SNC 2DI - PRACTICE EXAM ANSWERS

Name: _____ Class: _____ Date: _____ ID: A

Exam Review

True/False

Indicate whether the statement is true or false.

T 1. Microscopes helped people understand that all cells come from cells.
T 2. White blood cells have a big nucleus.
T 3. The cell is the basic organizational unit that makes up tissue.
T 4. *Cytosol* is a term that describes the contents of a cell.
T 5. Both plant and animal cells have cell membranes that help them function.
T 6. Mitochondria help muscle cells.
T 7. Genes are found in the nucleus of the cell, which is divided during mitosis.
T 8. It is just as easy to clone a sheep as it is to clone a carrot.
T 9. A cut heals because new cells are produced.
T 10. Cells separate into two cells during mitosis.
F 11. A cell spends most of the cell cycle going through mitosis.
F 12. Ribosomes are found only in animal cells.
T 13. All tumour cells are cancer cells.
T 14. Epithelial cells make up all the layers of the skin.
T 15. Connective tissue cells can be bone, fat, or blood cells.
F 16. Stem cells are found only in embryos.
T 17. Pluripotent cells have the ability to differentiate into any other type of cell.
T 18. Skin is an organ system made up of many types of cells.
F 19. The digestive system starts with the stomach.
T 20. Arteries and veins are connected by capillaries.

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T 21. Carcinogens, such as some chemicals in cigarette smoke, cause some cells to form tumours.
T 22. Xylem and phloem form the vascular bundles.
T 23. Tiny holes on the bottom of a leaf allow oxygen to enter the leaf.
T 24. Dandelions have a taproot.
F 25. Water enters the leaves of plants and is carried to the roots.
T 26. The advantage of a taproot is that it can draw a lot of water through its large surface area.
T 27. Solar energy provides energy for climate and weather.
F 28. Earth revolves every 24 hours.
T 29. Earth's rotation around the Sun is a fixed circle.
T 30. An increase in the tilt of Earth would increase the rate of glacial melting at the poles.
T 31. The greenhouse gas effect keeps our planet warm enough to live on.
F 32. *Albedo* refers to the changes in temperature seen in the polar regions compared to the equatorial regions.
F 33. Solar variations, volcanoes, and a wobbling planet are an adequate explanation for recent changes in climate.
T 34. *Anthropogenic* refers to human activities that cause climate change.
F 35. People who live in the tropical zones experience relatively consistent temperatures.
T 36. Canada's boreal forest is an example of an ecoregion.
T 37. Climate data will help scientists predict future areas of crop production.
T 38. Solar energy is a form of electromagnetic radiation.
F 39. An example of convection occurs when an egg is cooked on a hot surface. conduction
F 40. All radiation from the Sun is absorbed by Earth.
F 41. Air receives thermal energy though conduction. convection
F 42. The hole in the ozone layer is visible to astronauts in space.
F 43. An object that can be heated to such a high temperature that it emits visible light is called a fluorescent source.

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T 44. A firefly glowing in the night is an example of bioluminescence.
T 45. Incandescent lighting is much more energy-efficient than fluorescent lighting.
T 46. The most abundant source of light is the Sun.
F 47. Street lights emit light from heated gases.
F 48. A normal is a line that is parallel to the reflected surface.
T 49. The angle between the incident ray and the normal is called the angle of incidence.
T 50. Reflection occurs when light bounces off a surface.
F 51. If the angle of reflection is 55°, then the angle of incidence will also be 55°.
F 52. While looking in the bathroom mirror, you observe that your reflection appears to be the same distance behind the mirror as you are in front of the mirror. This must be a convex mirror.
T 53. In a convex mirror, objects appear smaller than they are in reality.
F 54. Concave mirrors make great security devices in stores.
F 55. Images in plane mirrors are always upright, real, and larger than the object.
T 56. When an object is placed closer to a concave mirror than *F*, the image will always be upright and virtual.
F 57. Radar antennae act as convex mirrors for radio waves.
T 58. Rays of light spread out when reflected off at concave mirror.
T 59. The focal length is the distance between the vertex of a mirror and the focal point.
T 60. The principal axis passes through the centre of curvature of the mirror.
T 61. Reflection is the bending of light as it travels from one medium to another.
T 62. Light travels in a straight line and at a constant speed as long as the medium it is travelling in is the same.
T 63. Fermat's principle states that when light travels from one point to another, it follows the path that will take the least time.

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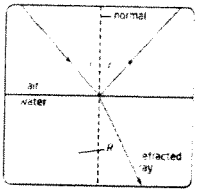
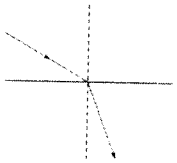
T 64. The diagram below demonstrates total internal reflection.



T 65. In the diagram below, light is passing from air into a medium of greater optical density, as evidenced by the fact that light refracts toward the normal.



T 66. The angle of incidence that produces a refracted ray at an angle of 90° from the normal is called the critical angle.
T 67. A rainbow forms when sunlight enters a water droplet and refracts, reflects off the inner surface of the droplet, and then refracts again when leaving the droplet.
T 68. Objects viewed at the bottom of a swimming pool are actually deeper than they appear.
T 69. Mirages are caused by the reflection of light in unevenly heated air.
T 70. Diverging lenses cause parallel light rays to spread away from a common point.
T 71. The cornea is the tissue that forms a transparent, curved structure in the front of the eye that refracts light before it enters the eye.
T 72. Hyperopia, also known as far-sightedness, is the condition in which the eye cannot focus on nearby objects.
F 73. In the human eye, the lens is the coloured ring that functions like the diaphragm of a camera.

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F 74. An ionic compound is composed of ions with the same charge.

F 75. A cation a negatively charged ion.

T 76. A binary ionic compound is composed of two metal cations.

T 77. Magnesium phosphide is an ionic compound.

T 78. Multivalent metals have more than one ion charge.

F 79. A reactant is a pure substance that is formed in a chemical change.

T 80. Formation of a gas is evidence that a chemical reaction has occurred.

F 81. The electrolysis of water, resulting in production of hydrogen and oxygen gas, is an example of a double displacement reaction.

T 82. The reaction of zinc metal with hydrochloric acid, producing hydrogen gas, can be classified as a single displacement reaction.

T 83. Synthesis reactions are characterized by the following general equation:

$A + B \rightarrow AB$

F 84. Acids have a pH of greater than 7.

F 85. Acids are characterized by a bitter taste.

F 86. Bases are characterized by having a slippery feeling on skin.

F 87. Acids react with phenolphthalein and turn pink.

F 88. Bases react with litmus and turn blue.

T 89. When bases dissolve in water they release hydroxide ions.

T 90. Neutral solutions have the same concentration of hydrogen and hydroxide ions.

F 91. Acids react with bases to form only table salt and water.

T 92. Acids in soil determine whether some types of hydrangea plants produce blue or pink flowers.

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Multiple Choice

Identify the choice that best completes the statement or answers the question.

B 93. Which of these statements is not part of the cell theory?
a. All cells come from pre-existing cells.
b. All cells have a nucleus.
c. All living organisms are made of one or more cells.
d. The cell is the basic organizational unit of life.

C 94. Which of these organelles are found only in plant cells?
a. cell membrane
b. mitochondria
c. chloroplast
d. vesicle

A 95. The nucleus of a cell contains
a. chromosomes
b. stored food
c. eggs
d. fibres

C 96. The first mammal cloned from an adult cell rather than from an egg was
a. a red calf.
b. a cat.
c. a sheep.
d. a Labrador retriever.

C 97. Which of the following is not part of a plant cell?
a. Golgi body
b. cell membrane
c. cell wall
d. ribosome

B 98. The cell membrane
a. has no function that is known.
b. controls what substances enter the cell.
c. is responsible for starting mitosis.
d. has a thick cuticle around the outside.

A 99. Diffusion means that
a. particles move around until they are distributed evenly.
b. all particles cross a membrane.
c. smaller particles move across the membrane faster.
d. particles stop when they are halfway across the membrane.

A 100. Spindle fibres first start to form during
a. prophase.
b. metaphase.
c. anaphase.
d. telophase.

B 101. The chromosomes are aligned across the centre of the cell during
a. prophase.
b. metaphase.
c. anaphase.
d. telophase.

C 102. The replicated chromosomes are separated by spindle fibres during
a. prophase.
b. metaphase.
c. anaphase.
d. telophase.

D 103. The newly separated chromosomes are surrounded by the nuclear membrane during
a. prophase.
b. metaphase.
c. anaphase.
d. telophase.

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D 104. Cytokinesis in plant cells is different from cytokinesis in animal cells because
a. new cells are made at the terminal bud.
b. there are no spindle fibres.
c. plants don't have chromosomes.
d. a cell plate forms without pinching.

D 105. Which is an activity that a cell does not do during interphase?
a. make special proteins
b. copy the DNA in chromosomes
c. release energy from food
d. separate into two different cells

A 106. Which factor is *not* a main factor that influences differentiation in divided animal cells?
a. the size of the cell
b. environmental conditions such as temperature
c. the contents of the cell's cytoplasm
d. the influence of neighbouring cells

A 107. A specialized cell
a. has some inactive genes.
b. has no active genes.
c. is ready for mitosis.
d. is ready for cell death.

C 108. Nerve tissue forms
a. ligaments.
b. nuclear cells.
c. neurons.
d. matrix cells.

D 109. Stem cells in animals are comparable to which cells in plants?
a. bud cells
b. endosperm cells
c. ground cells
d. meristem cells

A 110. How are bodies organized? (from big to small)
a. system, organ, tissue, cell
b. cell, organ, tissue, system
c. tissue, organ, cell, system,
d. organ, cell, system, tissue

B 111. Food passes through the digestive system from the mouth to the stomach through the
a. small intestine
b. esophagus
c. duodenum
d. pyloric sphincter

A 112. The large intestine
a. absorbs water.
b. secretes enzymes.
c. makes bile.
d. breaks down the food eaten.

D 113. The main purpose of the heart is to
a. clean waste from the blood before it goes to the lungs.
b. mix blood from the lungs and the body.
c. remove toxic substances from blood after it comes back from the lungs.
d. pump blood through the body and blood through the lungs.

B 114. The aorta comes out of the
a. left atrium.
b. left ventricle.
c. right atrium.
d. right ventricle.

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B 115. The most muscular pump in the heart is the
a. left atrium.
b. left ventricle.
c. right atrium.
d. right ventricle.

A 116. The air we breathe moves to the bronchus from the
a. trachea.
b. pharynx.
c. bronchioles.
d. diaphragm.

D 117. Dust and dirt are removed from the air by
a. smooth muscle contractions.
b. ureters and urethra.
c. microvilli and villi.
d. cilia and mucus.

D 118. In the lungs, oxygen enters the blood stream from the
a. epiglottis.
b. alveoli.
c. microvilli.
d. capillaries.

B 119. Meristematic cells can become everything except
a. dermal tissue.
b. sap.
c. vascular tissue.
d. ground tissue.

A 120. Plant ground tissue includes
a. xylem cells.
b. photosynthetic cells.
c. epidermal cells.
d. phloem cells.

C 121. The layers of a leaf from top to bottom are
a. mesophyll, guard cells, palisade, epidermis
b. epidermis, guard cells, mesophyll, palisade
c. epidermis, palisade, mesophyll, guard cells
d. mesophyll, palisade, guard cells, epidermis

B 122. The cuticle helps the leaf by
a. letting carbon dioxide into the leaf.
b. reducing water loss.
c. keeping insects out.
d. attracting pollinators.

B 123. Palisade cells help the plant by
a. protecting the leaf from insects.
b. providing some structural strength to the leaf so it does not collapse.
c. attracting pollinators to flowers.
d. carrying sugar made by photosynthesis away to other parts of the plant.

B 124. Guard cells control
a. the insects that might enter a plant.
b. the openings in leaves called stomata.
c. the amount of sap that gets into a leaf.
d. the size of a leaf.

A 125. Transpiration is controlled by
a. guard cells.
b. mesophyll cells.
c. vascular bundles.
d. palisade cells.

B 126. Chloroplasts are
a. found in all parts of a plant.
b. responsible for making sugar.
c. coloured to attract pollinators.
d. used by guard cells to close stomata.

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C 127. Which statement is true regarding climate and weather?
a. Climate changes; weather remains the same.
b. Both climate and weather change.
c. Weather changes, but climate remains the same.
d. Neither weather nor climate change

A 128. Which of the following can be used to explain differences in the winter in North America as compared to the winter in South America?
a. tilt
b. wobble
c. eccentricity
d. all of the above

B 129. Order the steps in the greenhouse effect:
1. Earth absorbs solar radiation and radiates thermal energy.
2. Solar radiation enters Earth's atmosphere.
3. Thermal energy emitted by gases in the atmosphere keeps Earth warm.
4. Gases in the atmosphere absorb thermal energy.

a. 1, 3, 4, 2
b. 2, 1, 4, 3
c. 3, 4, 2, 1
d. 3, 4, 1, 2

C 130. Which of the following would eliminate wind, but not life, on Earth?
a. if the Sun were to stop shining
b. if sunspots were to be eliminated
c. if Earth's surface heated evenly
d. all of the above

D 131. The hydrosphere includes all of the following except
a. water on the surface of Earth.
b. water that is frozen.
c. water that is in gaseous form.
d. water on the space shuttle.

C 132. Which of the following is responsible for water's ability to moderate coastal weather?
a. the three states of water
b. the heat held in water
c. the specific heat capacity of water
d. the density of water

B 133. Volcanic eruptions are the result of
a. global warming.
b. plate movement.
c. jet streams.
d. solar radiation.

D 134. Which of the following is an anthropogenic problem?
a. rain
b. oil spills
c. tornadoes
d. all of the above

___ 135. Which is false regarding the burning of fossil fuels?
a. Burning fossil fuels produces energy.
b. Burning fossil fuels produces carbon dioxide.
c. Fossil fuels are non-renewable.
d. Some fossil fuels do not produce pollutants when burned.

B 136. Which climatic zone contains Ontario?
a. Southern Temperate Zone
b. Northern Temperate Zone
c. Tropical Zone
d. North Polar Zone

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B 137. Which would be the most helpful in predicting weather for the following 6 months?
a. weather reports
b. a climatograph of the region
c. climatic zone information
d. cloud patterns and local bodies of water

B 138. Ecozones are divided based upon
a. wildlife.
b. vegetation.
c. surface features.
d. rainfall and similar data.

D 139. Melting ice will do which of the following?
a. increase the cost of commercial ice
b. decrease the sea level
c. increase wildlife habitat
d. none of the above

B 140. Which of the following is responsible for wind?
a. radiation
b. convection
c. conduction
d. emission

A 141. Earth radiates
a. long-wave radiation.
b. short-wave radiation.
c. nuclear radiation.
d. gamma radiation.

C 142. What amount of solar radiation is not absorbed by Earth?
a. 5%
b. 30%
c. 70%
d. 95%

B 143. Which of the following is not a greenhouse gas?
a. methane
b. nitrogen N_2
c. nitrous oxide NO
d. carbon dioxide CO_2

B 144. What is the main anthropogenic source of carbon dioxide?
a. respiration
b. burning fossil fuels
c. forest fires
d. volcanoes

B 145. Which of the following is able to reduce the global temperature?
a. hurricane
b. volcano
c. earthquake
d. landslide

D 146. Which of the following is not a source of methane?
a. cattle
b. rice paddies
c. cattle eating alfalfa
d. All of the above are a source of methane.

A 147. Which of the following is not a source of nitrous oxide?
a. decomposing garbage
b. fertilizer
c. manure treatment
d. vehicle exhaust

C 148. Which term describes the visible light given off by a chemical reaction?
a. incandescence
b. fluorescence
c. chemiluminescence
d. bioluminescence

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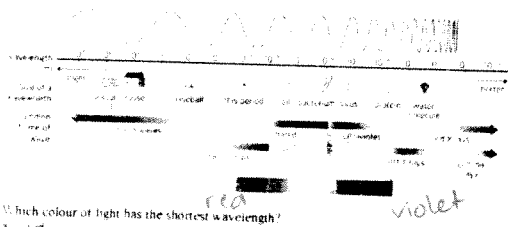
D 149. Which of the following best describes the term *ray*?
a. light that passes through any substance
b. a straight line that represents the path of a beam of light
c. light that is bent as it passes through a translucent object
d. an explanation based on observation of how light behaves

D 150.



Which colour of light has the shortest wavelength?
a. red
b. blue
c. green
d. violet

A 151. Theresa wants to powder her nose. The powder comes in a small compact with a mirror. When Theresa opens the mirror, she notices that when she is close to the mirror, her nose appears a bit larger than normal. From her studies in optics, she is confident that the mirror is ...
a. concave.
b. convex.
c. plane.
d. compact.

A 152. The image seen in a convex mirror, in comparison with the object, is always
a. smaller and upright.
b. larger and upright.
c. smaller and inverted.
d. larger and inverted.

C 153. When an object is far from a concave mirror, the image is always
a. smaller and upright.
b. larger and upright.
c. larger and inverted.
d. smaller and inverted.

B 154. How do reflected rays form an image you can see in a mirror?
a. Light reflects off the object only.
b. Light reflects off the object and the mirror.
c. Light travels into the mirror and forms an image.
d. Light travels from the object directly into your eye.

D 155. Which of these descriptors is *not* a characteristic of an image?
a. size
b. upright or inverted
c. location
d. accommodation

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B 156. A concave mirror has a focal length of 10 cm. How far away from the mirror will the image appear if an object is placed 20 cm from the mirror?
a. 15 cm
b. 20 cm
c. 25 cm
d. 30 cm

$\frac{1}{d_i} = \frac{1}{f} - \frac{1}{d_o}$ $\frac{1}{d_i} = \frac{1}{10} - \frac{1}{20}$

D 157. A 15-cm high object is place 5 cm from a concave mirror of focal length 10 cm. How far from the mirror will the image appear?
a. 5 cm in front of the mirror
b. 5 cm behind the mirror
c. 10 cm in front of the mirror
d. 10 cm behind the mirror

$\frac{1}{d_i} = \frac{1}{10} - \frac{1}{5}$

B 158. What is the magnification of a mirror of focal length 10 cm if a 12-cm high object appears to be 18 cm tall?
a. 2.0
b. 1.5
c. 1.75
d. 1.2

$m = \frac{h_i}{h_o}$ $m = \frac{18}{12}$

C 159. Which of the following statements is true of an image seen in a plane mirror?
a. It is smaller than the object it reflects.
b. It is larger than the object it reflects.
c. It is the same size as the object it reflects.
d. It can be either larger or smaller than the object it reflects.

B 160. While driving across the prairie on your summer vacation, you notice the road ahead looks as if it is covered by a pool of water. As you get closer, however, the pool seems to disappear. It was actually ...
a. an image of the sky refracted by the warm air near the ground.
b. heat waves refracted across the surface of the road.
c. refracted images of the road affected by the heat.
d. caused by cool air near the road refracting the warmer air above the road.

B 161. This optical device contains prisms that change the path of light through 360° as it moves from the objective lens to the eyepiece.
a. telescope
b. binoculars
c. microscope
d. camera

C 162. The surface between two media is called the
a. normal.
b. reflecting surface.
c. boundary.
d. wave front.

medium 1 | medium 2

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Use the accompanying table to answer the following questions.

Substance	Absolute Index of Refraction
Vacuum	1.000 00
Gases at 0°C and 101.3 kPa	
Hydrogen	1.000 14
Oxygen	1.000 27
Air	1.000 29
Carbon dioxide	1.000 45
Liquids at 20°C	
Water	1.333
Ethyl alcohol	1.362
Glycerol	1.470
Carbon disulfide	1.632

A 163. In which of the following media is the speed of light fastest?
a. water
b. glycerol
c. carbon disulfide
d. ethyl alcohol

C 164. The speed of light in water is equal to which of the following?
a. $3.00 \leftrightarrow 10^8$ m/s
b. $2.20 \leftrightarrow 10^8$ m/s
c. $2.25 \leftrightarrow 10^8$ m/s
d. $3.36 \leftrightarrow 10^8$ m/s

C 165. Which of the following is the opening in your eye through which light enters?
a. retina
b. optic nerve
c. pupil
d. iris

B 166. An object is placed between one and two focal lengths from a converging lens. Which of the following is not characteristic of the image formed?
a. farther from lens than object
b. upright
c. larger than object
d. real

D 167. For diverging lenses, the image characteristics are *never* which of the following regardless of the location of the object?
a. upright
b. virtual
c. closer to the lens than the object
d. larger than the object

A 168. Which ion has the same number of electrons as an atom of argon?
a. Ca^{2+}
b. Na^{+}
c. Br^{-}
d. N^{3-}

B 169. How many electrons does a beryllium atom lose when it forms an ion?
a. 1
b. 2
c. 3
d. 4

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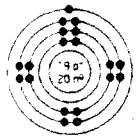
C 170. How many electrons does phosphorus have in its valence energy level?
a. 3
b. 4
c. 5
d. 6

D 171. When carbon dioxide is formed, how many shared pairs of electrons are present?
a. 1
b. 2
c. 3
d. 4

C 172. Which element does not exist as a diatomic molecule?
a. oxygen
b. nitrogen
c. phosphorus
d. chlorine

B 173. Consider the diagram below of an unknown element. Elements from which chemical family in the periodic table are most likely to react with this element to form an ionic compound?



a. alkali metals
b. halogens
c. alkaline earth metals
d. noble gases

B 174. Which of the following is not an acceptable formula for a manganese compound?
a. MnO
b. Mn_2O_3
c. Mn_2O_5
d. MnO_3

C 175. The correct name for the compound P_4O_{10} is:
a. phosphorus(V) decaoxide
b. phosphorus oxide
c. tetraphosphorus decaoxide
d. diphosphorus pentaoxide

C 176. Consider the following skeleton equation for the production of ammonia. When the equation is balanced, how many atoms of hydrogen appear on each side of the chemical equation?

$N_2 + H_2 \rightarrow NH_3$

a. two
b. three
c. six
d. eight

B 177. What type of chemical reaction will produce at least one solid ionic product from the reaction of two aqueous ionic solutions?
a. single replacement
b. double replacement
c. synthesis
d. combustion

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C 178. Consider the following balanced formula equation:

$2\,Fe_2O_3(s) \rightarrow 4\,Fe(s) + 3\,O_2(g)$

Which of the following is an accurate description of the events occurring in this reaction?
a. Iron(III) cations gain electrons and oxide anions lose electrons as the product elements form.
b. Iron(II) cations gain electrons and oxide anions lose electrons as the product elements form.
c. Iron(III) cations lose electrons and oxide anions gain electrons as the product elements form.
d. Iron(II) cations lose electrons and oxide anions gain electrons as the product elements form.

C 179. When magnesium metal and nitrogen gas react together, the correct formula for the product will be:
a. MgN
b. Mg_2N_3
c. Mg_3N_2
d. MgN_3

A 180. Consider the following reactants:

$K_3PO_4 + Fe(NO_3)_3 \rightarrow ? + ?$

The products of the reaction that occurs are:
a. $FePO_4 + KNO_3$
b. $FeK_3 + NO_3PO_4$
c. $Fe_3PO_4 + K_3NO_3$
d. $K_3Fe + PO_4(NO_3)_3$

D 181. Consider the following reaction:

$Sn(NO_3)_4 + Na_3PO_4 \rightarrow Sn_3(PO_4)_4 + ?$

Which of the following is the name of the missing product?
a. tin(IV) nitrate
b. sodium phosphate
c. tin(IV) phosphate
d. sodium nitrate

B 182. Consider the following balanced chemical equation:

$2Al(s) + 3CuCl_2(aq) \rightarrow 2AlCl_3(aq) + 3Cu(s)$

Which of the following statements best describes what is occurring during this reaction?
a. Aluminum ions are replacing copper atoms from solution.
b. Aluminum atoms are replacing copper ions from solution.
c. Copper ions are replacing aluminum atoms from solution.
d. Copper atoms are replacing aluminum ions from solution.

C 183. A chemical change occurs when
a. a tomato is sliced.
b. an egg is boiled.
c. iced tea crystals are dissolved in water.
d. an ice cube melts.

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Use the following table to answer the next five questions.

pH Table	
Solution	pH
U	5.3
V	7.0
W	12.8
X	3.1
Y	1.2
Z	9.5

C 184. Identify the solutions that are acidic.
a. U, V, and X
b. V, W, and Z
c. U, X, and Y
d. V, W, and Z

B 185. Identify the solutions that are basic.
a. X and Y
b. W and Z
c. U and V
d. V and Y

B 186. Identify the solution that is neutral.
a. U
b. V
c. W
d. Z

A 187. Which solution is the most acidic?
a. Y
b. X
c. U
d. V

A 188. Which solution is the most basic?
a. W
b. X
c. Y
d. Z

B 189. Which reaction is an example of a neutralization reaction?
a. $Cl_2(g) + 2NaBr(aq) \rightarrow Br_2(l) + 2NaCl(aq)$
b. $NaOH(aq) + HCl(aq) \rightarrow NaCl(aq) + H_2O(l)$
c. $H_2CO_3(aq) \rightarrow CO_2(g) + H_2O(l)$
d. $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$

A 190. A solution is found to have an H^+ ion concentration 10 000 times lower than that of pure water. Which of the following conclusions would correspond to this observation?
a. a basic solution with a pH of 11
b. an acidic solution with a pH of 3
c. an acidic solution with a pH of 11
d. a basic solution with a pH of 3