







SCIENCE 10

Year-End Review**UNIT A: CHEMISTRY**

1. Write the missing label or draw the missing picture for each WHMIS symbol below.

	Exploding bomb (for explosion or reactivity hazards)		Flame (for fire hazards)		Flame over circle (for oxidizing hazards)
					Skull and Crossbones (can cause death or toxicity with short exposure to small amounts)
	Health hazard (may cause or suspected of causing serious health effects)				
					

2. Identify the element at each of the following locations on the periodic table:
- a) Group 1, Period 2 _____
- b) Group 4, Period 6 _____
- c) Group 7, Period 5 _____
- d) Group 16, Period 7 _____
3. Give the name & characteristics of each group below
- a. Group 1: _____
- b. Group 2: _____
- c. Group 17: _____
- d. Group 18: _____

4. Three unknown elements demonstrate the following properties:

Property	Element A	Element B	Element C
State of matter	Solid	Solid	Gas
Conductivity	High	Medium	Low


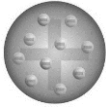
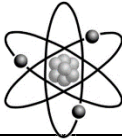

Classify each element as a metal, non-metal, or metalloid. Justify your answer.

Element A _____

Element B _____

Element C _____

5. For each atomic model pictured below, write the name of the scientist who proposed it, the name of the model, and some features of the model.

Scientist & Name of Model				
Model Image				
Features				

6. What is a valence electron?

7. Draw the Bohr diagram for each element. Then indicate the number of valence electrons each would have.

<p>a. Sodium</p> <p>Number of valence electrons = _____</p>	<p>c. Nitrogen</p> <p>Number of valence electrons = _____</p>
<p>b. Calcium</p> <p>Number of valence electrons = _____</p>	<p>d. Fluorine</p> <p>Number of valence electrons = _____</p>

8. Based on valence electrons, which 2 elements from the previous question would be the most reactive? Explain.

9. Which two elements are more alike in terms of reactivity & behavior: Lithium and Sodium or Lithium and Beryllium? Explain.

10. An atom of magnesium has 12 protons, 12 electrons, and 13 neutrons. What is its mass number?

11. An atom of iron has 26 protons, 30 neutrons, and 26 electrons. What is its mass number?

12. What is an isotope? Give an example of two isotopes of an element, and indicate how many protons, electrons, and neutrons each has.

13. Define and give an example of an ion –

14. Compare and contrast “cations” and “anions” & give an example of each –

15. Define and give an example of a “multivalent ion” –

16. Define and give an example of a “polyatomic ion” –

17. Compare and contrast molecular and ionic compounds

	IONIC	MOLECULAR
Composition		
Electron distribution (shared vs transferred)		
Typically soluble in water?		
Solutions are electrolytes?		

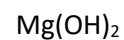
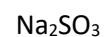
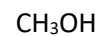
18. Name or write the chemical formula of each of the following compounds.

Ionic or Molecular?	Name	Chemical Formula
		BrF
	potassium dichromate	
	iron (III) sulfide	
		AlBr ₃
	phosphorus pentachloride	
		Zn(OH) ₂
		SnPO ₄
		NO
	difluoride tetraoxide	

19. Complete the following table comparing acids and bases.

	Definition	Properties	Examples
Acids			
Bases			

20. Circle the chemicals below that are acids. Draw a box around the bases. Draw a star next to the chemicals that are neutral.



21. An unknown solution is found to be a conductor of electricity, and turns litmus paper blue. Is the solution acidic, basic, or neutral?

22. Name each of the following acids.

a. H_2SO_4 _____

c. HCl _____

b. HNO_3 _____

d. H_2S _____

23. Name each of the following bases

a. $\text{Ca}(\text{OH})_2$ _____

c. $\text{Ti}(\text{OH})_3$ _____

b. NH_4OH _____

d. LiOH _____

24. Determine whether each of the following compounds are soluble or insoluble in water.

a. Na_2SO_4 = _____

c. AgNO_3 = _____

b. PbI_2 = _____

d. KClO_4 = _____

25. Compare and contrast endothermic and exothermic chemical reactions.

26. The chemical reaction for photosynthesis is shown below.



Based on this chemical equation, state whether photosynthesis is endothermic & exothermic. Explain how you know.

27. Explain the difference between physical & chemical change. Provide an example of each.

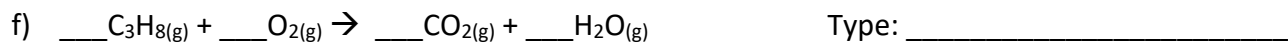
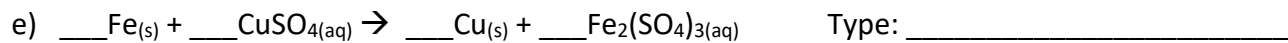
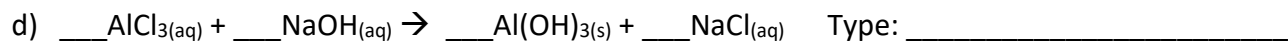
28. Is ice melting an example of a physical or chemical change? Explain.

29. Balance the following chemical equations & identify the **type of reaction**

a) $\text{Fe}_{(s)} + \text{S}_{8(s)} \rightarrow \text{FeS}_{(s)}$ Type: _____

b) $\text{AsCl}_{3(aq)} + \text{H}_2\text{S}_{(aq)} \rightarrow \text{As}_2\text{S}_3(s) + \text{HCl}_{(aq)}$ Type: _____

c) $\text{CH}_{4(g)} + \text{O}_{2(g)} \rightarrow \text{CO}_{2(g)} + \text{H}_2\text{O}_{(g)}$ Type: _____



30. Write a **balanced** chemical equation for each of the following word equations. In cases that describe energy changes, write the term **“thermal energy”** on the correct side of the equation. Include **states of matter**.

a) Aqueous calcium chloride reacts with solid indium.

b) The thermal decomposition of solid aluminum oxide is **endothermic**.

c) Liquid pentane (C_5H_{10}) burns **exothermically** in the presence of oxygen.

d) Aqueous cobalt (III) nitrate reacts with solid zinc to produce zinc nitrate and solid cobalt.

e) A solution of zinc sulfate reacts with a solution of strontium hydroxide.

31. Calculate the molar mass of

a. NaBr

c. $\text{Zr}_3(\text{PO}_4)_4$

b. CaF_2

d. iron (III) chloride

32. Calculate the number of moles in

a. 34 g of NH_4NO_3

b. 54 g of aluminum hydroxide

33. Calculate the mass of

a. 17 moles of water

b. 29.98 moles of $\text{Ni}_2(\text{SiO}_3)_3$

UNIT B: PHYSICS

1. Do the following conversions

a. 25 km = _____ m

d. 3.25cm = _____ m

b. 3.5 m = _____ km

e. 1 hr = _____ s

c. 54 J = _____ KJ

f. 12 kg = _____ g

2. Put the following in scientific notation to 3 significant figures.

a. 2300 J _____

d. 0.0000267 m _____

b. 0.00789 N _____

e. 30001 J _____

c. 4539162 kg _____

f. 0.00891 g _____

3. Complete the following table comparing scalar & vector quantities.

Quantity	Definition	Examples
Scalar		
Vector		

4. Define the term “uniform motion” & give an example

5. A student runs a distance of 10 m North over a period of 12 s. They then run 12 m South over a period of 15 s, and another 5 meters North over a period of 8 s.

a) What is the total distance travelled by the student?

b) What is the student’s displacement from their original position?

c) What is the student’s average speed?

d) What is the student’s average velocity?

6. A skateboarder travels with uniform motion as she approaches a ramp at 33 km/h. How fast is she travelling in m/s?

7. An object moves at a constant speed of 2.8 m/s for a period of 5 minutes. How far does it travel, in meters?

8. A car accelerates from a speed of 60 km/h to a speed of 110 km/h over a period of 20s.

a. Is the car's acceleration positive or negative? Explain.

b. Determine the car's rate of acceleration, in m/s.

9. An object travels at an initial velocity of 2.3 m/s [W]. If the object's average acceleration is 0.50 m/s² [W], how long will it take the object to reach a velocity of 9.6 m/s [W]?

10. The 4 graphs shown to the right represent the motion of a bug travelling around. Identify the graph matching each description below.

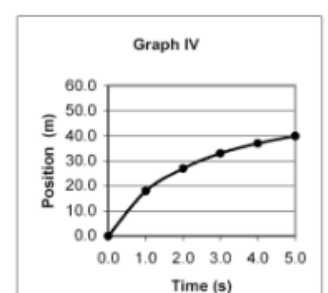
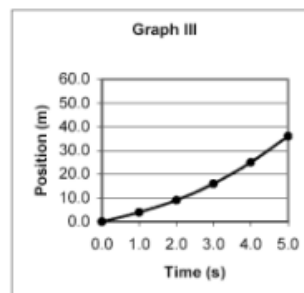
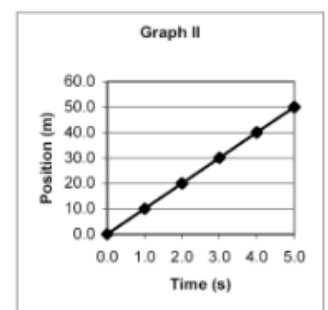
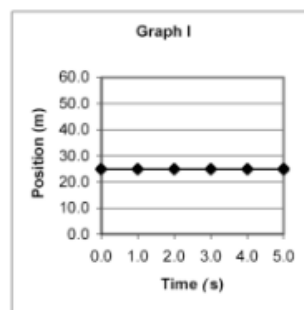
a. the bug is decreasing his rate of acceleration

b. the bug is travelling with constant velocity

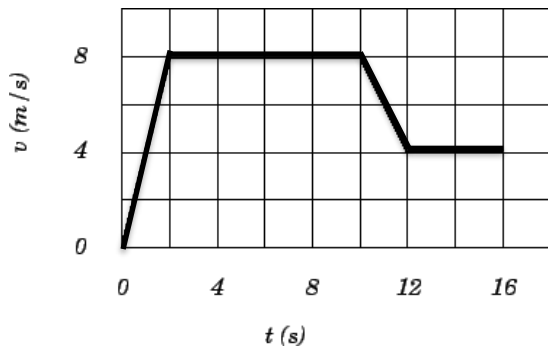
c. the bug is not moving

d. the bug is accelerating

e. Calculate the average velocity of the object in Graph B.



11. Consider the following graph depicting the motion of a bird over time:



a) How far does the bird travel in the first 2 seconds?

b) Calculate the bird's rate of acceleration from 10 and 12 s.

c) Calculate the displacement of the bird over the first 10 s.

12. Complete the following table comparing measurements of force, work, and energy.

Measurement	Definition	Formula(s)	Unit(s) of measurement
Force			
Work			
Energy			

13. A person pushes hard against a wall, exerting lots of energy and becoming sweaty in the process. Is the person doing work? Explain.

14. The kids in the class pile their textbooks into the arms of one student. The student walks forward a distance of 3 m before the books topple over. Did the student do work? Explain.

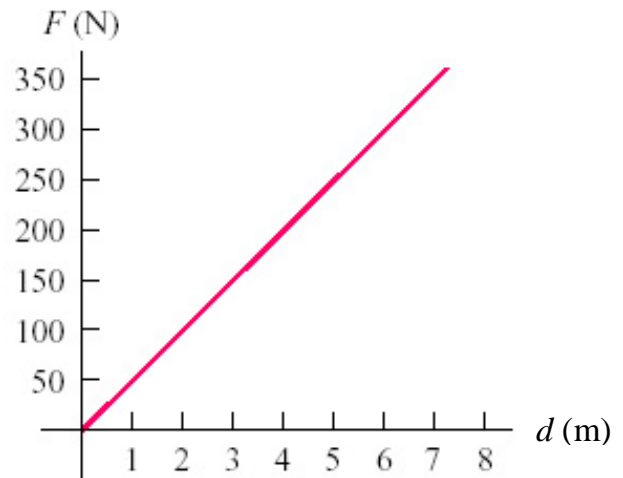
15. A hockey puck with a mass of 8.50 g is struck by a hockey stick, causing it to accelerate at a rate of 7.5 m/s^2 . Determine the force applied to the puck by the stick.

16. A force of 102 N is applied to an object, causing it to accelerate. If the object reaches a velocity of 5.50 m/s after a period of 10.0 s, what must be the mass of the object?

17. Consider the following graph used to represent the amount of force required to move a 25.0 kg desk a distance of 8 m:

a) Determine the amount of work done on the desk in order to slide it a distance of 8m.

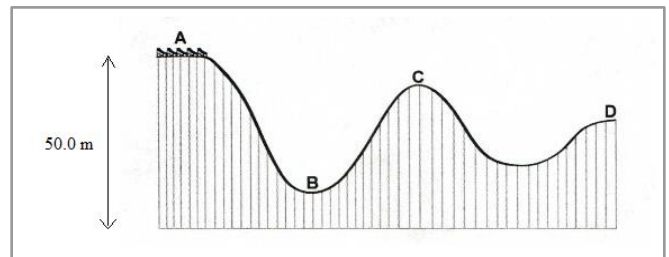
b) Determine the desk's acceleration after being pushed a distance of 5m.



18. The kinetic energy of a vehicle is 25,671 kJ. If the vehicle has a mass of 1500.0 kg, at what speed is the vehicle travelling?

19. A ball has a potential energy of 981 J at a height of 10 m where it is at rest.
- What is the kinetic energy of the ball just as it falls and strikes the ground?
 - Calculate the mass of the ball

20. Consider the following diagram of a roller coaster car...



- At which point does the car have the most gravitational potential energy?
- At which point does the car have the most kinetic energy?
- The roller coaster car has a mass of 125 kg. Calculate the gravitational potential energy of the car at Point A.
- How high is the car at Point C if it has 52000.0 J of gravitational potential energy?
- The coaster car has 12500.0 J of kinetic energy at Point B. How fast is it moving?

21. For each type of potential energy, give an example of an object/situation that contains it:
- elastic potential energy –
 - chemical potential energy –
 - gravitational potential energy –
22. What is mechanical energy?
23. What is efficiency?
24. A In lifting a car, the total mechanical energy input of a hydraulic hoist is 5610 Joules, while the useful mechanical energy output is 1926 Joules. Calculate the percent efficiency of the hoist.
25. Describe the energy conversions required to produce electrical energy from the burning of coal in a power-plant.

UNIT C: BIOLOGY

1. List the three main points of cell theory.
- -
 -
2. Match each scientist listed below with their contribution to microscopy & cell theory.

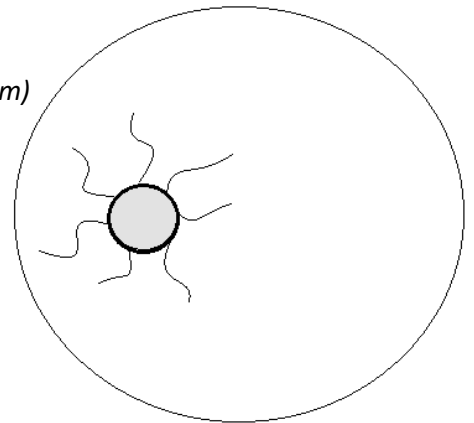
<u>Scientist</u>	<u>Contribution</u>
A. Hooke	_____ Invented the first microscope
B. Leeuwenhoek	_____ Coined the term “cell” after viewing cork under a microscope
C. Janssens	_____ Disproved the theory of spontaneous generation
D. Schleiden	_____ Concluded that plants were composed of cells
E. Pasteur	_____ First to see living cells under a microscope

3. Identify the controlled, manipulated, and responding variables in Pasteur’s experiment.

Controlled (list 3)	Manipulated	Responding

4. The following is an image of a protist under a microscope at 100X magnification (medium power). The field diameter is 1500 μm .

a) What is the estimated size of the protist? (*record your answer in μm*)



b) What is the scale of their drawing?

5. What makes a microscope “compound”?

6. If a compound microscope has a 10x ocular lens and a 25x objective lens, what is the total magnification?

7. Match the organelles in column A with the correct function in column B.

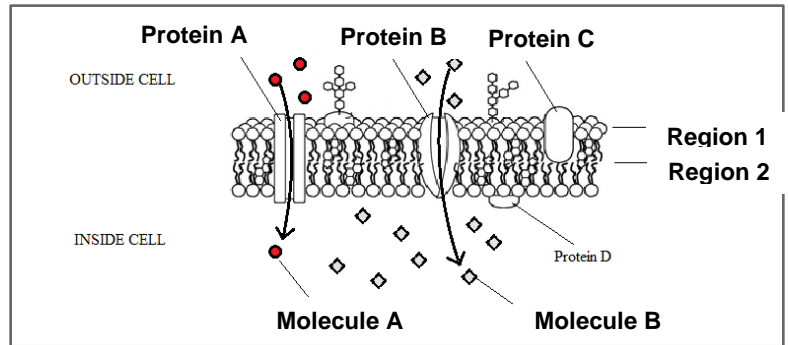
- | | |
|---------------------|--|
| ___ cytoplasm | a) jelly like fluid containing cellular organelles |
| ___ nucleus | b) ribosomes are made here; network of tubules for transporting substances |
| ___ chloroplast | c) makes ATP energy through the process of cellular respiration |
| ___ nucleolus | d) digests worn out cell parts & destroys invaders (bacteria, viruses, etc.) |
| ___ Golgi apparatus | e) site of protein synthesis (production) |
| ___ mitochondria | f) storage area |
| ___ centrioles | g) the “brain” of the cell; contains DNA |
| ___ cell wall | h) produces glucose through the process of photosynthesis; in plant cells only |
| ___ ribosomes | i) protective, sturdy layer surrounding plant cells |
| ___ vacuole | j) the packaging and distribution center |
| ___ lysosomes | k) only in animal cells; helps with cell division |

11. Consider the following diagram of a cell membrane:

a) Which region repels water? What is the term that describes this region?

b) Which process is used to transport Molecule A into the cell? How do you know?

c) Which process is used to transport Molecule B into the cell? How do you know?



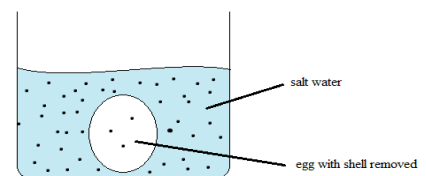
12. Why is it beneficial for cells to have a greater surface area to volume ratio?

13. How could you increase the surface area to volume ratio of an object?

14. What are some advantages and disadvantages of multicellularity?

15. An egg's shell is removed and it is placed in a solution of salt water. The membrane of an egg is permeable to water, but not to salt...

a) Is the egg considered to be hypertonic or hypotonic relative to the solution of salt water around it?



b) What can we expect to observe if the egg is left in the solution of salt water overnight? Explain.

16. Complete the following table comparing the three main plant tissues.

Tissue	Location	Roles	Specializations
Dermal			
Ground			
Vascular			

17. Complete the table comparing the two types of vascular tissue.

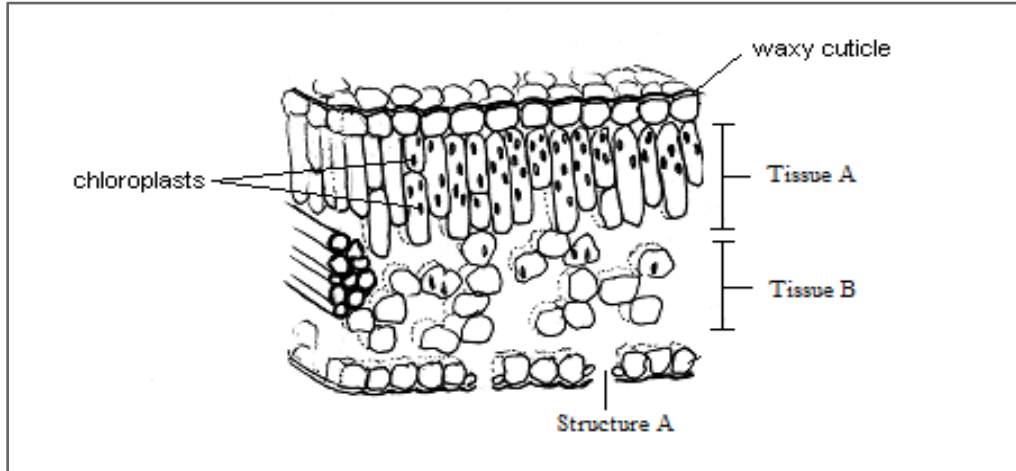
Tissue	What it transports	Direction of transport
Xylem		
Phloem		

18. Outline the 4 ways water is transported upwards against gravity in plants

19. Describe the purpose & process of photosynthesis

20. Describe the purpose & process of transpiration in plants

21. Consider the following cross-section of a leaf:



a) Identify each of the following:

Tissue A =

Tissue B =

Structure A =

b) Explain why the cells in Tissue A appear to have more chloroplasts than the cells in Tissue B.

c) Explain why the cells of Tissue B seem to be spread out

d) What is the purpose of Structure A?

e) Identify 2 reasons Structure A might be closed.

22. Explain the difference between positive & negative tropism. Provide an example of each.

23. What are meristems?

24. What are auxins? What purpose do they serve in plants?

