directly transmitted by the parietal than the visceral pleura.
130) Childbirth is based on the increasing levels of oxytocin that cause the uterine contractions. Under positive feedback, oxytocin levels increase which results in increasing strong contractions by the upper uterus that will ultimately result in the birth of the child. But this positive feedback needs numerous contraction cycles to overcome the muscular resistance to stretching in the lower uterus in order for the head to pass.
131) The wound is located on the outer side of the leg, the peroneal or fibular area.
132) D
133) B
134) E
135) C
136) A
137) C

138) B
139) B
140) D
141) E
142) C
143) A
144) B
145) C
146) D
147) A
148) D
149) C
150) A
151) B
152) D
153) C
154) A
155) C
156) B
157) D
158) B
159) C
160) A
161) A
162) D
163) C
164) B
165) A
166) B
167) D
168) C
169) A
170) C
171) B
172) FALSE
173) TRUE
174) FALSE
175) TRUE
176) FALSE
177) FALSE
178) FALSE
179) TRUE
180) TRUE
181) TRUE
182) TRUE
183) TRUE
184) TRUE
185) TRUE
186) TRUE
187) TRUE

188) TRUE
189) FALSE
190) TRUE
191) TRUE
192) TRUE
193) C
194) C
195) B
196) C
197) D
198) C
199) A
200) C
201) A
202) B
203) D
204) C
205) D
206) B
207) D
208) D
209) A
210) C
211) C
212) C
213) A
214) B
215) C
216) D
217) D
218) A
219) B
220) B
221) B
222) B
223) C
224) A
225) A
226) A
227) D
228) C
229) D
230) C
231) D
232) D
233) B
234) B
235) C
236) D
237) C

238) A
239) C
240) D
241) D
242) A
243) A
244) B
245) D
246) A
247) C
248) B
249) C
250) C
251) D
252) A
253) B
254) C
255) A
256) The active sites are destroyed.
257) Potential energy is inactive stored energy that has potential to do work. Kinetic energy is energy in action.
258) Phospholipids have both polar and nonpolar ends. The polar end interacts with water, leaving the nonpolar end oriented in the opposite direction.
259) High heat capacity, high heat of vaporization, polar solvent properties, reactivity, and cushioning.
260) Its energy is easy to capture and store; it releases just the right amount of energy for the cell's needs so it is protected from excessive energy release. A universal energy currency is efficient because a single system can be used by all the cells in the body.
261) Due to the electronegativity of oxygen, it pulls the shared electron more strongly than the hydrogen. As a result, the oxygen acquires a partial negative charge, and the hydrogens acquire a partial positive charge.
262) HCl ionizes to form current-conducting electrolytes. Dextrose does not ionize, and therefore does not conduct current.
263) Temperature increases kinetic energy and therefore the force of molecular collisions. Particle size: smaller particles move faster at the same temperature and therefore collide more frequently; also, smaller particles have more surface area given the same concentration of reactants. Concentration: the higher the concentration, the greater the chance of particles colliding. Catalysts increase the rate of the reaction at a given temperature. Enzymes are biological catalysts.
264) False. Hydrogen has one proton and one electron. It is the neutron, not the electron that can coexist in the nucleus and that hydrogen does not have.
265) Mixtures come in three forms–solutions, colloids, and suspensions. Components of these mixtures always retain their original makeup and can be separated into their individual components; therefore, no chemical bonding has taken place.
266) It is possible to reverse any reaction if the products are still present. Those that are only slightly exergonic are easily reversible. Some would require an enormous amount of energy to reverse. In the simple reaction Na + Cl →NaCl the amount of energy it takes to reverse table salt to chlorine gas and sodium metal is enormous. When glucose is oxidized the energy goes into bonds of ATP molecules which are then spent and thus the energy is not available to reform glucose.
267) Polar bonds have an unequal sharing of electrons resulting in a slight negative charge at one end of the molecule and a slight positive charge at the other end. Nonpolar bonds have an equal sharing of electrons, resulting in a balanced charge among the atoms.
268) Amino acids have two components–a base group (proton acceptor) and an organic acid part (a proton donor). Some have additional base or acid groups on the ends of their R groups as well.

269) 1. Most are proteins.
2. They have specific binding sites for specific substrates.
3. They lower the activation barrier for a specific reaction.
4. The names often end in "Suffix: -ase."
5. They can be denatured.
6. They can be used again and again.

270) The 2 indicates that there are two hydrogen atoms in the compound and the 3 indicates that there are three oxygen atoms in the compound.

271) All chemical reactions are theoretically reversible, but only if the products are not consumed and enough energy is available for the reaction.

272) Atoms of different elements are composed of different numbers of protons, electrons, and neutrons.

273) Sodas are strong acids that can reduce bone and tooth salts. Calcium phosphate makes teeth hard and therefore more resistant to tooth decay.

274) Cholesterol is produced by the liver, in addition to being ingested in foods.

275) The DNA of a person is unique to that individual. By obtaining the DNA from nucleated cells from the crime scene (e.g., blood, semen, other body tissues), enzymes may be used to break up the DNA into fragments. Because nearly everyone's DNA is different, it also breaks up into fragments differently. When the fragments are separated, they form patterns even more unique than fingerprint patterns. A match of suspect and crime scene DNA is strong evidence.

276) When an acid and base of equal strength are mixed, they undergo a displacement (neutralization) reaction to form water and a salt.

277) You would expect a high pH. Taking antacids will neutralize the acidic stomach. Taking a "handful" of antacids can cause an alkaloid state. Certain drugs, such as corticosteroids and antacids that contain baking soda, will lead to metabolic alkalosis.

278) The bicarbonate buffer system is going to be involved in this situation. In this buffer system, the weak acid is carbonic acid, which is formed from the reaction between carbon dioxide and water. The body responds to an increase in blood pH by shifting the equation to the left, causing carbonic acid to dissociate into bicarbonate and protons. These protons will bring the rising pH back to a normal level.

279) Cellulose is a polysaccharide found in all plant products that adds bulk to the diet to promote feces through the colon. Water acts as a lubricating liquid within the colon, which eases feces through the bowel.

280) B
281) C
282) E
283) A
284) D
285) D
286) C
287) C
288) A
289) B
290) E
291) D
292) A
293) B
294) E
295) D
296) B
297) C
298) A
299) E
300) C

301) E
302) A
303) B
304) D
305) C
306) E
307) B
308) A
309) D
310) A
311) C
312) B
313) B
314) C
315) TRUE
316) TRUE
317) TRUE
318) TRUE
319) FALSE
320) FALSE
321) FALSE
322) TRUE
323) FALSE
324) FALSE
325) FALSE
326) TRUE
327) FALSE
328) TRUE
329) FALSE
330) TRUE
331) TRUE
332) B
333) B
334) C
335) C
336) C
337) A
338) D
339) D
340) D
341) C
342) D
343) B
344) B
345) C
346) B
347) A
348) C
349) D
350) A

351) C
352) B
353) D
354) C
355) B
356) D
357) A
358) B
359) D
360) C
361) C
362) B
363) C
364) C
365) B
366) B
367) B
368) C
369) C
370) D
371) B
372) D
373) A
374) A
375) B
376) D
377) D
378) B
379) D
380) B
381) B
382) C
383) C
384) A
385) transfer
386) aquaporins
387) Cytokinesis
388) S phase of interphase
389) mitochondria
390) potassium
391) exocytosis
392) hypotonic
393) To modify, sort, and package proteins.
394) Without a nucleus, a cell cannot make proteins, nor can it replace any enzymes or other cell structures (which are continuously recycled). Additionally, such a cell could not replicate.
395) No. Because they are passive processes that do not require energy, they can occur in the absence of any cellular processes.
396) Both diffusion and active transport mechanisms operate within the cell membrane to maintain a resting membrane potential.

397) The glycocalyx is the sticky, carbohydrate-rich area on the cell surface. It helps bind cells together and provides a highly specific biological marker by which cells can recognize each other.
398) The complementary strand would be GGCTAA since C bonds with G and A bonds with T.
399) Hydrostatic pressure is the pressure of water exerted on the cell membrane. Osmotic pressure is created by different concentrations of molecules in a solution separated by the cell membrane. Because these pressures are exerted on the membrane they can be used by the cell to change the shape of the cell, regulate substances entering and exiting the cell, and change the osmolarity of the cell.
400) Mitochondria
401) Free ribosomes make soluble proteins that function in the cytosol. Membrane-bound ribosomes produce proteins that are to be used on the cell membrane or exported from the cell.
402) Peroxisomes contain oxidases that use oxygen to detoxify harmful substances. They are very good at neutralizing free radicals. Peroxisomes directly bud from the ER. Lysosomes contain powerful hydrolytic enzymes that will pretty much destroy anything they come in contact with. They are manufactured by the Golgi apparatus.
403) G0 - resting phase. The cells do not undergo mitosis in this phase.
G1 - growth phase. The cell is metabolically active and the centriole begins to divide at the end of this phase.
S - DNA replicates itself. New histones are made and assembled into chromatin.
G2 - Enzymes and proteins are synthesized and centriole replication is completed. This is the final phase of interphase.
404) nuclear regions containing the DNA that issues genetic instructions for synthesizing ribosomal RNA
405) It is formed by diffusion-limited concentration differences of ions resulting in ionic imbalances that polarize the membrane. It is maintained by active transport processes.
406) 1. chemical insults and free radical formation (wear and tear theory)
2. diminished energy production by free radical-damaged mitochondria
3. progressive disorders in the immune system
4. genetic programming
407) cell injury, cell oxygen deprivation, presence of excessive amounts of vitamin A in the cell
408) Most of the metabolic machinery of the cell is involved in protein synthesis since structural proteins constitute most of the dry cell material and functional proteins direct all cellular activities.
409) Exons are amino acid-specifying informational sequences in genes. Introns are noncoding gene segments that provide a reservoir of ready-to-use DNA segments for genome evolution and a source of a large variety of RNA molecules.
410) They are assemblies of saturated phospholipids associated with sphingolipids and cholesterol. They are concentrating platforms for molecules needed for cell signaling.
411) A new polypeptide is translated at the ribosome and is threaded into the rough endoplasmic reticulum (RER). Within the RER the protein is aided in folding by chaperone proteins and modifications, like the addition of carbohydrates can be made to the protein here. The protein will be placed into a vesicle that will migrate from the RER to the *cis*-face of the Golgi apparatus.
412) Within the Golgi apparatus, further modifications of the protein can take place, like the addition of phosphate groups. The folded and processes protein will then be "tagged" and sent by vesicle from the *trans*-face of the Golgi apparatus to the plasma membrane for exocytosis.
413) Both allow ions and small molecules to pass through by diffusion. However, gap junctions are embedded within in the plasma membranes of two neighboring cells. The alignment and connection of the gap junctions between the neighboring cells allows the passage of ions and small molecules directly from one cell into another.
414) Fluid volume deficit occurs when the body loses both water and electrolytes from the extracellular fluid compartment. Fluid is initially lost from the intravascular compartment (blood). Then fluid is drawn from the interstitial compartment into the intravascular compartment, depleting the interstitial compartment. To compensate for the decreased volume, the body then draws intracellular fluid out of the cells. This could lead to collapse and death.
415) Saline contains solutes that make it isotonic or equivalent to the blood in his body. If he were given pure water instead, the lack of solutes would push water into the cells causing them to burst. Saline is a better choice because it mimics blood components.

416) It is an inherited condition where various chemicals are broken down in the brain by a cell organelle called the lysosome. Unfortunately, because of the buildup of undigested nerve cell lipids, the symptoms of listlessness and motor weakness will progress to mental retardation, seizures, blindness, and ultimately death.
417) Ciliated cells that live in the respiratory tract propel mucus, laden with dust particles and bacteria, upward and away from the lungs. If the cilia are paralyzed, bacteria remain in the lungs and may cause infection.
418) Normal cells divide in two distinct events–mitosis and cytokinesis which are well-controlled. Cancer cells divide wildly, with uncontrollable mechanisms and defective mitosis, sometimes ending in unequal chromosome sets, which makes them dangerous to their host. Additionally, the cancer cells are non-functioning (useless) cells.
419) Microtubules determine cell shape and intracellular movement. They are dynamic organelles constantly growing from the centrosome, dissembling, and then reassembling. Without microtubules, the elongated brain cell might either lose shape or lose its ability to move materials from end to end and keep its distant parts well-supplied and alive. Loss of signal followed by cell death result.