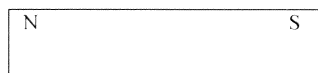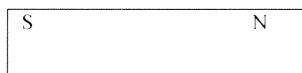# June Review Term 2

Topic 1- Magnetism and Static electricity
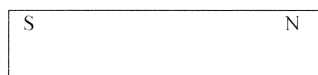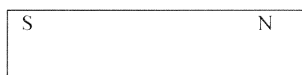
1. What criteria must a substance have in order to be a magnetic substance?

2. Draw the magnetic field for the following :
    a.

    | S   N | | N   S |

    b.
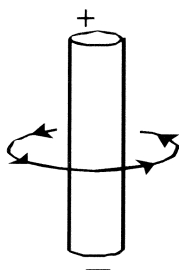
    | S   N | | S   N |

    | S |

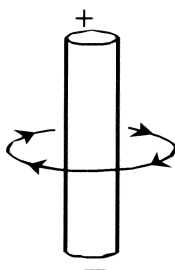3. Explain how a compass works.

4. What is the right hand rule for a straight wire?

5. An electric current flows through a straight wire and produces a magnetic field. Which of the following diagrams correctly represents this magnetic field?
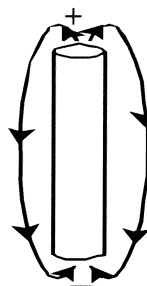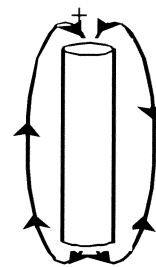
A)   B)   C)   D)

6. Which diagram(s) correctly show the relationship between the magnetic field and the electric current producing it?
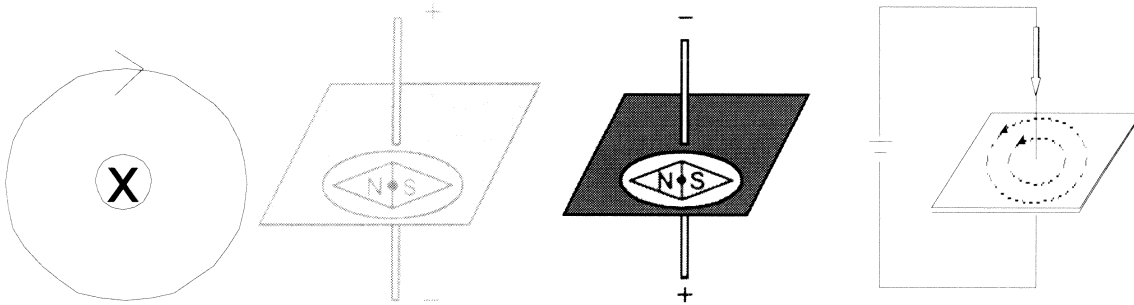
7. Draw the position of the needle in each of the compasses placed near the magnets or wire illustrated below.

a)
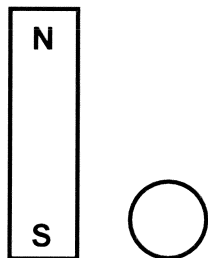
b)
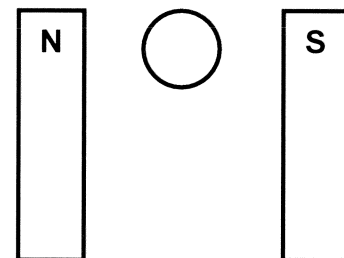
8. You have five spheres which are each electrically charged. Determine what will occur when sphere 1 and sphere 4 come into contact and when sphere 2 and 5 come into contact.

9. If two substances like cotton and acetate are rubbed together, what will be their reaction and explain why this occurs?

10. In the laboratory, a student was given the following substances :

1. ebonite
2. cotton
3. silk
4. glass

The student was told that when two substances from the above list are rubbed together, the one higher up in the list becomes negatively charged and the other becomes positively charged.
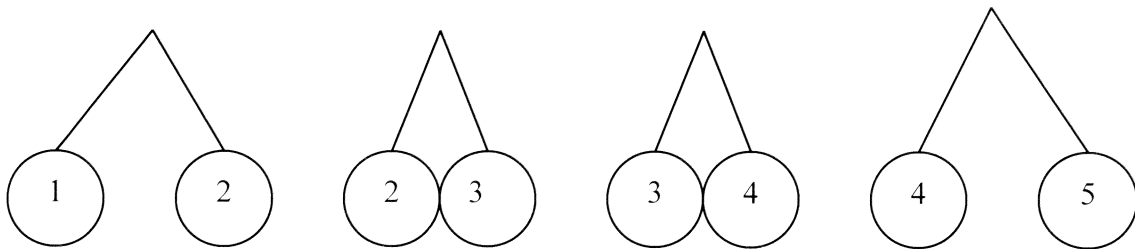The student did the following :
- Rubbed the ebonite and the silk together.
- Rubbed the glass and the cotton together.
- Brought the cotton close to the ebonite.
- Brought the cotton close to the silk.

Which one of the following statements is TRUE?
A) Ebonite and cotton repel each other; silk and cotton repel each other.
B) Ebonite and cotton repel each other; silk and cotton attract each other.
C) Ebonite and cotton attract each other; silk and cotton repel each other.
D) Ebonite and cotton attract each other; silk and cotton attract each other.

11. A student was given four electrically charged spheres.
The following diagrams show what happened when these spheres were suspended in pairs close to each other.
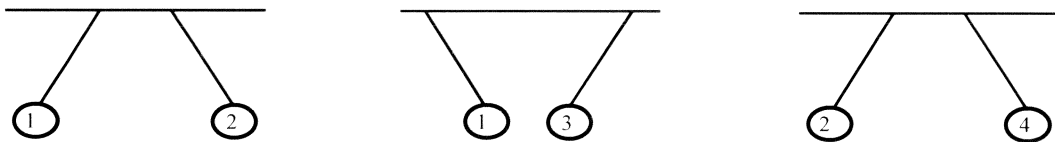
Which of the following statements is true?
A) Spheres 1, 2, 3 and 4 have the same charge.   C) Spheres 1, 2 and 4 have the same charge.
B) Spheres 2, 3 and 4 have the same charge.   D) Spheres 1 and 3 have the same charge.

Topic 2- Electricity formulas and circuits

1. Define current intensity, resistance and potential difference. What are their symbols and units?

2. In the table below fill in the formula in the top box, then give the appropriate triangle used for each unknown. Include units for each.

Resistance	Power	Energy

3. How would you convert the following time units:

Minutes to seconds_____   Seconds to minutes_____

Hours to seconds _____   Seconds to hours_____

Minutes to hours _____   Hours to minutes_____

W to kW   _____   J to kWh _____

4. How much power did an electric lawn mower use if it used 45 000 J of energy in the 50 minutes it took to mow the lawn?

5. How much time was a fish tank on when it needed 0.5 A, 100 V and 45 000 J of energy?

6. A man used the computer for 7 hours and used 500 W of power. How much energy did it take to use the computer for seven hours?

7. What is the potential difference of a light bulb when it uses a 200 Ω resistor and 0.4 A?

8. A radio is on for 150 minutes and has 450 W of power. What is the energy in kWh?

9. A toaster takes 300 seconds to toast a piece of bread. If it uses 400 W of power how much energy will be used in J?

10. What is the current intensity of a clock radio when it uses a 150 Ω resistor and 200 V?

11. An oven is used for 35 minutes to bake cookies. Its voltage is 150 V and its intensity is 4 A. How much energy was used in J to bake the cake?

12. How much time passed in minutes when a computer did 50 000 J of work and had 550 W of power?

13. How much energy was used when a radio was on for 90 minutes and had 220 V and a current intensity of 2 A?

14. What is the resistance of a resistor if a circuit is on for 2 hours, used 50 000 J of energy and 220 V?

15. What is the power of an appliance if it works on 5 A and has a 3.5 Ω resistor?

16. What was the current intensity of a clock radio that used 20 000 J of energy when it was on for 2 hours and had 110 V?

17. Draw the symbols for the following:

Resistor	Voltmeter	Total voltage	Current	Total current	Light	Wire	Switch	Power supply

18. Fill in the table

	Series circuit	Parallel circuit
Give the definition		

19. What are the 4 parts of a circuit and give their function?

20. Draw a series and parallel circuit, each with two resistors. Include a switch and a fuse for the controlling the whole circuit.

Series	Parallel

21. Draw a circuit where current intensity has 4 possible pathways. Use the specifics below when drawing the circuit
   - Place a voltmeter that measures the potential difference coming from the power source, use V_t as your symbol.
   - Place a voltmeter that measures the potential difference across resistor R_2, use V_2 as your symbol.
   - Place an ammeter that measures the current intensity from the power source, use A_t as your symbol.
   - Place an ammeter that measures the current intensity through resistor R_3, use A_3 as your symbol.
   - Place an ammeter that measures the current intensity through resistor R_3 and resistor R_4, use A_4 as your symbol.
   - Place a switch that will cause the whole circuit to stop working when it is open.
   - Place a switch that will cause resistor R_1 to stop working when it is opened.
   - Place a switch that will cause resistors R_2, R_3, and R_4 to stop working when it is opened.
   - Place a fuse to control the whole circuit
   - Place a switch to control resistor 3

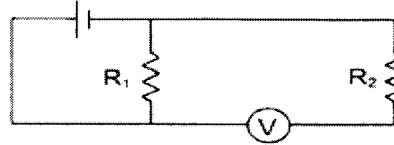22. Four electric circuit diagrams are given below.
    You wish to measure the potential difference across the terminals of resistor R2.
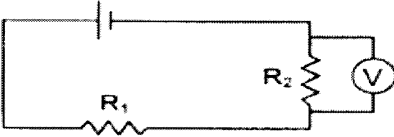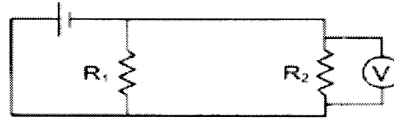   Which diagrams show a correctly connected voltmeter?

1)
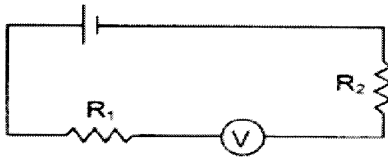
3)

2)

4)

    A) 1 and 3   B) 2 and 4   C) 1 and 2   D) 2 and 3

23. The following electric circuit consists of a power supply, V_T, connected to three resistors (R1, R2
    andR3). Which of the following circuit diagrams shows the correct connection for an ammeter A
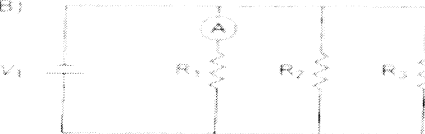   that measures the current flowing through resistor R1?

24. An electrical circuit consists of a power source, two switches (S$_1$ and S$_2$) and two light bulbs (L$_1$
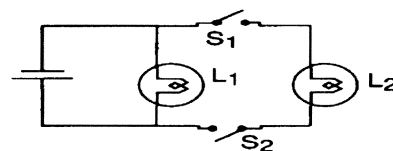   and L$_2$). The following table shows what happens to both light bulbs:

Switch		Light Bulb	
S$_1$	S$_2$	L$_1$	L$_2$
open	open	out	out
closed	open	bright	out

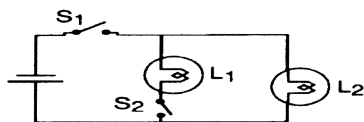Which of the following circuit diagrams illustrates the results shown in the table above?
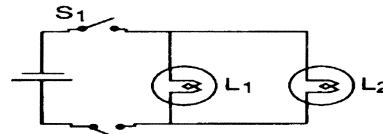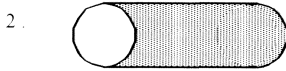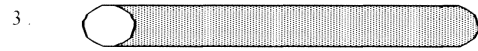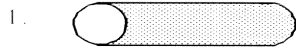
A)
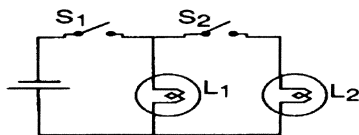
C)

B)

D)

25. A circuit consists of a power supply, a light bulb and two terminals that can be connected to a rod.

The copper rods illustrated below are inserted into the circuit one at a time. The rods are the same temperature, but they have different dimensions.

Which rod will offer the least resistance to the flow of electric current?
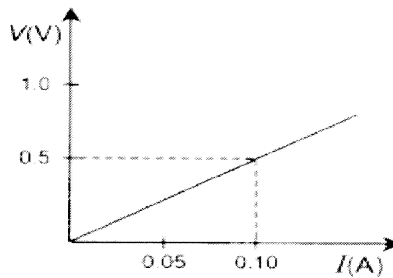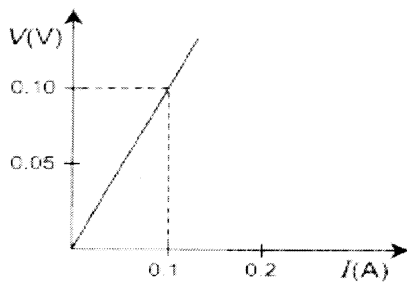A) rod 1   B) rod 2   C) rod 3   D) rod 4

26. The following table shows measurements related to four different resistors.
    Which of the resistors below has the most conductance?

Resistor	Potential Difference (V)	Current Intensity (A)
1	10	10
2	10	1
3	1	10
4	4	2

27. Which of the following graphs represents the conductor with the highest resistance?

28. The following graph describes the behavior of three resistors subjected to different voltages.
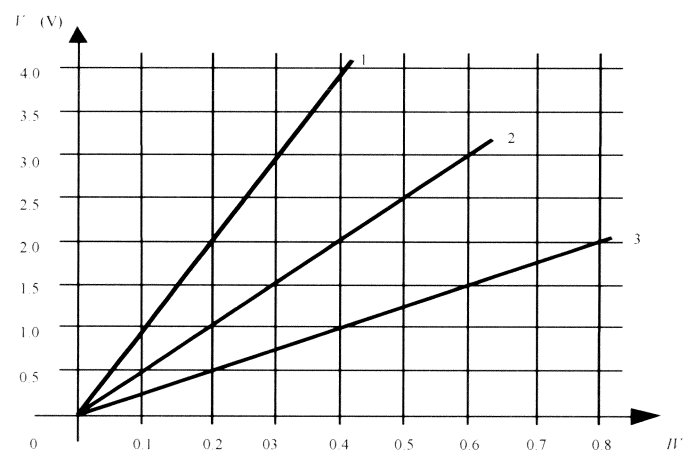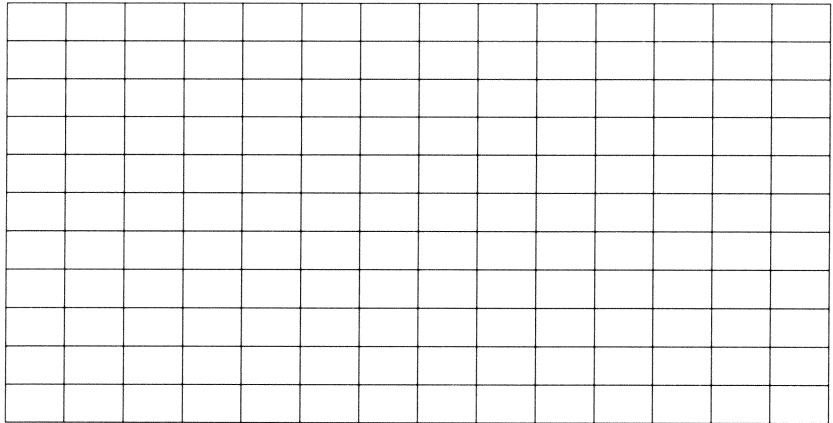

Which is the resistor would you use as the best conductor?
Justify your answer using calculations.

29. Use the results to answer the questions.

Voltage (V)	0	1.5	3.0	4.5	6	7.5	9
Current (A)	0	0.35	0.70	1.0	1.4	1.7	2.0

Draw a resistance graph   Find the resistance

Topic 3 Energy efficiency and heat

1. What is the energy efficiency formula?

2. An elevator has an energy efficiency of 64%. What amount of energy must the elevator consume in order to provide 95 kWh of useful energy?

3. A microwave consumes 27 000 J of energy in order to provide 21 500 J of useful energy. What is its energy efficiency?

4. A computer that is 87% efficient consumes 375 kWh of energy. How much useful energy does it provide?

5. A television that is 83% efficient provides 4 600 J of useful energy. How much energy does it consume?

6. An oven consumes 425 kWh of energy in order to provide 386 kWh of useful energy. What is its percent efficiency?

7. What are the 2 variables for heat?