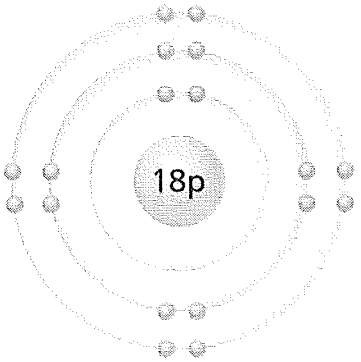
DATE: NAME: ANSWER KEY CLASS:

CHEMISTY **Test Review** Sci 10

Goal • Check your understanding of Chemical Reactions and Radioactivity.

1. Which of the following is an ionic compound?
   A. F_2
   B. CH_4
   C. SO_4^{2-}
   D. Na_3PO_4

Use the following Bohr diagram to answer questions 2 and 3.



2. Which of the following is represented by the diagram?
   A. argon atom
   B. silicon ion
   C. calcium ion
   D. calcium atom

3. How many valence electrons are indicated in the diagram?
   A. 2
   B. 8
   C. 10
   D. 18

4. Ammonia window cleaner has a pH of 11. Which of the following shows the correct colour of each indicator when a small amount of ammonia window cleaner is tested?

	Methyl Orange	Bromothymol Blue	Indigo Carmine
A.	red	blue	blue
B.	red	yellow	green
C.	yellow	green	yellow
D.	yellow	blue	blue

5. How many atoms of each of the following elements are indicated by the formula for ammonium sulphite?

	Nitrogen	Hydrogen	Sulphur	Oxygen
A.	1	4	1	3
B.	4	4	3	3
C.	2	6	1	3
D.	2	8	1	3

6. What is the name of the compound PbS_2?
   A. lead sulphide
   B. lead disulphide
   C. lead(II) sulphide
   D. lead(IV) sulphide

7. What type of chemical reaction involves two smaller molecules reacting to produce one larger molecule?
   A. Synthesis
   B. Decomposition
   C. Single replacement
   D. Double replacement

8. What type of reaction would you expect when potassium carbonate reacts with magnesium nitrate?
   A. single replacement
   B. double replacement
   C. neutralization
   D. combustion

9. When a flame is brought near a lump of coal, the coal slowly begins to burn. When the same flame is placed in the path of falling coal dust, an explosion occurs. What is the factor that causes the second reaction to have a faster rate of reaction?
   A. temperature
   B. catalyst
   C. concentration
   D. surface area

10. What element is formed during the alpha decay of uranium-235?
    A. thorium-231
    B. neptunium-235
    C. plutonium-239
    D. protactinium-236

DATE: NAME: CLASS:

BLM 2-48 continued

Match the Term on the left with the best Descriptor on the right. Each Descriptor may be used only once.	
Term	**Descriptor**
H 11. isotopes	A. a substance that increases reaction rate without being used up
L 12. cation	B. an electron
E 13. covalent	C. formed in the reaction of an acid and a base
G 14. Alpha particle	D. produces hydrogen ions in water
J 15. base	E. a kind of chemical bond in which electrons are shared
A 16. catalyst	F. the time it takes half the a sample of a radioactive substance to decay
F 17. half-life	G. a helium nucleus
B 18. Beta particle	H. atoms of the same element that differ in number of neutrons
C 19. salt	I. type of chemical reaction that has one product
I 20. synthesis	J. produces hydroxide ions in water
	K. produces an acidic solution when dissolved in water
	L. when an atom loses electrons and becomes positive

Short Answer Questions

21. Complete the chart.

Name of Isotope	Symbol	Mass Number	Number of Protons	Number of Neutrons
scandium-49	$^{49}_{21}Sc$	49	21	28
cobalt - 60	$^{60}_{27}Co$	60	27	33
nitrogen - 15	$^{15}_{7}N$	15	7	8

DATE: NAME: CLASS:

BLM 2-48
continued

22. Complete the chart.

Name of Ion	Symbol	Number of Protons	Number of Electrons	Net Charge
oxide ion	O^{2-}	8	10	2−
iodide ion	I^-	53	54	1−
scandium ion	Sc^{3+}	21	18	3+

23. Complete the chart.

Name	Formula	Ionic or Covalent?
Tin (IV) oxide	SnO_2	ionic
disulfur pentachloride	S_2Cl_5	covalent
Calcium phosphide	Ca_3P_2	ionic

24. Complete the chart.

Formula	Name	Ionic or Covalent?
K_2S	potassium sulfide	ionic
$CuBr_2$	copper (II) bromide	ionic
S_2O_3	disulfur trioxide	covalent

25. What are two difference between ionic and covalent bonds?

① ionic = between a metal & non metal
covalent = between 2 non-metals
② ionic = atoms lose or gain electrons
covalent = atoms share electrons

DATE: NAME: CLASS:

BLM 2-48 continued

26. Balance each reaction and classify as synthesis, decomposition, single replacement, double replacement, neutralization, or combustion.

	Reaction	Classification
(a)	___ $Ni(OH)_2$ + 2 HCl → ___ $NiCl_2$ + 2 H_2O	acid base neutralization
(b)	2 $Au(CN)_3$ + 3 Zn → 2 Au + 3 $Zn(CN)_2$	single replacement
(c)	___ O_2 + 2 Be → 2 BeO	synthesis

27. Sodium metal reacts with oxygen gas to produce sodium oxide.
(a) Which type of chemical reaction is this?

Synthesis

(b) Write the balanced chemical equation to represent the reaction.

$4Na + O_2 \rightarrow 2Na_2O$

(c) Explain how the law of conservation of mass is illustrated by the reaction.

4 atoms of sodium bond with 1 molecule of oxygen gas to produce 2 molecules of sodium oxide. Same # of Na & O atoms on both sides

28. Zinc metal reacts with hydrochloric acid.

(a) Predict the two products of the reaction.

$Zn + 2HCl \rightarrow H_2 + ZnCl_2$

(b) Suggest two ways to increase the rate of this reaction.

- increase concentration of hydrochloric acid
- crush the zinc into powder (↑ surface area)
- ↑ temperature

DATE: NAME: CLASS:

BLM 2-48 continued

29. Complete each equation by writing the correct nuclear symbol in the blank and labelling the type of decay.

$^{60}_{28}Ni^* \rightarrow$ $^{60}_{28}Ni$ $+ \ ^{0}_{0}\gamma$ gamma

$^{238}_{92}U \rightarrow$ $^{234}_{90}Th$ $+ \ ^{4}_{2}He$ alpha

$^{24}_{11}Na \rightarrow$ $^{24}_{12}Mg$ $+ \ ^{0}_{-1}e$ beta

30. Argon is a gas, and is driven out of molten rock, such as lava. Potassium however, remains in molten rock. Consider the following data for the isotope pairs potassium-40 (parent) and argon-40 (daughter).

Number of Half-Lives	Elapsed Time (billion y)	Amount of Potassium-40 Present	Amount of Argon-40 Present	Ratio of Argon-40 to Potassium-40
0	0	1000 g	0	0:1
1	1.3	500 g	500 g	1:1
2	2.6	250 g	750 g	3:1
3	3.9	125 g	875 g	7:1
4	5.2	62.5 g	937.5 g	15:1

Explain how you would determine the age of a rock sample using potassium-40/argon-40 ratios.

If the ratio is 50:50, you know 1 half life has passed (1.3 billion years). For every half life that has passed, you know that 1.3 billion years have also passed.

31. The half life of iodine-131 is 8 days and it undergoes beta decay.

a) Write the decay formula for iodine 131

$^{131}_{53}I \rightarrow \ ^{0}_{-1}e + \ ^{131}_{54}Xe$

b) If you are given a sample of 50 g, how many days would it take to reduce the sample to 6.25 g?

Half life	days	amt
0	0	50 g
1	8	25
2	16	12.5
3	24	6.25
4	32	3.175

∴ You know that 24 days have passed.

c) How much of the daughter isotope would there be after 16 days?

H.L.	Days	Amt Parent	Amt Daughter
0	0	50g	0g
1	8	25g	25g
2	16	12.5 g	37.5g

∴ there would be 37.5g of the daughter isotope

d) Sketch a decay curve of iodine-131 for 40 days.