Grade 9 Academic Science

(Final Exam Review)

Chemistry

1. Which of the following is a list of characteristic physical properties?
2. Acidity, lustre and viscosity
3. Colour, boiling point, and reactivity
4. Density, melting point, and freezing point
5. Malleability, conductivity and flammability
6. Which of the following statements is true according to the particle theory of matter?
7. All particles of matter move.
8. Only particles of solids move.
9. Particles of matter never move.
10. Only particles of liquids and gases move.
11. Which of the following groups of elements is least reactive?
12. Halogens
13. Noble gases
14. Alkali metals
15. Alkaline earth metals
16. Which of the following is an element as well as a molecule?
17. CO2
18. Ca
19. O3
20. 14 kt gold
21. Which group of elements belongs in the alkaline earth metal family?
22. Li, Be, B c) Mg, Ca, Sr
23. Li, Na, K d) O, S, Se
24. In the periodic table, elements are arranged according to
25. Atomic mass
26. Number of neutrons
27. Number of protons
28. Mass number
29. The atomic number tells us the number of
30. Neutrons
31. Protons
32. Protons and neutrons
33. Mass number
34. Anelectron
35. Carries a negative charge and is located in the nucleus
36. Carries a negative charge and is very small compared to the proton
37. Carries a positive charge and is very small compared to the neutron
38. Carries no charge and orbits the nucleus
39. The identity of an element is determined by
40. The mass of the atom
41. The number of electron orbits of the atom
42. The number of neutrons in the atom
43. The number of protons in the atom
44. The outermost electron orbits of the noble gases all have
45. One electron
46. Two electrons
47. Seven electrons
48. The maximum number of electrons
49. From his gold foil experiment, Ernest Rutherford theorized that the atom
50. Is mostly empty space with positive charges evenly distributed throughout
51. Is mostly empty space with negative charges evenly distributed throughout
52. Consists of a dense central nucleus containing positively charged protons
53. Consists of a dense central nucleus containing negatively charged electrons
54. Bohr’s model was a result of his experiments which showed
55. negatively charged particles bending in a vacuum tube
56. Positively charged particles bending in a vacuum tube
57. Positively charged particles bouncing back from gold atoms
58. Hydrogen atoms emitting a few lines of colour instead of a complete rainbow
59. Which of the following is an example of a solution?
60. Cereal
61. Carbon
62. Solder
63. Water
64. Boling point is the temperature at which a substance changes rapidly from
65. A solid to a liquid
66. A liquid to a gas
67. A liquid to a solid
68. A gas to a solid
69. Which of the following is a chemical property?
70. Density c) solubility
71. Reactivity with water d) boiling point
72. Who was the first scientist to discover that atoms are divisible?
73. Mendeleev c) Thomson
74. Rutherford d) Dalton
75. A sodium atom is composed of 11 protons, 12 neutrons and 11 electrons. Which of the following describes the particles that make up an ion of this isotope of sodium?
76. 11 protons, 12 neutrons, and 10 electrons
77. 10 protons, 12 neutrons, and 11 electrons
78. 11 protons, 11 neutrons, and 10 electrons
79. 11 protons, 13 neutrons, and 12 electrons
80. In which family would you expect to find an element that is very reactive with water and whose atoms have one valence electron?
81. Halogens c) alkaline-earth metals
82. Noble gases d) alkali metals
83. Which of the following is a covalent compound?
84. CCl4 c) KCl
85. MgCl2 d) NaI
86. Describe each of the following physical properties of matter, and provide an example of each one.
87. Boiling point
88. Electrical conductivity
89. Solubility
90. Identify two physical properties and one chemical property of water.
91. What is the charge associated with each type of particle?
92. A proton
93. An electron
94. An ion formed by gaining an electron
95. Describe the relative mass of a proton, a neutron and an electron.
96. How does an atom’s valence electrons influence the element’s chemical properties?
97. Draw a Bohr-Rutherford model for each atom or ion.
98. Na d) S2-
99. Ar e) Mg2+
100. C f) P3-
101. Determine the number of protons, electrons, and neutrons in each atom or ion.
102. C c) S
103. Cr d) N
104. Distinguish among the terms atomic number, atomic mass and mass number.
105. Explain how the size of the atoms changes as you move down a family in the periodic table.
106. Describe the laboratory tests that used to identify each of the following gases.
107. Hydrogen
108. Oxygen
109. Carbon dioxide
110. Explain why sodium metal would not be a good material to use for a water bottle.
111. Use the information in the following table to answer the questions below.

Atomic Properties

|  |  |  |  |
| --- | --- | --- | --- |
| Element | Number of Valence Electrons | Atomic Mass | Atomic Number |
| A | 6 | 16.0 | 8 |
| B | 2 | 40.1 | 20 |
| C | 8 | 39.9 | 18 |

1. Which element is located farthest to the left in the periodic table? Explain your reasoning.
2. Which element is a noble gas? Explain your reasoning.
3. Which element is most likely to form negative ions? Explain your reasoning.
4. Which element appears latest in the periodic table? Explain your reasoning.
5. Which element has the highest electrical conductivity? Explain your reasoning.
6. Use the following Bohr Rutherford model to answer the questions below.
7. If this model represents an atom, what element is it?
8. If this model represents an ion with a charge of 3-, what element is it?
9. If this model represents an ion with a charge of 2+, what element is it?
10. Compare elements and compounds. Clearly describe the relationship between them.
11. Make a table to compare ionic compounds and covalent compounds. Include their properties, as well as how their valence electrons are involved in bonding.
12. Organize the following models of the atom in the order they were developed. Write the names of the models, from earliest to latest, across the width of a page in your notebook. Under each name, draw a sketch of the model and briefly describe the experimental evidence that supported the model.

**Thomson’s Model Dalton’s Model Bohr’s Model Rutherford’s Model**

1. Sketch an outline of the periodic table, and identify the following on your outline.
2. Metals d) alkali metals
3. Non-metals e) alkaline-earth metals
4. Noble gases f) halogens

Biology

1. A step-by-step sequence showing how organisms feed on each other is referred to as:
2. An ecosystem c. A population
3. A food chain d. An ecological pyramid
4. Bracket fungi, mushrooms, and bread mould are all:
5. Producers c. Carnivores
6. Herbivores d. Decomposers
7. There are 2000 white-tailed deer in 100 km2 of a forest. This description is of a deer:
8. Community c. Biome
9. Population d. Species
10. Which of the following describes abiotic factors in an ecosystem?
11. Competition between species
12. Predator- prey relationships
13. Amount of sunlight
14. Birth rate
15. Green plants are referred to as autotrophs. Autotrophs:
16. Covert ammonia into nitrates.
17. Carry out photosynthesis.
18. Feed on primary consumers.
19. Occupy the top of the food pyramid.
20. The hydrosphere is
21. The water in oceans on Earth
22. The non-living components of an ecosystem
23. The layer of air above Earth’s surface
24. The hard part of Earth’s surface
25. The size of a population that can be supported indefinitely by the resources and services of an ecosystem is known as its
26. Carrying capacity
27. Ecological footprint
28. Exponential limit
29. Niche
30. Which situation is an example of bioamplification?
31. A bear eats a large meal and stores the nutrients as fat.
32. A frog is poisoned by the nearby use of pesticides and dies soon after.
33. A hawk eats a fish that has eaten many smaller aquatic animals, which all had toxins in their bodies.
34. A caterpillar feeds on leaves that contain toxins, and the toxins are stored faster than they are eliminated.
35. Fill in the blanks.
36. The original source of energy for most ecosystems on earth is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
37. Within a food web, plants are classified as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and animals as \_\_\_\_\_\_\_\_\_\_\_\_\_.
38. In a food web, organisms that break down organic matter, returning nutrients to the ecosystem for further growth can be classified as\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
39. A group of animals of the same species, and living in the same area, is called an \_\_\_\_\_\_\_\_\_\_\_\_\_\_.
40. An area in which organisms interact with the physical environment is an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
41. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ factors, such as sunlight, water, temperature, and wind, influence organisms within an ecosystem.
42. The increasing concentration of a toxin in organisms as you move up a food chain is referred to as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
43. Human interference often causes ecosystems to change.
44. Provide an example of how human interference has caused an increase in the population of a species.
45. Provide an example of how human interference has caused a decrease in the population of a species.
46. Provide an example of how the rapid increase in a species has affected another species.
47. Define the term “food web”. Draw a food web showing the organisms you would expect to find in a rotting log.
48. In your own words, define “matter cycle”. Why must matter be continuously cycled within ecosystems?
49. Describe the flow of energy in ecosystems.
50. In your own words, define “bioamplification”.
51. Ecosystems are dynamic and have the ability to respond to change, within limit, while maintaining their ecological balance. What are some potential problems that may occur on Earth when the human population reaches its peak?
52. Why is maintaining the biodiversity on Earth important?
53. What is a sustainable ecosystem?

Physics

1. The kind of circuit in which an electrical load may be disconnected without affecting other loads is called a:
2. Series circuit c. Closed circuit
3. Open circuit d. Parallel circuit
4. Two light bulbs A and B are connected in a series circuit to a dry cell. The switch is closed. If Bulb B is removed from its socket, the brightness of bulb A will:
5. Decrease c. Increase
6. Become zero d. Remain the same
7. A piece of fur is positively charged when:
8. It has an excess of electrons.
9. It has a deficiency of electrons.
10. The nuclei of its atoms are positively charged.
11. The electrons of its atoms are positively charged.
12. When glass and silk are rubbed together
13. Protons are transferred from the silk to the glass
14. Electrons are transferred from the silk to the glass
15. Protons are transferred from the glass to the silk
16. Electrons are transferred from the glass to the silk
17. Charging by induction best explains why
18. Rubbing two different objects together produces oppositely charged objects
19. Lightning discharges into the ground
20. Your hair stands up if you go down a plastic tube slide
21. Neutral objects are attracted to charged objects
22. Non-renewable energy sources that are used to generate electrical energy are
23. Coal, wind, uranium and tidal
24. Coal, natural gas, oil and uranium
25. Coal, sunlight, oil, and uranium
26. Coal, oil, hydro-electric and geothermal
27. Renewable energy sources that are used to generate electrical energy are
28. Wind, tidal, sunlight, uranium and hydroelectric
29. Wind, tidal, natural gas, uranium and sunlight
30. Wind, tidal, geothermal, biomass and hydroelectric
31. Water, uranium, sunlight and wind
32. Which of the following would you consider to be a load in a circuit?
33. Switch
34. Battery
35. Voltmeter
36. Lamp
37. A series circuit
38. Has a power source, connecting wires, a control device, and several paths for the electric current to follow
39. Has a power source, connecting wires, a control device and one path for the electric current to follow
40. Has a power source, connecting wires, a control device, a load and several paths for the electric current to follow
41. Has a power source, connecting wires, a control device, a load and one path for the electric current to follow
42. Which of the following correctly relates to Ohm’s law?
43. Electrical resistance is equal to the ratio of voltage to current.
44. The slope of a line from a voltage versus a current graph gives the electrical resistance.
45. As the electric potential difference is increased, the current increases.
46. All of the above.
47. Fill in the blanks.
48. A positively charged object has a(n) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of electrons.
49. The law of electric charges states that unlike charges \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
50. A negative ion has a(n) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of electrons.
51. When a positively charged object touches an uncharged object, the uncharged object becomes \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ charged.
52. When cells are connected \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the voltage of the battery increases.
53. To increase the amount of time a battery of a particular voltage will last he cells are connected in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
54. When additional loads are connected in a parallel circuit, the total current \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
55. As the voltage drop across a resistor increases the current \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
56. As the number of loads in a parallel circuit is increased, the effective resistance \_\_\_\_\_\_\_\_\_\_\_\_.
57. Nuclear fuel and fossil fuels are both \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ sources of energy.
58. The efficiency of a device compares the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to the input energy.
59. When electric charge flows through a material with no resistance, the material is a \_\_\_\_\_\_\_\_\_\_.
60. Describe how you could make an object:
61. Neutral
62. Positively charged
63. Negatively charged
64. Why do two different substances build up static charges when rubbed together?
65. Calculate the voltage drop across the following electrical loads:
66. A food blender that has a resistance of 65Ω and has a current of 1.85 A flowing through it.
67. A current of 0.15 A flows through a resistance of 800Ω.
68. A bulb that has 0.75 A flowing through it. The resistance of the bulb is 16Ω.
69. a. Calculate the power of a toaster that uses 72 000 J of energy in 50s.

b. Calculate the power of a vacuum cleaner if the operating voltage is 120V and the current flowing

through when it is used is 7.90 A.

1. Could the efficiency of an electrical device ever be greater than 100%? Explain your answer.
2. Calculate the efficiency of an electric motor that produces 15 000 J of useful energy while using an input energy of 22 500 J.
3. Draw the following circuits:
4. a circuit showing a series circuit containing a three cell battery, a switch, and 2 bulbs. Show a voltmeter connected to measure the potential difference across the source and an ammeter connected to measure the current in the circuit. Label the positive and negative terminals of the cell, the voltmeter, and the ammeter and indicate the direction of the electron flow.
5. a circuit that has a source, two light bulbs, and two switches. In this circuit, the two light bulbs do not have any effect on each other and each is controlled by its own switch.
6. Relatively few applications make use of static electricity, while many applications use current electricity. Describe the properties of static and current electricity that account for this difference.
7. Bulbs that flash on and off are often used in advertising.
8. Draw a diagram of a circuit used for this purpose.
9. What is the effect on the brightness of the other bulbs in a circuit when a flashing bulb is connected in series?
10. What is the effect on the brightness of the other bulbs when a flashing bulb is connected in parallel?

Earth Space Science

1. Which statement accurately describes an astronomical unit (AU)?
2. The distance light travels in one year.
3. The distance light travels between Earth and the Sun.
4. The time it takes for light to travel 10 trillion km.
5. The time it takes for light to travel from Earth to the Sun.
6. Which statement correctly describes Mars’ location in our solar system?
7. Mars is the first planet from the Sun.
8. Mars is the third planet from the Sun.
9. Mars is the fourth planet from the Sun.
10. Mars is the ninth planet from the Sun.
11. The model of the solar system that places the Sun at the centre is called the
12. Geocentric model
13. Solar nebula theory
14. Heliocentric model
15. Big bang model
16. If a star is the same mass as the Sun, for how many years can it fuse hydrogen into helium?
17. 5 billion years
18. 10 billion years
19. 15 billion years
20. 20 billion years
21. Which of the following statements about planets and stars is true?

a. Stars are closer to Earth than other planets.

b. Both planets and stars emit light.

c. Planets are usually cool and stars are very hot.

d. A planet is made of gases whereas a star is not made of gas.

1. Which of the following best describes the term 'constellation'?

a. A group of stars that travel through space together.

b. A group of stars that form a shape or pattern.

c. A group of stars that is seen in the same part of the sky.

d. A group of stars that are located near each other in space.

7. The best explanation of why orbiting astronauts appear to be floating is

that they are experiencing:

a. microgravity

b. weightlessness

c. no gravity

d. continuous free fall

8. Which of the following is a condition astronauts experience when spending long periods of time in a

microgravity environment?

1. Bone loss
2. Weight gain
3. Poor eyesight
4. Difficulty breathing

9. Compared with the terrestrial planets, the gas giants tend to:

a. be hotter, rotate faster, and have a lower density

b. be colder, rotate faster, and have a lower density

c. be colder, rotate slower, and have a lower density

d. be colder, rotate slower, and have a higher density

e. be hotter, rotate faster and have a higher density

10. The visible part of the Sun is called:

a. the chromosphere

b. the corona

c. the surface

d. the photosphere

11. Fill in the Blanks

1. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is everything that exists, including all the matter and energy everywhere.
2. The four planets closest to the Sun can be called the \_\_\_\_\_\_\_\_\_\_ planets or the \_\_\_\_\_\_\_\_\_\_\_\_\_\_planets.
3. The process used by stars to produce energy.
4. Stars start and end their lives as clouds of dust and gas called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
5. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the force of attraction between all objects that have mass.
6. True/False
7. The astronomical unit (AU) is the most convenient unit for expressing distance to celestial objects outside our solar system.
8. Most stars are bigger than the Sun.
9. The Sun is in a galaxy called the Milky Way.
10. In the lives of stars, a red supergiant results from stars that have a smaller mass than the Sun.
11. Evidence of an expanding universe comes from red shift of the spectra of stars and galaxies.
12. Space probes have been sent to explore stars nearest to the solar system in our galaxy.
13. Both stars and planets form from nebulas.
14. Sirius is the brightest star in the night sky.
15. The sun is the largest star in the universe.
16. The sun is primary composed of Helium.
17. The sun will run out of fuel over the next 500 years.
18. As we move from the innermost core of the sun outwards – temperature decreases.
19. Those stars that have the greatest temperatures emit a red glow.
20. The revolution of the earth produces day and night.
21. Black holes indicate the absence of matter.
22. Rotation of the spacecraft helps to overcome the effects of zero gravity.
23. The moon is a satellite.
24. Each of the following descriptions fits one of the planets in our solar system. Name the planet described by each sentence.
25. It rotates on its side. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
26. It has more mass than all the other planets combined. \_\_\_\_\_\_\_\_\_\_\_
27. It has an atmosphere containing oxygen. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
28. It has surface temperatures ranging from –1800C to 4000C \_\_\_\_\_\_\_
29. It is neither a gas giant nor a terrestrial planet. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
30. It has over 1000 rings around it. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
31. It appears reddish in colour. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
32. It has very warm surface caused by its thick atmosphere. \_\_\_\_\_\_\_\_
33. Draw and label a diagram of our solar system. Be sure to include the asteroid belt as well as the Earth’s moon.
34. Describe the lives of stars.
35. Briefly describe the Big Bang Theory and identify the pieces of evidence used by astronomers/scientists to support this theory.