

## GRADE 9 -UNIT B REVIEW

1. The more energy that particles have  
A. the faster they move  
B. the slower they move  
C. the higher the mass of the object  
D. the more likely they are to form a solid
2. Which term describes the temperature at which a solid turns to a liquid?  
A. boiling point  
B. melting point  
C. condensation point  
D. phase change
3. Which statement is part of the kinetic molecular theory?  
A. Energy makes particles move.  
B. Atoms contain protons.  
C. Density is a property of matter.  
D. all of the above
4. Why do materials expand when heated?  
A. The particles in the material get larger.  
B. The particles in the material move faster, increasing spaces between them.  
C. The particles get larger and increase the spacing between them.  
D. The material melts.
5. J.J. Thomson discovered that all atoms contain particles that later became known as electrons. What did this discovery make it possible to conclude about atoms?  
A. All atoms are negatively charged.  
B. All atoms are identical to all other atoms.  
C. All atoms are composed of a combination of subatomic particles.  
D. All atoms conduct electricity.
6. Which best describes the nucleus?  
A. contains protons and electrons; electrically neutral  
B. contains protons and electrons; positively charged  
C. contains protons and neutrons; positively charged  
D. contains neutrons and electrons; negatively charged
7. Which best describes an atom?  
A. electrically neutral  
B. positively charged  
C. negatively charged  
D. positively or negatively charged

p 206.

8. Approximately how many elements have been discovered?

- A. three
- B. 35
- C. 100
- D. 300

C

9. Name two metals that are not silver coloured.

- A. sulphur and chlorine
- B. copper and gold
- C. copper and chlorine
- D. sulphur and gold

B

*only answer with 2 metals*

10. Which of the following is a metalloid?

- A. sodium
- B. sulphur
- C. silicon
- D. strontium

C

11. What is a period in the Periodic Table?

- A. a vertical column
- B. a horizontal row
- C. a family of elements with similar properties
- D. a group of elements all of which have the same number of valence electrons

B

12. What do the noble gases He and Kr have in common?

- A. The same number of electrons
- B. The same number of valence electrons
- C. Filled valence energy levels
- D. Both gases will make a balloon tend to float.

C

13. How is the periodic table arranged?

- A. by atomic mass and chemical properties
- B. by ion charge and atomic mass
- C. by ion charge and atomic number
- D. by atomic number and chemical properties

D

14. Which family of elements contains a solid, a liquid, and a gas at room temperature?

- A. Group 1
- B. Group 2
- C. Group 17
- D. Group 18

C

15. Which phrase is correct for a Bohr model of a metal ion?

- A. more protons than electrons
- B. more electrons than protons
- C. equal numbers of protons and electrons
- D. equal number of neutrons and protons

A

16. Which best describes the alkaline earth metal family?

- A. family of metals that is magnetic
- B. family of metals used to make coins
- C. the most reactive family of metals
- D. family whose elements have two valence electrons

17. Which best describes an element?

- A. a pure substance that cannot be broken down or separated into simpler substances
- B. a pure substance that can be decomposed further by physical means
- C. a mixture of different kinds of atoms, with different numbers of protons
- D. a family of substances all of which have different but similar properties

18. Which of the following is an ionic compound?

- A.  $P_4$
- B.  $PCl_3$
- C.  $P_4O_{10}$
- D.  $Na_3PO_4$

*covalent*

19. Which of the following is a compound?

I.	$CO_3^{2-}$
II.	$CO_2$
III.	$HCO_3^-$
IV.	$O_2$

- A. II only
- B. I and III only
- C. II and IV only
- D. I, II, and III only

20. Consider the following formula:  $Na_2CO_3$ .

What is the ratio of positive to negative ions represented by this formula?

- A. 2:3
- B. 2:1
- C. 3:2
- D. 2:1:3

21. What is the formula for aluminum hydroxide?

- A.  $AlOH$
- B.  $AlOH_3$
- C.  $Al_3(OH)$
- D.  $Al(OH)_3$

22. Which terms correctly describe  $\text{CH}_3\text{COO}^-$ ?

I.	ion
II.	multivalent
III.	polyatomic
IV.	compound

- A. I and II  
B. III and IV  
C. II and IV  
D. I and III

23. What is the name of the metal ion in  $\text{Fe}_2\text{S}_3$ ?

- A. iron  
B. iron(II)  
C. iron(III)  
D. sulphide

24. What is the name of  $\text{Na}_2\text{CO}_3$ ?

- A. sodium carbonate  
B. sodium carbon oxide  
C. sodium carbide  
D. sodium carbon oxygen

25. What is the name of  $\text{PbS}_2$ ?

- A. lead sulphide  
B. lead(II) sulphide  
C. lead(IV) sulphide  
D. lead(II) sulphate

26. How many atoms in total are represented by the formula  $(\text{NH}_4)_3\text{PO}_4$ ?

- A. 11  
B. 13  
C. 17  
D. 20

27. An explosive device is used to blast rock for the construction of a new highway. Which set of terms describes the explosive device?

- A. physical change and endothermic  
B. physical change and exothermic  
C. chemical change and endothermic  
D. chemical change and exothermic

28. Which term(s) describe the formation of a solid from either a liquid or a gas?

I.	freezing
II.	deposition
III.	condensation
IV.	solidification

- C
- A. I only
  - B. II and III only
  - C. I, II, and IV only
  - D. I, II, III, and IV

29. Which phrase best describes the physical property known as density?

- D
- A. the tendency to be solid, liquid, or gas
  - B. the ability to dissolve in water
  - C. the ability of a material to flow
  - D. the ratio of a material's mass to its volume

30. Which of the following best describes atoms?

- C
- A. nucleus contains protons and electrons; nucleus is surrounded by neutrons
  - B. nucleus contains neutrons; nucleus is surrounded by protons and electrons
  - C. nucleus contains protons and neutrons; nucleus is surrounded by electrons
  - D. nucleus contains electrons and neutrons; nucleus is surrounded by protons

31. Which of the following is a metal?

- B
- A. fluorine
  - B. potassium
  - C. phosphorus
  - D. selenium

32. What is meant by the term "group" in the periodic table?

- D
- A. a collection of elements that are all solids
  - B. a horizontal row of elements
  - C. a collection of elements in the same period
  - D. a family of elements with similar properties

33. Which phrase correctly describes for both the sulphide ion  $S^{2-}$  and the oxide ion  $O^{2-}$ ?

- B
- A. more protons than electrons
  - B. more electrons than protons
  - C. equal numbers of protons and electrons
  - D. equal number of neutrons and protons

34. Which of the following is a covalent compound?

- C
- A. Fe
  - B.  $FeF_3$
  - C.  $OF_2$
  - D.  $O_3$

35. How many atoms in total are represented by the formula  $\text{Fe}(\text{CH}_3\text{COO})_3$ ?

- A. 6
- B. 9
- C. 11
- D. 22

36. One bad apple in a barrel causes the whole bunch to turn rotten, causing them to turn brown, get warmer, and become mushy. Which kinds of change(s) are involved?

- A. physical change only that is exothermic
- B. chemical change only that is endothermic
- C. chemical change and physical change that is exothermic
- D. chemical change and physical change that is endothermic

37.(a) Dalton's atomic theory says that all matter is made of small particles called atoms.

Use Dalton's theory to explain why a piece of copper cannot be turned into piece of gold.

*copper 29 protons  
gold 79 protons  
cant add 50 protons*

(b) Rutherford's model of the atom resulted from an experiment in which alpha particles were made to pass through a thin gold sheet. Most alpha particles passed straight through, but some were deflected. Explain what Rutherford was able to conclude from this about the composition of atoms.

*most alpha particles (+ charged) passed through because most of atom is empty space  
- some bounced back - nucleus (small) is + charged.*

(c) Bohr studied the results of experiments on the light released by gaseous samples of atoms, such as those of hydrogen. What was he able to conclude from this about the way electrons exist in atoms?

*e<sup>-</sup> in defined shells, a certain distance from nucleus  
e<sup>-</sup> can't exist between shells  
e<sup>-</sup> gain/lose energy when they move up/down to another shell.*

38. (a) Where is 99.99% of the mass in an atom located?

*nucleus*

(b) Which particles in an atom occupy 99.99% of the volume of the atom?

*electrons*

(c) Where is all of the positive charge in an atom located?

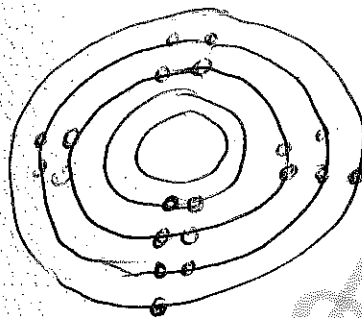
*nucleus*

39. List any four types of information usually recorded on a periodic table in addition to the element's name.

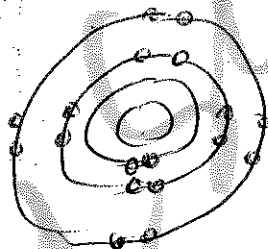
symbol      mass  
charge      atomic #      density

40. Calcium's atomic number is 20.

(a) Draw a simple Bohr diagram showing the number of electrons in each energy level of a calcium atom.



(b) Draw a simple Bohr diagram showing the number of electrons in each energy level of a calcium ion,  $\text{Ca}^{2+}$ .



41. List four properties of alkali metal elements that distinguish them (make them different) from iron.

not magnetic  
one  $e^-$  in outer valence  
react  $\bar{c}$  water violently  
react  $\bar{c}$   $\text{Cl}_2$  (halogens).

42. (a) What is a valence electron?

$e^-$  in outer shell.

(b) How are valence electrons related to chemical families?

Ch families all have same # of  $e^-$  in outer shell.

(c) Do non-metals tend to gain electrons or lose electrons as they form ions?

43. Consider the polyatomic ion  $\text{PO}_4^{3-}$ .

(a) How is  $\text{PO}_4^{3-}$  like a molecule?

P & O exist in fixed ratio  
P & O bonded together.

(b) How is  $\text{PO}_4^{3-}$  like an ion?

*charged.*

44. Write the formula:

- (a) magnesium nitride  $\text{Mg}_3\text{N}_2$   
(b) nickel(III) fluoride  $\text{NiF}_3$   
(c) ammonium sulphate  $(\text{NH}_4)_2\text{SO}_4$

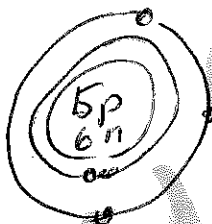
45. Write the name:

- (a)  $\text{Sr}_3\text{P}_2$  strontium phosphide  
(b)  $\text{V}_2\text{O}_5$  vanadium oxide  
(c)  $\text{Cs}_2\text{Cr}_2\text{O}_7$  cesium dichromate

46. Using kinetic molecular theory, explain how a solid can turn into a liquid.

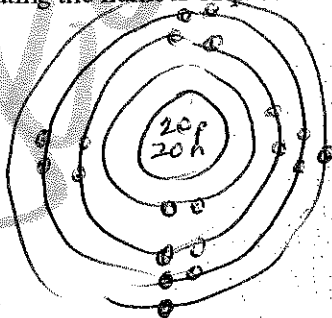
*energy added, molecules move faster,  
move further apart*

47. Draw a simple sketch of an atom containing 5 protons, 6 neutrons, and as many electrons as are needed to make the atom neutral. Show the correct number of electrons in each energy level.

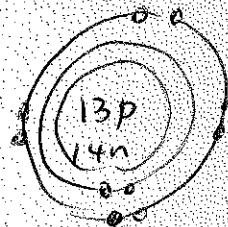


48. Sketch a Bohr model diagram indicating the number of protons as well as the number and arrangement of electrons in each:

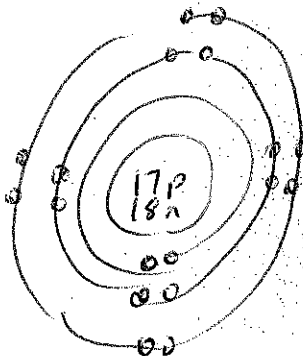
- (a) Ca  
p - 20  
n - 20  
e - 20



- (b)  $\text{Al}^{3+}$   
p 13  
n 14  
e - 10



- (c)  $\text{Cl}^-$   
p 17  
n 18  
e - 18





49. Use a periodic table to identify these elements.
- (a) the metal in period 5, group 11 Silver
  - (b) the element with atomic mass 16.0 amu oxygen
  - (c) the metalloid in the second period carbon
  - (d) the metal in period 4 with three common ion charges chromium
  - (e) the halogen whose atoms are heavier than sulphur's atoms and which has an atomic number less than selenium chlorine

50. List six chemical or physical properties typical of alkali metal elements.

one e<sup>-</sup> in outer shell

shiny  
malleable  
ductile

react with water  
" " halogens 1:1

51. Write names for the following compounds.

- (a) NaCl Sodium chloride
- (b) Mg<sub>3</sub>P<sub>2</sub> magnesium phosphide
- (c) FeO iron II oxide
- (d) (NH<sub>4</sub>)<sub>3</sub>PO<sub>4</sub> ammonium phosphate
- (e) Pt(SO<sub>4</sub>)<sub>2</sub> platinum sulphate

52. Write formulas for the following compounds.

- (a) calcium bromide CaBr<sub>2</sub>
- (b) copper(I) phosphide Cu<sub>3</sub>P
- (c) potassium carbonate K<sub>2</sub>CO<sub>3</sub>
- (d) aluminum hydroxide Al(OH)<sub>3</sub>
- (e) ruthenium(IV) sulphite Ru(SO<sub>3</sub>)<sub>2</sub>

53. (a) Explain the difference between a physical change and a chemical change.

phys - can be reversed  
- no new materials

ch - can't be reversed, new material

- (b) Give an example of each type of change.

phys - chopping wood  
- melting

ch - burn wood