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SCH4C Practice WS Unit 1					
Multip Identif		Choice choice that best completes the statement or answers the question.			
	1.	The special band of light waves that the human eye can detect is known as the a. continuous spectrum c. radio spectrum b. line spectrum d. visible spectrum			
	2.	Electromagnetic energy is a. a measure of a magnetic field b. light energy c. electric energy d. heat energy			
	3.	Which of the following is an example of light energy? a. visible light b. X-rays c. ultraviolet light d. all of the above			
	4.	Each element produces a characteristic a. line spectrum b. continuous spectrum c. visible spectrum d. none of the above			
	5.	For light that is emitted in the visible range, the colour of the light depends upon a. the type of spectroscope used c. the element that is used b. the frequency of the light wave d. all of the above			
	6.	According to the law of electric charges, Rutherford's "atom" should have a. emitted ultraviolet light c. collapsed b. been very stable d. emitted X-rays			
	7.	Niels Bohr was able to explain the line spectrum of a. helium c. neon b. hydrogen d. sodium			
	8.	Bohr's theory is based on the fact that an electron's energy is a. negligible c. always the same b. very large d. quantized			
	9.	Bohr compared the electrons in an atom to a. raisins in a bun b. bees around a beehive c. planets orbiting the sun d. stars in the sky			
	10.	When an electron gains a specific amount of energy, a. it moves to a higher energy level c. it moves to its ground state b. it gives off light energy d. none of the above			
	11.	An electron that occupies a higher energy level than normal is said to be in a. the wrong energy level c. a higher state b. an excited state d. the ground state			
	12.	Electrons in their ground state a. are not moving b. give off light energy continually c. do not emit any light energy d. none of the above			

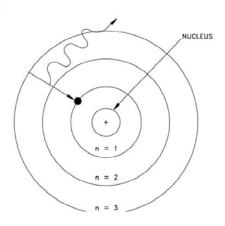
- 13. Bohr's model was successful because
 - a. it could explain the line spectrum of hydrogen
 - b. it introduced the idea of quantized energy
 - c. it explained why the atom did not collapse
 - d. all of the above
- 14. Bohr's model was not the perfect model of the atom because it only explained
 - a. the nucleus
 - b. the line spectra of the first 20 elements
 - c. the innermost electrons
 - d. the line spectrum of hydrogen
- 15. With his model, Bohr hypothesized that there were different energy levels. How many energy levels are there?
 - a. 3 b. 10

- c. 15
- d. infinite
- 16. Bohr predicted that each energy level could hold a maximum number of electrons. How many electrons could the first three energy levels hold?
 - a. 2, 2, 6

c. 2, 4, 6

b. 2, 8, 8

d. 2, 4, 8



- 17. The diagram above represents an atom whose electron is
 - a. moving from the ground state to an excited state
 - b. moving from an excited state to the ground state
 - c. absorbing a quantum of energy
 - d. none of the above
- 18. In the diagram above, the amount of electromagnetic radiation given off by the electron falling to a lower energy level will depend upon
 - a. the element
 - b. the number of electrons in the atom
 - c. the energy difference in the energy levels
 - d. nothing; it is always the same
- 19. The model of the atom, where electrons are in fixed orbits about the nucleus, was proposed by
 - a. John Dalton

Ernest Rutherford

b. J.J. Thomson

d. Niels Bohr

 20.	What is a method for identifying different types	sofi	matter using qualitative analysis?
	a. thermal emission spectroscopy	c.	
	b. light spectroscopy	d.	all of the above
21.	The ability of a substance to conduct an electric	cur	rent is known as
	a. electrolysis	c.	electrolytic
	b. conductivity	d.	ionization
22.	Conductivity is a		
	a. physical property	c.	both a and b
	b. chemical property	d.	none of the above
23.	A compound that is able to conduct a current w	hen	placed in water to form a solution is
	a. a nonelectrolyte	c.	a conductor
	b. an electrolyte	d.	an insulator
24.	A compound that is not able to conduct a curren	nt w	hen placed in water to form a solution is
	a. a nonelectrolyte	c.	a conductor
	b. an electrolyte	d.	an insulator
25.	When an atom gains or loses valence electrons,		
	a. a cation is formed	c.	an ion is formed
	b. an anion is formed	d.	a polyatomic ion is formed
26.	Sodium chloride is an example of		
	a. an ionic compound	c.	a salt
	b. an electrolyte	d.	all of the above
 27.	A full outer shell usually means		
	a. 2 valence electrons	c.	8 valence electrons
	b. 6 valence electrons	d.	none of the above
 28.	If an atom gains two extra electrons, it has a cha	arge	of
	a. 2+	c.	1–
	b. 2-	d.	none of the above
29.	If an atom loses two electrons, it has a charge o	f	
	a. 2+	c.	1–
	b. 2-	d.	none of the above
30.	The octet rule states that		
	a. atoms must gain or lose 8 valence electrons	s to	be stable
	b. atoms must lose 8 valence electrons to be s		
	c. atoms can only be stable when they gain 8	vale	ence electrons
	d. atoms are stable when they have 8 valence	elec	etrons
 31.	If sodium loses one electron, how many valence	e ele	ectrons does it now have?
	a. 1	c.	8
	b. 0	d.	7

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- 32. If chlorine gains one electron, how many valence electrons does it now have?
 - a.

c. 8

b. 0

- d. 7
- 33. If sulfur gains one electron, how many electrons will it have in its valence shell?
 - a.

e. 8

b. 0

b.

- d. 7
- 34. In order to be stable, oxygen must

lose 2 electrons

a. gain 1 electron

- c. gain 2 electrons
- d. lose 1 electron
- 35. In order to be stable, magnesium must
 - a. gain 1 electron

c. gain 6 electrons

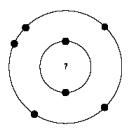
b. lose 2 electrons

- d. gain 2 electrons
- 36. When an atom gains one or more electrons, the number of protons
 - a. decreases

c. stays the same

b. increases

- d. none of the above
- 37. In order to become like a noble gas, metals usually tend to
 - a. gain electrons
 - b. lose electrons
 - c. gain or lose electrons depending on the metal
 - d. none of the above



- 38. In the Bohr–Rutherford diagram above, how many valence electrons does the atom have?
 - a.

c 5

b. 2

- d. not enough information is given
- 39. Which element does the Bohr–Rutherford diagram above represent?
 - a. nitrogen

c. carbon

b. oxygen

- d. not enough information is given
- _ 40. In the Bohr–Rutherford diagram above, how many valence electrons does this atom need to gain or lose to satisfy the octet rule?
 - a. 2

c. .

b. 5

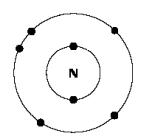
- d. not enough information is given
- 41. In the Bohr–Rutherford diagram above, which noble gas would this element be most like if it had 8 valence electrons?
 - a. helium

c. argon

b. neon

d. not enough information is given

42.



The Bohr-Rutherford diagram above of nitrogen is best represented by which Lewis diagram?

a.

b.

not enough information is given d.

When using Lewis symbols, the number of dots represents

the total number of electrons

- only the nonvalence electrons
- only the valence electrons
- the number of electrons needed
- The Lewis symbols of elements down a group of the periodic table have
 - the same number of dots
- a decreased number of dots
- an increased number of dots b.
- an unrelated number of dots
- The correct Lewis symbol for oxygen is

a.

b.

- :O:
- d.

- 46. An ion with a -1 charge has
 - one extra electron
 - one missing electron

one missing proton d. one extra proton

- 47. An ion with a +1 charge has
 - one extra electron
 - one missing electron

- one missing proton
- d. one extra proton

- 48. An ion with a -2 charge has
 - two extra electrons
 - two missing electrons

- one missing proton, one extra electron
- two missing protons d.

- 49. Ionic bonds form between
 - two metals
 - a metal and a nonmetal

- two nonmetals
- all of the above
- 50. As an ionic bond is formed when
 - two atoms share two electrons
 - two atoms both lose electrons
 - one atom gains electrons from the other atom
 - the electrons are passed back and forth between the two atoms

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	51.	Chemical formulas of ioni a. the type of atoms in the the ratio of the types of a formula unit of the od. all of the above	ne compound of atoms in the compo		l	
	52.	Ionic compounds form a. molecules b. crystals		c. d.	polyatomic ions none of the above	
	53.	When ionic compounds ar a. electrolytes b. nonelectrolytes		hey c. d.	are semiconductors none of the above	
	54.	When ionic compounds di a. ionize b. dissociate	•	c. d.	remain neutral none of the above	
	55.	A single covalent bond is a. two atoms share two ob. two atoms both lose e. one atom gains electrod. the electrons are passo	electrons electrons ons from the other ato		n the two atoms	
	56.	Covalent compounds forma. molecules b. crystals		c. d.	polyatomic ions none of the above	
Short	t Ans	wer				
	57.	Define the terms <i>frequenc</i> related to each other.	y and <i>wavelength</i> as th	ney	relate to electromagnetic energy.	Explain how they are
	58.	Distinguish between a con	tinuous spectrum and	a li	ne spectrum.	
	59.	Why can a line spectrum b	e used in qualitative a	ınal	vsis?	

moving charges?

- 62. According to Bohr, why do electrons not collapse into the nucleus?
- 63. Explain how quantization of energy is analogous to a ball on a flight of steps.
- 64. According to Bohr's theory, how many electrons can be in each of the first three energy in levels in order for the atom to be stable?

60. What is the law of moving charges? How did scientists know that the electron did not follow the law of

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- 65. Explain how and why an ion is formed.
- 66. Why does sodium have an octet of electrons when it loses its valence electron? Support your answer with a diagram.
- 67. Why are ions normally formed in pairs of anions and cations?
- 68. Why is the term formula unit used when referring to the chemical formula of an ionic compound?

SCH4C Practice WS Unit 1 Answer Section

MULTIPLE CHOICE

- 1. D
- 2. B
- 3. D
- 4. A
- 5. B
- 6. C
- 7. B
- 8. D
- 9. C
- 10. A
- 11. B
- 12. C
- 13. D
- 14. D
- 15. D
- 16. B17. B
- 18. C
- 19. D
- 20. D
- 20. D
- 22. A
- 23. B
- 24. A
- 25. C
- 26. D
- 27. C
- 28. B
- 29. A
- 30. D
- 31. B
- 32. C
- 33. D
- 34. C
- 35. B
- 36. C
- 37. B
- 38. C
- 39. A
- 40. C

- 41. B
- 42. B
- 43 B
- 44. A
- 45. B
- 46. A
- 47. B
- 48. A
- 49 B
- 50. C
- 51. D
- 52. B
- 53. A
- 54. B
- 55. A
- *33.* 11
- 56. A

SHORT ANSWER

- 57. the frequency of a light wave is the number of cycles that pass a point in one second
 - the wavelength is the distance between successive crests and troughs in a wave
 - related as the wavelengh decreases the frequency must increase
- 58. a continuous spectrum shows all the colours in an uninterrupted pattern, while a line spectrum shows only distinct lines of colour
- 59. each element has a characteristic line spectrum
- 60. the law of moving charges states that when an electron orbits the nucleus, it should emit energy in the form of electromagnetic radiation
 - as the electron runs out of energy, it should collapse into the atom's nucleus
- 61. Bohr used hydrogen because it has only one electron
- 62. Bohr suggested that the electrons revolve around the atom's nucleus in orbits of fixed energy
- 63. the ball on the steps is restricted to specific levels; it cannot sit between steps
 - the ball can only possess fixed amounts (quanta) of energy, specific to each step

64.

energy level 1	2
energy level 2	8
energy level 3	18

- 65. an ion is formed when an atom gains or loses one or more electrons
 - atoms form ions in order to become more stable by attaining 8 (an octet of) valence electrons
- 66. when sodium loses its one valence electron, its outermost shell is now empty
 - the second energy level is full (i.e., it has 8 electrons)
 - the diagram should be a Bohr-Rutherford diagram that shows a full second energy level for the sodium ion
- 67. an anion is formed when an atom gains one or more electrons
 - a cation is formed when an atom loses one or more electrons
 - the electrons that the cation loses are the electrons gained by the anion
- 68. since an ionic compound is a crystal consisting of many positive and negative ions, the term *formula unit* is used indicate the types of ions and their ratio to each other in the crystal