▬▬ PRACTICE EXAM ▬▬

**Name -** _____

INSTRUCTIONS

1. Write your first <u>and</u> last name on the line provided above.
2. All parts of the practice exam will be completed on this paper.
3. Be mindful of the time.

<u>Part 1 – Multiple Choice</u> (Value - 40)

<u>Circle</u> the letter of the best answer.

1. The *Certainty Rule* is used to
   (a) determine the number of significant digits when adding and subtracting measured values
   (b) determine the number of significant digits when adding and multiplying measured values
   (c) determine the number of significant digits when subtracting and dividing measured values
   (d) determine the number of significant digits when multiplying and dividing measured

2. You are riding your bicycle west. If you decide to decrease your velocity, in what direction is your acceleration?
   (a) south
   (b) north
   (c) east
   (d) west

3. Which list includes only nonmetals?
   (a) krypton, nitrogen, helium, xenon
   (b) titanium, zinc, copper, lead
   (c) gold, mercury, carbon, iron
   (d) nickel, platinum, chlorine, aluminum

4. Which of the following includes only scalar quantities?
   (a) displacement, acceleration and velocity
   (b) distance, time, and speed
   (c) position, displacement and speed
   (d) displacement, speed and velocity

5. A family in the periodic table that contains only nonmetals is the
   (a) actinides
   (b) alkali metals
   (c) lanthanides
   (d) halogens

6. Which substance in the following list is an element?
   (a) ammonia
   (b) methane
   (c) bismuth
   (d) water

7. When the following equation is balanced, the numerical coefficients for P_4 and Cl_2 are respectively:
$$S_8 + I_2 \longrightarrow S_2I$$
   (a) 2, 8
   (b) 8, 2
   (c) 1, 2
   (d) 2, 1

8. In 1997, Thrust SSC, the world's fastest jet-engine car, travelled 604 m at an average speed of 341 m/s. The length of time it took was
   (a) 0.565 s
   (b) 1.77 s
   (c) 263 s
   (d) 945 s

9. An atom has a total of 18 electrons. These electrons are found in 3 orbits that have:
   (a) 6 electrons each
   (b) 8, 8, and 2 electrons, moving out from the nucleus;
   (c) 2, 8, and 8 electrons, moving out from the nucleus;
   (d) 2, 10, and 6 electrons, moving out from the nucleus.

10. A solution has a pH of 2. How is this solution best described?
    (a) strongly basic
    (b) slightly basic
    (c) slightly acidic
    (d) strongly acidic

11. If Cl_2 and Na_2S solutions are mixed together, a:
    (a) double displacement reaction occurs
    (b) single displacement reaction occurs
    (c) decomposition occurs
    (d) synthesis reaction occurs

12. A speed of 2.8 m/s is equal to
    (a) 0.78 km/h
    (b) 5.6 km/h
    (c) 10 km/h
    (d) 14 km/h

13. An atom becomes an ion with a charge of +2 when it:
    (a) gains 2 protons
    (b) loses 2 neutrons
    (c) loses 2 electrons
    (d) gains 2 electrons

14. Which of the following is an example of speed?
    (a) 40 km
    (b) 20 km/h[E]
    (c) 1.5 m [right]
    (d) 15 km/h

15. Which of the following graphs illustrates an object that is speeding up?
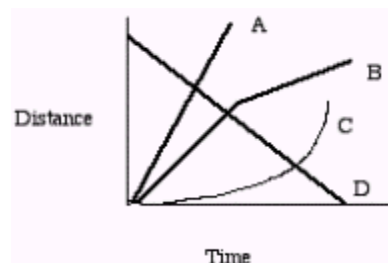
    (a) A
    (b) B
    (c) C
    (d) D

16. Boron-11 has ___ neutrons.
    (a) 11
    (b) 6
    (c) 5
    (d) 3

17. Which statement concerning electric charges is true?
    (a) There is one type of electric charge.
    (b) There are two types of electric charge.
    (c) There are three types of electric charge.
   (d) There are four types of electric charge.

18. Which element is a member of the halogens?
    (a) astatine
    (b) copper
    (c) radium
    (d) potassium

19. Protons are
    (a) negatively charged particles found outside the nucleus of an atom.
    (b) neutral particles found in the nucleus of an atom.
    (c) positively charged particles found outside the nucleus of an atom.
    (d) positively charged particles found in the nucleus of an atom.

20. What type of reaction does the following equation represent?

$$AB + CD \longrightarrow CB + AD$$
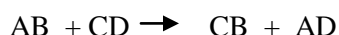
    (a) single displacement
    (b) combustion
    (c) double displacement
    (d) decomposition

21. A beryllium ion has
    (a) 4 protons, 6 electrons and an ionic charge of 2-.
    (b) 4 protons, 2 electrons and an ionic charge of 2+.
    (c) 4 protons, 6 electrons and an ionic charge of 2+.
    (d) 4 protons, 2 electrons and an ionic charge of 2-.

22. In the Periodic Table, elements with similar properties are grouped in:
    (a) diagonal rows
    (b) horizontal rows
    (c) periods
    (d) vertical columns

23. Gold can be hammered into thin sheets. What physical property is being described?
    (a) malleability
    (b) ductility
    (c) viscosity
    (d) solubility
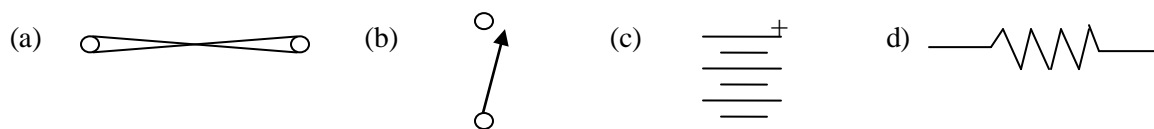
24. Which of the following is a chemical property?
    (a) freezing
    (b) burning
    (c) dissolving
    (d) boiling

25. Which of the following includes only mixtures?
   (a) heterogeneous mixtures and solutions
    (b) elements, compounds and solutions
    (c) compounds and solutions
    (d) elements and compounds

26. The symbol that represents a switch in a circuit diagram is

27. A positive slope on a distance-time graph indicates:
    (a) the object's speed is increasing.
    (b) the object is not moving.
    (c) the object's speed is decreasing.
    (d) the object has a constant speed.
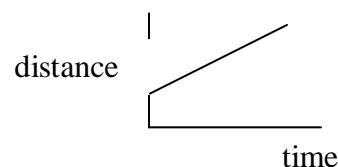
28. The reaction below is an example of the reaction type called:

$$A + B \longrightarrow AB$$

   (a) combustion
   (b) decomposition
   (c) synthesis
   (d) single displacement

29. An element that does form a diatomic molecule is
   (a) iodine
   (b) sulfur
   (c) phosphorous
   (d) hydrogen

30. John walks to his friend's house 5 blocks east and then walks 15 blocks west to his own home. His displacement is
   (a) 10 blocks
   (b) zero blocks
   (c) 10 blocks [E]
   (d) 10 blocks [W]

31. A measurement of 0.020 km has
   (a) 2 significant digits
   (b) 4 significant digits
   (c) 5 significant digits
   (d) 6 significant digits

32. If 1min = 60 s, then 42 s equals
   (a) 12 min
   (b) 0.70 min
   (c) 178 min
   (d) 2520 min

33. Which WHMIS symbol means "bio-hazardous infectious material"?

(a)   (b)   (c)   (d)

34. The slope of a distance-time graph will determine the
   (a) distance of the object
   (b) speed of the object
   (c) acceleration of the object
   (d) displacement of the object

35. Acceleration can best be defined as
   (a) the speed at which an object is travelling at a particular instant
   (b) the displacement of an object divided by time
   (c) the total distance covered over the total time measured
   (d) the rate of change in velocity

36. In any chemical reaction, the total mass of the reactants is always equal to the total mass of materials produced. This is known as the law of :
   (a) chemical reactions
   (b) conservation of mass
   (c) constant proportion
   (d) conservation of energy

37. Which chemical formula correctly matches the chemical name provided?
   (a) $Ni_2(SO_4)_3$ – nickel (III) sulfate
   (b) $PbCO_3$ – lead (IV) carbonate
   (c) $Fe(ClO_3)_2$ – iron (III) chlorate
   (d) Cu_2PO_4 – copper (I) phosphate

38. A vector quantity has
    (a) direction
    (b) size
    (c) size and direction
    (d) none of the above

39. The rate of many reactions is approximately doubled for every $10\,^{\circ}C$ rise in temperature. If
    such a reaction takes 30 min at $65\,^{\circ}C$, at $75\,^{\circ}C$ it should take about:
    (a) 5 min
    (b) 10 min
    (c) 15 min
    (d) 20 min

40. Which of the following is a molecular compound held together by covalent bonds?
    (a) LiBr
    (b) CaO
    (c) H_2O
    (d) Mg_3P_2

Part 2 – Compounds (Value - 16)

State whether each compound is ionic or molecular and give the compound name or chemical formula as required.

		Ionic or molecular	Name or Formula
a)	$CrBr_3$	_____	_____
b)	$BeSO_4$	_____	_____
c)	AlI_3	_____	_____
d)	FI_3	_____	_____
e)	cobalt (III) sulfide	_____	_____
f)	gallium phosphide	_____	_____
g)	dinitrogen tetraoxide	_____	_____
h)	potassium dichromate	_____	_____

Part 3 – Atoms (Value - 15)

Write your answers in the space provided.

1. Give the standard atomic notation for sodium-23 **and** draw its Bohr-Rutherford
   diagram. **(5)**

2. Magnesium and fluorine react to form a compound.
   (a) Draw **Bohr** diagrams of magnesium and fluorine separately.   **(2)**

   (b) Circle the metal and underline the nonmetal. **(1)**

          magnesium   fluorine

   (c) Sketch **Bohr** diagrams showing the electron movement that occurs when
       magnesium and fluorine react. More than one atom of each element may be
       necessary. **(3)**

   (d) What are the charges on the magnesium and fluoride ions? **(2)**

   (e) Give the chemical formula and the chemical name of the compound formed when
       magnesium and fluorine react. **(2)**

Part 4 – Velocity-Time Graph (Value - 14)

Show your work in the space provided.

1. Data was collected for an object in motion. Draw a velocity-time graph for the data in the chart. Remember to include a title for the graph, labels for the axes and a line of best-fit. **(8)**

Time (s)	Velocity (m/s)
0.0	0.0
0.5	5.0
1.0	10
1.5	15
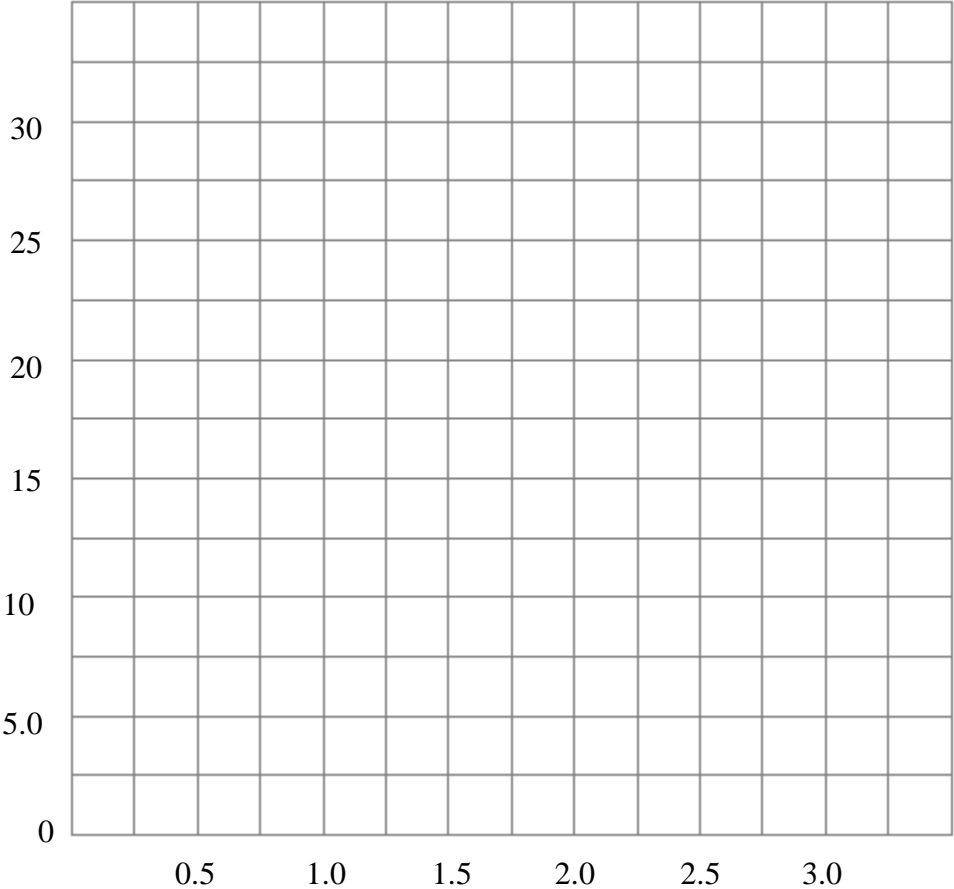
2. Using the data in the graph, calculate the acceleration of the object. Show your work. **(3)**

3. a) How fast was the object moving at t = 1.25 s? **(1)**

   b) At what t value would the object be travelling at 7.5 m/s? **(1)**

4. What is the displacement of the object between t = 0.0 s and t = 1.5 s? Show your work. **(3)**

Part 5 – Identifying and Balancing Reactions

Balance the following equations & state the type of reaction.   **(10)**

Types – synthesis (S), decomposition (D), single replacement (SR), double replacement (DR) or
combustion (C)

TYPE

a) ____$CrCl_3$ → _____

b) ____ KCl + ____ $Mg(NO_3)_2$ → _____

c) ____Co + ____O_2 → _____

d) ____ Zn + ____H_2SO_4 → _____

e) ____C_2H_4 + ____O_2 → _____

Part 6 – Chemical Reactions (Value - 14)

Complete this part <u>on this paper</u>.

Predict the products of the reactions then complete the chemical equation. Remember to balance
each equation.

a) __MgF_2 + __Li_3P →

b) __CH_4 + __O_2 →

c) __$SrBr_2$ →

d) __ Zr + __ I_2 →

e) ___K_2SO_4 + ___ Al →

Show work for full value. Include a word statement.

1. A hot air balloon flew 12 h at an average speed of 210 km/h. How far did it travel? **(5)**

2. A race car accelerates at 5.0 m/s² [W]. If its initial velocity is 23 m/s [W], what is its final velocity after 2.7 s? **(5)**

3. A truck is travelling at 22 m/s east when the driver notices a speed limit sign for the town ahead. If it takes the driver 6.9 s to slow down to a velocity of 14 m/s east, what is the acceleration of the truck? **(4)**

4. A student travels 3.0 m [E] in 8.0 s then 4.6 m [W] in 12 s.

   a) What is his velocity of the student while traveling east? **(4)**

    b) What is the student's average velocity?   **(5)**

5. The peregrine falcon is the fastest of the flying birds. If a peregrine falcon can fly 1.73 km downward in 25 s, what is the average velocity of the bird in km/h? **(5)**

Part 8 – Electricity (Value - 13)

Use complete sentences for written responses.

1. What is the study of static electricity called? **(1)**

2. What are the two types of electrical charge? **(2)**

3. What are the four basic components of an electric circuit? **(4)**

4. a) Using the symbols below, draw a circuit diagram illustrating two bulbs in series so that both bulbs are lit. **(4)**
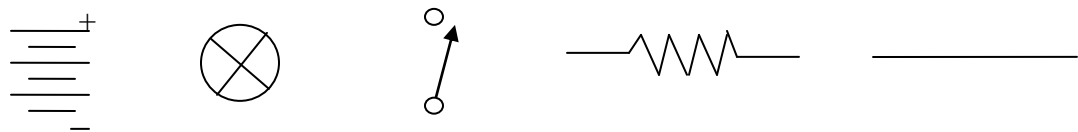
5. On the circuit diagram you drew in part (a), add a wire to create a short circuit. **(1)**

6. Imagine you have two bulbs in parallel in a closed circuit. What happens if you unscrew one of the bulbs? **(1)**