

SNC2DI - Exam Review

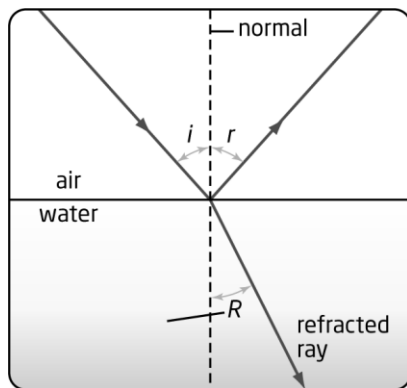
True/False

Indicate whether the statement is true or false.

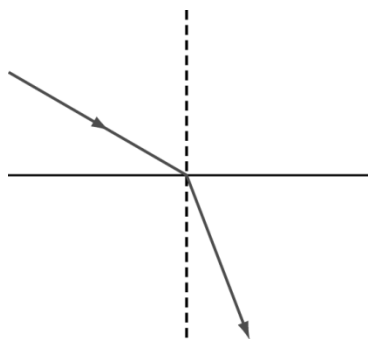
- ___ 1. Microscopes helped people understand that all cells come from cells.
- ___ 2. White blood cells have a big nucleus.
- ___ 3. The cell is the basic organizational unit that makes up tissue.
- ___ 4. *Cytosol* is a term that describes the contents of a cell.
- ___ 5. Both plant and animal cells have cell membranes that help them function.
- ___ 6. Mitochondria help muscle cells.
- ___ 7. Genes are found in the nucleus of the cell, which is divided during mitosis.
- ___ 8. It is just as easy to clone a sheep as it is to clone a carrot.
- ___ 9. A cut heals because new cells are produced.
- ___ 10. Cells separate into two cells during mitosis.
- ___ 11. A cell spends most of the cell cycle going through mitosis.
- ___ 12. Ribosomes are found only in animal cells.
- ___ 13. All tumour cells are cancer cells.
- ___ 14. Epithelial cells make up all the layers of the skin.
- ___ 15. Connective tissue cells can be bone, fat, or blood cells.
- ___ 16. Stem cells are found only in embryos.
- ___ 17. Pluripotent cells have the ability to differentiate into any other type of cell.
- ___ 18. Skin is an organ system made up of many types of cells.
- ___ 19. The digestive system starts with the stomach.
- ___ 20. Arteries and veins are connected by capillaries.
- ___ 21. Carcinogens, such as some chemicals in cigarette smoke, cause some cells to form tumours.
- ___ 22. Xylem and phloem form the vascular bundles.
- ___ 23. Tiny holes on the bottom of a leaf allow oxygen to enter the leaf.
- ___ 24. Dandelions have a taproot.

- ___ 25. Water enters the leaves of plants and is carried to the roots.
- ___ 26. The advantage of a taproot is that it can draw a lot of water through its large surface area.
- ___ 27. An object that can be heated to such a high temperature that it emits visible light is called a fluorescent source.
- ___ 28. A firefly glowing in the night is an example of bioluminescence.
- ___ 29. Incandescent lighting is much more energy-efficient than fluorescent lighting.
- ___ 30. The most abundant source of light is the Sun.
- ___ 31. Street lights emit light from heated gases.
- ___ 32. A normal is a line that is parallel to the reflected surface.
- ___ 33. The angle between the incident ray and the normal is called the angle of incidence.
- ___ 34. Reflection occurs when light bounces off a surface.
- ___ 35. If the angle of reflection is 55° , then the angle of incidence will also be 55° .
- ___ 36. 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.
- ___ 37. In a convex mirror, objects appear smaller than they are in reality.
- ___ 38. Concave mirrors make great security devices in stores.
- ___ 39. Images in plane mirrors are always upright, real, and larger than the object.
- ___ 40. When an object is placed closer to a concave mirror than F , the image will always be upright and virtual.
- ___ 41. Radar antennae act as convex mirrors for radio waves.
- ___ 42. Rays of light spread out when reflected off at concave mirror.
- ___ 43. The focal length is the distance between the vertex of a mirror and the focal point.
- ___ 44. The principal axis passes through the centre of curvature of the mirror.
- ___ 45. Reflection is the bending of light as it travels from one medium to another.
- ___ 46. Light travels in a straight line and at a constant speed as long as the medium it is travelling in is the same.
- ___ 47. Fermat's principle states that when light travels from one point to another, it follows the path that will take the least time.

___ 48. The diagram below demonstrates total internal reflection.



___ 49. 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.



___ 50. The angle of incidence that produces a refracted ray at an angle of 90° from the normal is called the critical angle.

___ 51. 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.

___ 52. Objects viewed at the bottom of a swimming pool are actually deeper than they appear.

___ 53. Mirages are caused by the reflection of light in unevenly heated air.

___ 54. Diverging lenses cause parallel light rays to spread away from a common point.

___ 55. 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.

___ 56. Hyperopia, also known as far-sightedness, is the condition in which the eye cannot focus on nearby objects.

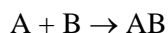
___ 57. In the human eye, the lens is the coloured ring that functions like the diaphragm of a camera.

___ 58. An ionic compound is composed of ions with the same charge.

___ 59. A cation a negatively charged ion.

___ 60. A binary ionic compound is composed of two metal cations

- ___ 61. Magnesium phosphide is an ionic compound.
- ___ 62. Multivalent metals have more than one ion charge.
- ___ 63. A reactant is a pure substance that is formed in a chemical change.
- ___ 64. Formation of a gas is evidence that a chemical reaction has occurred.
- ___ 65. The electrolysis of water, resulting in production of hydrogen and oxygen gas, is an example of a double displacement reaction.
- ___ 66. The reaction of zinc metal with hydrochloric acid, producing hydrogen gas, can be classified as a single displacement reaction.
- ___ 67. Synthesis reactions are characterized by the following general equation:



- ___ 68. Acids have a pH of greater than 7.
- ___ 69. Acids are characterized by a bitter taste.
- ___ 70. Bases are characterized by having a slippery feeling on skin.
- ___ 71. Acids react with phenolphthalein and turn pink.
- ___ 72. Bases react with litmus and turn blue.
- ___ 73. When bases dissolve in water they release hydroxide ions.
- ___ 74. Neutral solutions have the same concentration of hydrogen and hydroxide ions.
- ___ 75. Acids react with bases to form only table salt and water.
- ___ 76. Acids in soil determine whether some types of hydrangea plants produce blue or pink flowers.

Multiple Choice

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

- ____ 77. Which of these statements is not part of the cell theory?
- All cells come from pre-existing cells.
 - All cells have a nucleus.
 - All living organisms are made of one or more cells.
 - The cell is the basic organizational unit of life.
- ____ 78. Which of these organelles are found only in plant cells?
- cell membrane
 - mitochondria
 - chloroplast
 - vesicle
- ____ 79. The nucleus of a cell contains
- chromosomes
 - stored food
 - eggs
 - fibres
- ____ 80. The first mammal cloned from an adult cell rather than from an egg was
- a red calf.
 - a cat.
 - a sheep.
 - a Labrador retriever.
- ____ 81. Which of the following is not part of a plant cell?
- Golgi body
 - cell membrane
 - cell wall
 - ribosome
- ____ 82. The cell membrane
- has no function that is known.
 - controls what substances enter the cell.
 - is responsible for starting mitosis.
 - has a thick cuticle around the outside.
- ____ 83. Diffusion means that
- particles move around until they are distributed evenly.
 - all particles cross a membrane.
 - smaller particles move across the membrane faster.
 - particles stop when they are halfway across the membrane.
- ____ 84. Spindle fibres first start to form during
- prophase.
 - metaphase.
 - anaphase.
 - telophase.
- ____ 85. The chromosomes are aligned across the centre of the cell during
- prophase.
 - metaphase.
 - anaphase.
 - telophase.
- ____ 86. The replicated chromosomes are separated by spindle fibres during
- prophase.
 - metaphase.
 - anaphase.
 - telophase.
- ____ 87. The newly separated chromosomes are surrounded by the nuclear membrane during
- prophase.
 - metaphase.
 - anaphase.
 - telophase.
- ____ 88. Cytokinesis in plant cells is different from cytokinesis in animal cells because
- new cells are made at the terminal bud.
 - there are no spindle fibres.
 - plants don't have chromosomes.

d. a cell plate forms without pinching.

___ 89. 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

___ 90. 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

___ 91. A specialized cell

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

___ 92. Nerve tissue forms

- a. ligaments.
- b. nuclear cells.
- c. neurons.
- d. matrix cells.

___ 93. Stem cells in animals are comparable to which cells in plants?

- a. bud cells
- b. endosperm cells
- c. ground cells
- d. meristem cells

___ 94. 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

___ 95. Food passes through the digestive system from the mouth to the stomach through the

- a. small intestine
- b. esophagus
- c. duodenum
- d. pyloric sphincter

___ 96. The large intestine

- a. absorbs water.
- b. secretes enzymes.
- c. makes bile.
- d. breaks down the food eaten.

___ 97. 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.

___ 98. The aorta comes out of the

- a. left atrium.
- b. left ventricle.
- c. right atrium.
- d. right ventricle.

___ 99. The most muscular pump in the heart is the

- a. left atrium.
- b. left ventricle.
- c. right atrium.
- d. right ventricle.

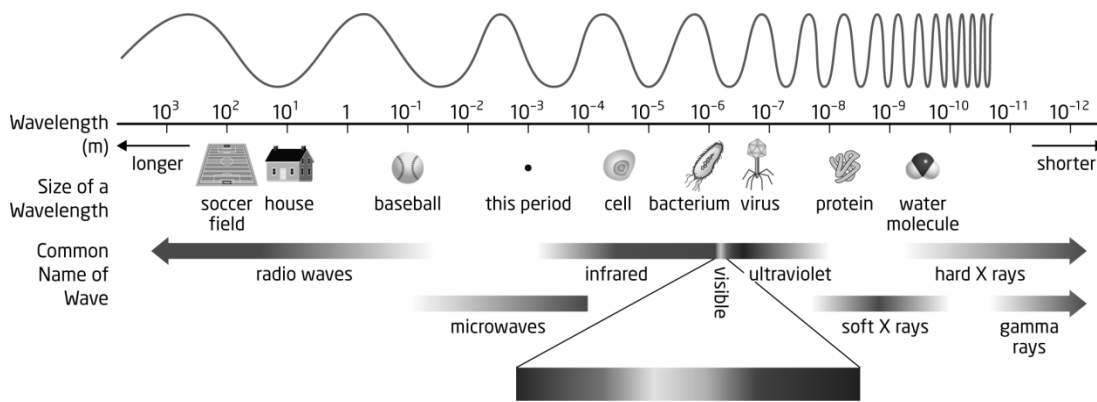
___ 100. The air we breathe moves to the bronchus from the

- a. trachea.
- b. pharynx.
- c. bronchioles.
- d. diaphragm.

___ 101. 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.

- ___ 102. In the lungs, oxygen enters the blood stream from the
- epiglottis.
 - alveoli.
 - microvilli.
 - capillaries.
- ___ 103. Meristematic cells can become everything except
- dermal tissue.
 - sap.
 - vascular tissue.
 - ground tissue.
- ___ 104. Plant ground tissue includes
- xylem cells.
 - photosynthetic cells.
 - epidermal cells.
 - phloem cells.
- ___ 105. The layers of a leaf from top to bottom are
- mesophyll, guard cells, palisade, epidermis
 - epidermis, guard cells, mesophyll, palisade
 - epidermis, palisade, mesophyll, guard cells
 - mesophyll, palisade, guard cells, epidermis
- ___ 106. The cuticle helps the leaf by
- letting carbon dioxide into the leaf.
 - reducing water loss.
 - keeping insects out.
 - attracting pollinators.
- ___ 107. Palisade cells help the plant by
- protecting the leaf from insects.
 - providing some structural strength to the leaf so it does not collapse.
 - attracting pollinators to flowers.
 - carrying sugar made by photosynthesis away to other parts of the plant.
- ___ 108. Guard cells control
- the insects that might enter a plant.
 - the openings in leaves called stomata.
 - the amount of sap that gets into a leaf.
 - the size of a leaf.
- ___ 109. Transpiration is controlled by
- guard cells.
 - mesophyll cells.
 - vascular bundles.
 - palisade cells.
- ___ 110. Chloroplasts are
- found in all parts of a plant.
 - responsible for making sugar.
 - coloured to attract pollinators.
 - used by guard cells to close stomata.
- ___ 111. Which term describes the visible light given off by a chemical reaction?
- incandescence
 - fluorescence
 - chemiluminescence
 - bioluminescence
- ___ 112. Which of the following best describes the term *ray*?
- light that passes through any substance
 - a straight line that represents the path of a beam of light
 - light that is bent as it passes through a translucent object
 - an explanation based on observation of how light behaves
- ___ 113.



Which colour of light has the shortest wavelength?

- a. red
- b. blue
- c. green
- d. violet

114. 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.

115. 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.

116. 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.

117. 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.

118. Which of these descriptors is *not* a characteristic of an image?

- a. size
- b. upright or inverted
- c. location
- d. accommodation

119. 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

120. A 15-cm high object is placed 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

121. 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

_____ 122. 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.

_____ 123. 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.

_____ 124. 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

_____ 125. The surface between two media is called the

- a. normal.
- b. reflecting surface.
- c. boundary.
- d. wave front.

Use the accompanying table to answer the following question(s).

Substance	Index of Refraction (n)
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

_____ 126. In which of the following media is the speed of light fastest?

- a. water
- b. glycerol
- c. carbon disulfide
- d. ethyl alcohol

_____ 127. 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

_____ 128. Which of the following is the opening in your eye through which light enters?

- a. retina
- b. optic nerve
- c. pupil
- d. iris

_____ 129. 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

_____ 130. 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

____ 131. Which ion has the same number of electrons as an atom of argon?

- a. Ca^{2+}
- b. Na^+
- c. Br^-
- d. N^{3-}

____ 132. How many electrons does a beryllium atom lose when it forms an ion?

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

____ 133. How many electrons does phosphorus have in its valence energy level?

- a. 3
- b. 4
- c. 5
- d. 6

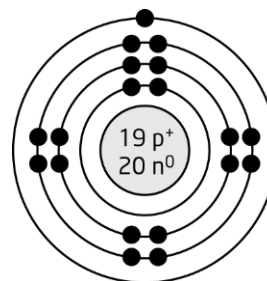
____ 134. When carbon dioxide is formed, how many shared pairs of electrons are present?

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

____ 135. Which element does not exist as a diatomic molecule?

- a. oxygen
- b. nitrogen
- c. phosphorus
- d. chlorine

____ 136. Consider the diagram below of an unknown element. which chemical family in the periodic table are most likely to react with this ionic compound?



Elements from element to form an

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

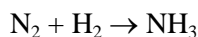
____ 137. Which of the following is not an acceptable formula for a manganese compound?

- a. MnO
- b. Mn_3O_2
- c. Mn_2O_3
- d. MnO_2

____ 138. The correct name for the compound P_4O_{10} is:

- a. phosphorus(IV) decaoxide
- b. phosphorus oxide
- c. tetraphosphorus decaoxide
- d. diphosphorus pentaoxide

____ 139. 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?

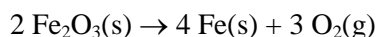


- a. two
- b. three
- c. six
- d. eight

____ 140. 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

____ 141. Consider the following balanced formula equation:



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.

____ 142. When magnesium metal and nitrogen gas react together, the correct formula for the product will be:

- a. MgN
- b. Mg₂N₃
- c. Mg₃N₂
- d. MgN₂

____ 143. Consider the following reactants:



The products of the reaction that occurs are:

- a. FePO₄ + KNO₃
- b. FeK₃ + NO₃PO₄
- c. Fe₃PO₄ + K₃NO₃
- d. K₃Fe + PO₄(NO₃)₃

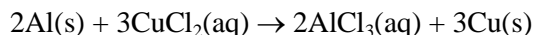
____ 144. Consider the following reaction:



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

____ 145. Consider the following balanced chemical equation:



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.

____ 146. 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.

Use the following table to answer the next five questions.

____ 147. 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

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

- ____ 148. Identify the solution that is neutral.
- a. U
 - b. V
 - c. W
 - d. Z

- ____ 149. Which solution is the most basic?
- a. W
 - b. X
 - c. Y
 - d. Z

- ____ 150. Which reaction is an example of a neutralization reaction?
- a. $\text{Cl}_2(\text{g}) + 2\text{NaBr}(\text{aq}) \rightarrow \text{Br}_2(\text{l}) + 2\text{NaCl}(\text{aq})$
 - b. $\text{NaOH}(\text{aq}) + \text{HCl}(\text{aq}) \rightarrow \text{NaCl}(\text{aq}) + \text{H}_2\text{O}(\text{l})$
 - c. $\text{H}_2\text{CO}_3(\text{aq}) \rightarrow \text{CO}_2(\text{g}) + \text{H}_2\text{O}(\text{l})$
 - d. $\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightarrow 2\text{NH}_3(\text{g})$

- ____ 151. 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