

Final Exam Review

Sec. 4 Science and Technology, Part B

Secondary 4 General Science & Technology Exam Review “Part B”

- 1) A dental assistant needs to organize fluoride solutions in their supply cabinet but their labels use different units. Arrange the following solutions in order of increasing fluoride concentrations:

Fluoride Concentration

Solution A: 7 g/l
Solution B: 200 ppm
Solution C: 0.3% (m/v)
Solution D: 8g/300ml

Solution A	Solution B	Solution C	Solution D

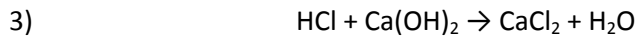
In order of increasing concentration the solutions should be arranged:

Lowest Concentration ____ Highest Concentration

- 2) A solution of acid with pH 2 is diluted to pH 6. How much weaker is the resulting diluted acid solution?

--

The solution is _____ weaker than the original acid.



- a) What type of reaction is described by the above formula. Explain your choice

- b) Rewrite the above equation as a balanced chemical equation.

- c) If 74g of Ca(OH)_2 is reacted with 73g of HCl to form CaCl_2 and 36g of water. What mass of salt would be formed by this reaction?

_____ of salt would be formed.

- d) Draw the above chemical equation using the particle model and the legend below:

Hydrogen (H)

Chlorine (Cl)

Calcium (Ca)

Oxygen (O)



4) Identify the alkaline earth metal in period 4 of the periodic table: _____

a) How many electrons does it have? _____

b) How many protons does it have? _____

c) How many neutrons does it have? _____

d) Draw the simplified Bohr-Rutherford model of this element.

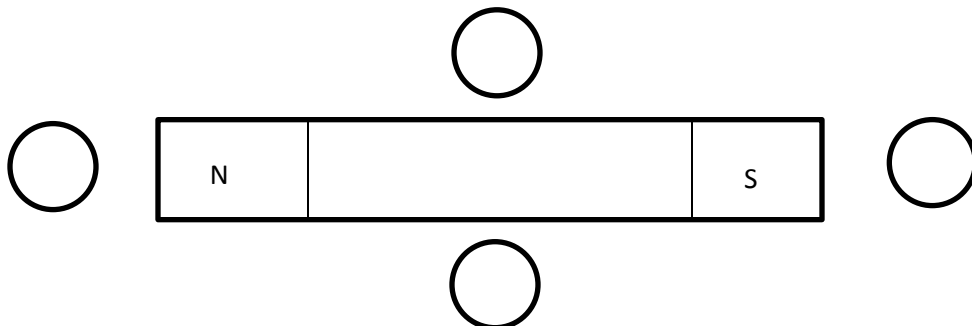
e) How many valence electrons does it have? _____

f) Draw a Lewis diagram of this element.

g) Is the element a metal or non-metal? _____

h) Describe the properties of this element.

5) a) Draw the magnetic field around this bar magnet:



b) Draw the compass needle for each of the compasses below as if they were positioned around the bar magnet.

6) A series circuit with a single resistor is set up and measurements for current and potential difference are taken using an ammeter and voltmeter. The current is measured to be 250 mA while the potential difference is 9V. What is the resistance of the resistor in ohms (Ω)?

The resistance is equal to _____.

7) Bruce is buying an electric golf cart for his father. The motor has a potential difference of 500V and draws a current of 30A. What is the power rating of the golf cart motor in kW?

The power rating is equal to _____.

- 8) A) If a 120W lightbulb is turned on for 5 minutes, how much energy, in joules (J), will it consume in that time?

The the bulb will consume _____ of energy.

- B) A different light bulb with a power rating of 80W is turned on for 120 minutes. How much energy will the 80W bulb consume in that time? State your answer in Wh (watt hours).

The the bulb will consume _____ of energy.

- C) A dishwasher with a power rating of 6000W is used for 3 hours each week to clean a family's dirty dishes. How much energy, in kWh, is consumed by the dishwasher in that 3 hour period?

The the dishwasher will consume _____ of energy.

- D) How much will it cost each week to run the dishwasher from part C if the rate for electricity is \$0.07 per kWh?

The dishwasher will cost _____ in electricity each week.

- 9) a) Baking a loaf of bread requires 120 000J of heat energy. If the Kelvin Klein oven has an energy efficiency of 70%, how much energy will it consume while baking a loaf of bread?

The Kelvin Klein oven will consume _____ of energy to bake the loaf of bread.

- b) How much energy is lost/wasted in the process of using the Kelvin Klein oven to bake bread?

_____ of energy were lost.

- 10) For the pairs of gears in the tables below fill in the missing piece of information (X) using the information given in the table.

	Gear Radius	Speed
Driver	12 cm	X
Driven	30 cm	400 rpm

X is equal to _____

	Number of Teeth	Speed
Driver	45	300 rpm
Driven	X	30 rpm

X is equal to _____

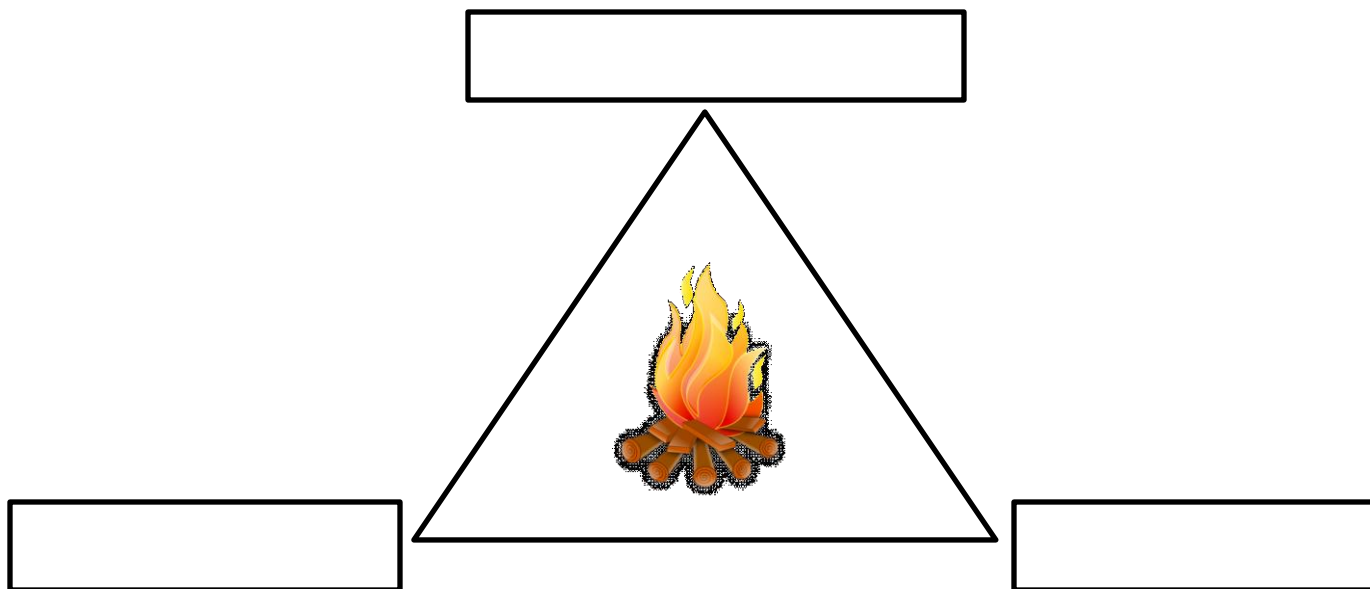
11) How does the melting of glaciers and pack ice affect thermohaline circulation?

Glaciers	Pack Ice

12) In what way does melting permafrost affect the greenhouse gas effect?

13) Explain how salts, acids and bases conduct electricity.

14) What are the three components required for a rapid combustion reaction to occur? Fill in the three boxes below.



15) A)



What is the name of the reaction shown above? _____

Justify your answer.

B)



What is the name of the reaction shown above? _____

Justify your answer.

- 16) A glass rod is rubbed with a polyester cloth; the glass rod gives up its electrons and becomes positively charged. A silver plate is then rubbed with a wool rag; the plate receives electrons from the wool and becomes negatively charged.

What will happen if the polyester cloth and wool rag are brought together?

- 17) List the four factors that must be considered to improve the conductivity of an electrical wiring system:






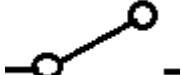
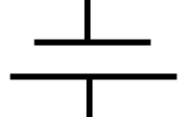
- 18) List the three factors that affect the strength of the magnetic field of an electromagnet (solenoid).

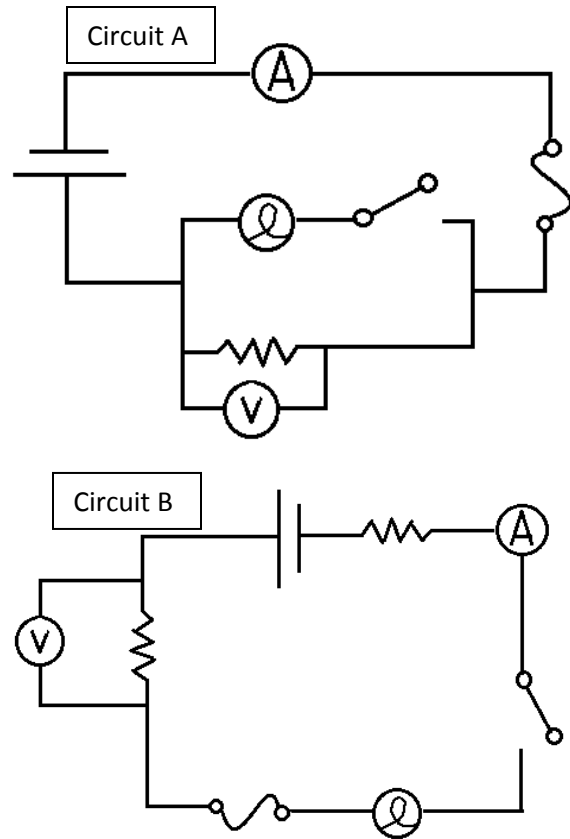
- 19) A) Describe the link formed between a plastic bottle and its screw-on cap using the four characteristics of links.



- B) What type of guiding control is demonstrated by the bottle and cap system? _____

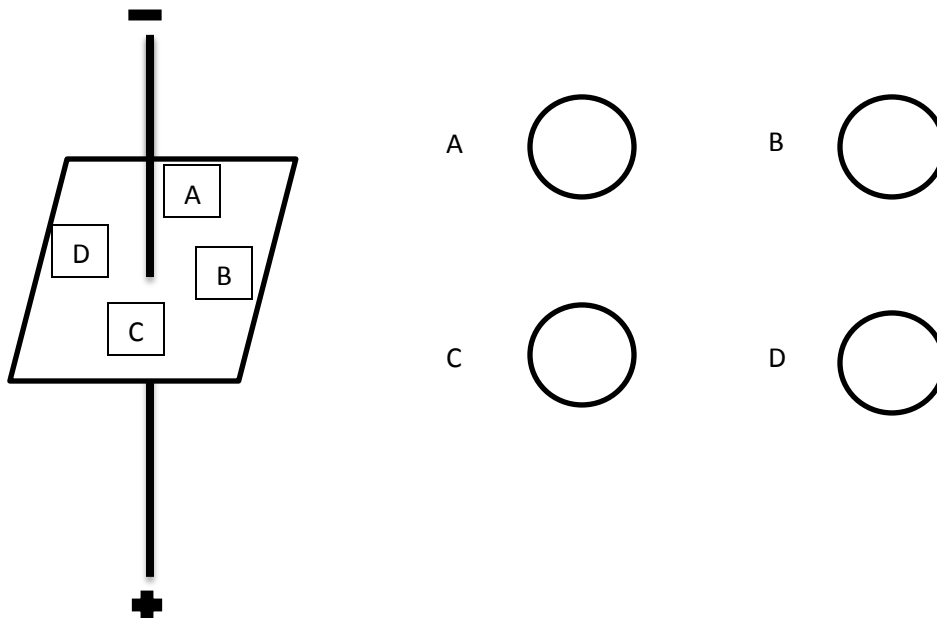
20) Name the components of the following circuits, state the function of each component and determine if the circuits are in series or parallel.

Symbol	Component	Function
		
		
		
		
		
		
		



Circuit A is connected in _____ and circuit B is connected in _____.
Explain.

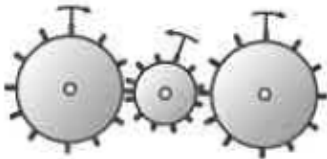
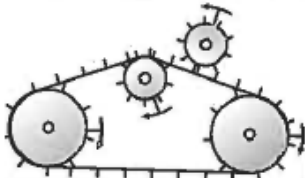
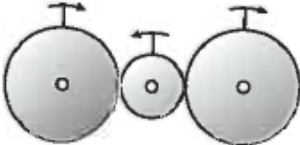
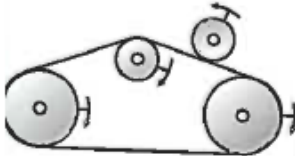
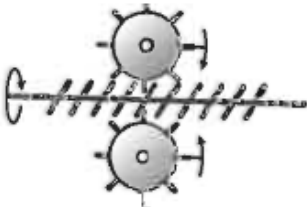
- 21) Determine the direction a compass needle would point if it were placed at the following four positions around a live electrical wire:



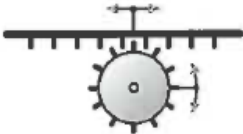
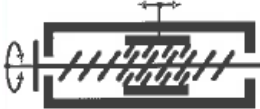
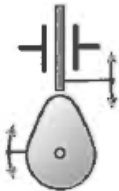

- 22) Several technological devices are listed in the following table. For each device describe the transformation of energy from one form to another. (ex. An electric light bulb transforms electrical energy into light energy)

Device	Energy Transformation
Gasoline Engine	→Mechanical
Wind Turbine	Mechanical→
Toaster	→Heat
Headphone Speakers	Electrical→
Television Screen	→Light (Luminous)
Piano	→Sound
Photovoltaic Cell	→Electrical
Piezoelectric Crystals	Electrical→
Battery	→Electrical
Geothermal Power Plant	→Electrical
Blender	→Mechanical
Glow Stick	→Light (Luminous)
Hydroelectric Dam	Mechanical→




23) For each of the following motion transmission systems indicate the name of the system and whether or not it is reversible.

	Name of System	Reversible (Yes/No)
		
		
		
		
		

24) For the following table of motion transformation systems indicate the name of the system, whether or not the system is reversible and in what way(s) the system can transform motion.

	Name of System	Reversible (Yes/No)	Type(s) of Transformation ex. Translational to Rotational
			
			
			
			

25) For the following situations indicate the constraints involved.

	Situation	Constraint
A)	Two groups of children playing Tug-O-War	
B)		
C)	A towel being wrung dry	
D)		
E)	A piece of paper being torn up	
F)		

26) For the following basic materials state at least two advantages and two disadvantages of each material and state how each material can be protected.

	Advantages	Disadvantages	Protective Measures
Ceramic	1. 2.	1. 2.	
Wood	1. 2.	1. 2.	
Metal	1. 2.	1. 2.	
Plastic	1. 2.	1. 2.	

27) For the following table of energy resources indicate whether or not the type of energy plant uses renewable energy, produces atmospheric pollutants, produces hazardous materials or can be constructed anywhere. Also indicate if the source of energy is part of the lithosphere, hydrosphere or atmosphere.

Type of Energy Facility	Renewable (Yes/No)	Atmospheric Pollution (Yes/No)	Hazardous Materials (Yes/No)	Constructed Anywhere (Yes/No)	Lithosphere, Hydrosphere or Atmosphere
Geothermal					
Hydroelectric					
Solar [Photovoltaic]					
Tidal					
Wind					
Coal-Fired					
Nuclear					

28) In the space labeled “Series” provided below draw a series circuit that contains two resistors, a power supply, a switch and a light. In the space labeled “Parallel”, draw a parallel circuit that contains the same components. (Hint: The resistors should be connected in parallel to one another)

Series	Parallel

29) Explain how human influence has caused the greenhouse gas effect to become an important factor to the increase of global average temperature.