

Name: _____

Teacher: _____

**DO NOT OPEN THE EXAMINATION PAPER UNTIL
YOU ARE TOLD BY THE SUPERVISOR TO BEGIN**

Grade 9 Science

FINAL EXAMINATION

June 2011

Value: 75 Marks

General Instructions

This examination consists of two parts. Both parts are contained in this booklet and further general instructions are provided on appropriate pages.

Part I – Multiple Choice (50 Marks)

Select the letter of the correct response from those provided and shade the letter on your computer scorable answer sheet. **Do ALL questions in this section.**

Part II – Constructed Response (25 Marks)

Answer ALL questions fully and concisely in the space provided.

Student Checklist

The items below are your responsibility. Please ensure that they are completed.

- Write your name and teacher's name on the top of this page.
- Write your name, teacher's name, course name and number on the Part I answer sheet.
- Check the exam to see that there are no missing pages (16 pages in total).

ALL MATERIALS MUST BE PASSED IN WITH THIS EXAM. Use your time wisely. Good luck!

Formulae:

$$V = IR$$

$$E = Pt$$

$$\text{Efficiency} = \frac{\text{useful energy output}}{\text{useful energy input}} \times 100\%$$

$$R = \frac{V}{I}$$

Part I
Total Value 40 Marks

Instructions: Place the letter of the correct answer on the answer sheet provided.

1. Which constellation is outlined in the diagram below?

- (A) Leo
- (B) Orion
- (C) Ursa Major
- (D) Ursa Minor



2. What is the name of the cyclic paths that all celestial bodies follow?

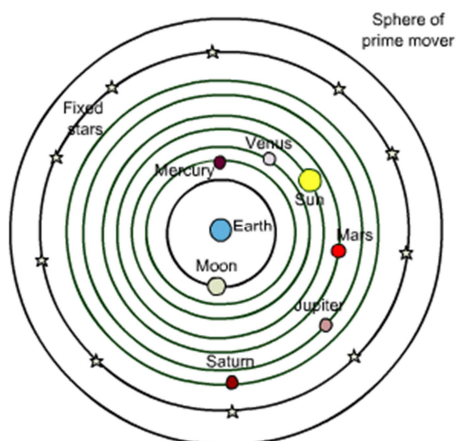
- (A) central axis
- (B) geocentric
- (C) orbits
- (D) retrograde motion

3. What instrument did Galileo invent to help study the planets and stars?

- (A) astrolab
- (B) space station
- (C) stone circle
- (D) telescope

4. Which astronomer's theory is represented by the diagram shown?

- (A) Aristotle
- (B) Galileo
- (C) Kepler
- (D) Newton



5. Which planet has a rocky surface?

- (A) Jupiter
- (B) Neptune
- (C) Saturn
- (D) Venus

6. A new outer planet is discovered. Which properties will it most likely exhibit, as compared to the Earth?

	Size	Temperature	Density
(A)	smaller	colder	lesser
(B)	smaller	warmer	greater
(C)	larger	colder	lesser
(D)	larger	warmer	greater

7. On which planet would you have the fewest birthdays?

- (A) Mars
- (B) Jupiter
- (C) Neptune
- (D) Venus

8. What are eruptions of gas on the Sun's surface called?

- (A) auroras
- (B) eclipses
- (C) solar flares
- (D) sun spots

9. Which would you find on the Earth's surface?

- (A) asteroid
- (B) comet
- (C) meteor
- (D) meteorite

10. As a bungee jumper falls they accelerate due to gravity but eventually the force of the bungee cord will pull the jumper back. Which theory on the origin of the universe does this represent?

- (A) Big Bang Theory
- (B) Nubular Theory
- (C) Oscillating Theory
- (D) Stellar Collision Theory

11. What will a very massive star (over 25 times larger than our sun) eventually become?

- (A) black hole
- (B) galaxy
- (C) nebula
- (D) quasar

12. Which is the WHMIS symbol for oxidizing material?

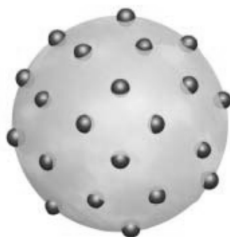


13. Which is an example of a chemical property of a substance?

- (A) burns in air
- (B) colourless
- (C) gaseous
- (D) low boiling point

14. Who developed/proposed the atomic model shown?

- (A) Bohr
- (B) Dalton
- (C) Rutherford
- (D) Thompson

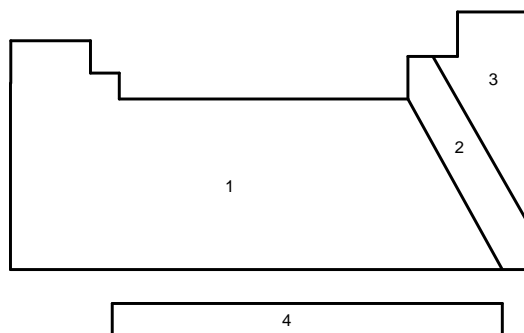


15. Scientists have discovered a new element which they plan to name Bieberium. Based on naming rules, what would be the chemical symbol for Bieberium?

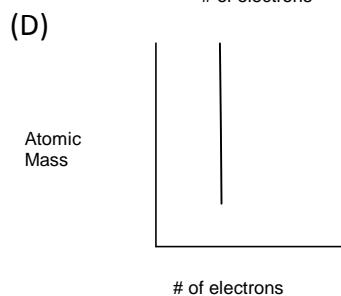
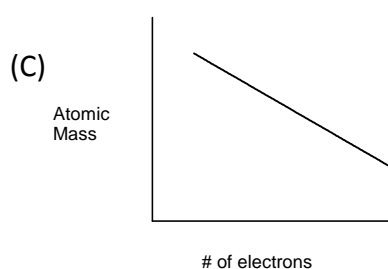
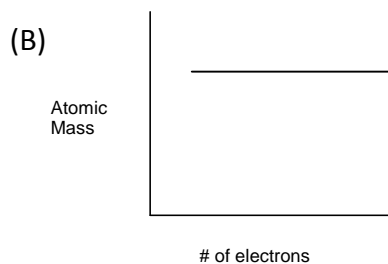
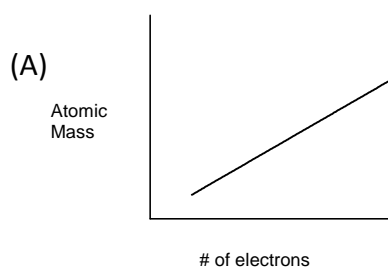
- (A) Bu
- (B) BU
- (C) bU
- (D) bu

16. Johnny is using an element which is brittle and dull. It does not conduct small amounts of heat and electricity. From which section of the Periodic Table would this element most likely be found?

- (A) 1
- (B) 2
- (C) 3
- (D) 4



17. Which graph shows the relationship between the atomic mass and the number of electrons in an element?



18. Which element is represented by the information in the table shown?

Mass #	64
# of Neutrons	35

- (A) Bromine
(B) Copper
(C) Einsteinium
(D) Gadolinium
19. Which is an alkali metal?
- (A) Calcium
(B) Chlorine
(C) Neon
(D) Sodium
20. Which element is located in Period 4, Group 5?
- (A) Hafnium
(B) Niobium
(C) Vanadium
(D) Zirconium

21. How many valence electrons does an atom of Lithium have?

- (A) 1
- (B) 2
- (C) 3
- (D) 4

22. What is the chemical formula for methane?

- (A) CaCO_3
- (B) $\text{C}_{12}\text{H}_{22}\text{O}_{11}$
- (C) CO_2
- (D) CH_4

23. What is the correct name for PF_3 ?

- (A) phosphorous fluoride
- (B) phosphorous trifluoride
- (C) potassium fluoride
- (D) potassium trifluoride

24. Which is a correct pairing of an **ionic** compound and its name?

- (A) CCl_4 - carbon chloride
- (B) CCl_4 - carbon tetrachloride
- (C) MgCl_2 - magnesium chloride
- (D) MgCl_2 - magnesium dichloride

25. Sarah made these observations about four elements in the lab.

Element	Good Conductor of Heat	Appearance	Reactivity	Malleable
W	Yes	Shiny	Yes	Yes
X	No	Dull	Yes	Yes
Y	Yes	Dull	Yes	No
Z	No	Dull	Yes	No

Based on these observations, which two elements would most likely make an ionic compound when combined?

- (A) WX
- (B) WZ
- (C) XY
- (D) XZ

26. How can an object be positively charged?

- (A) gain electrons
- (B) gain protons
- (C) lose electrons
- (D) lose protons

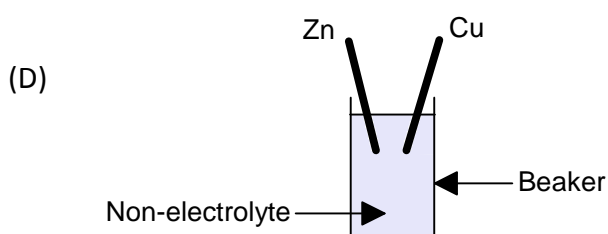
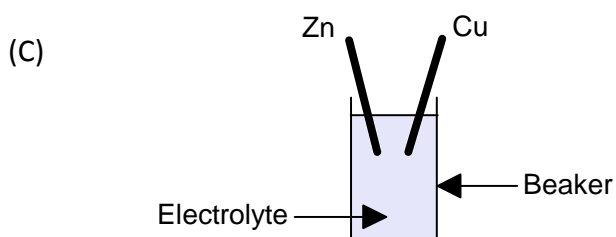
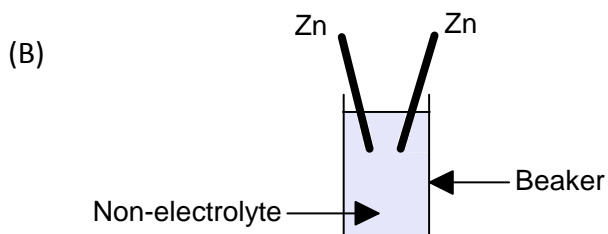
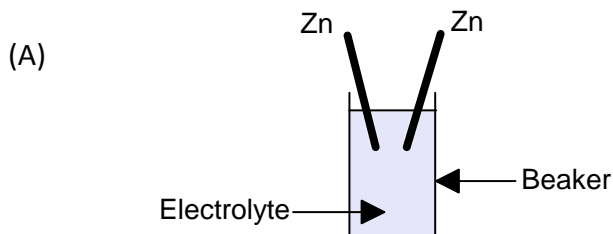
27. You rub a balloon on your hair. The balloon then sticks to the wall. Which law of electric charge does this demonstrate?

- (A) charges attract neutral
- (B) like charges attract
- (C) like charges repel
- (D) unlike charges attract

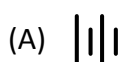
28. Which is an application of static electricity?

- (A) computer
- (B) generator
- (C) hair dryer
- (D) photocopier

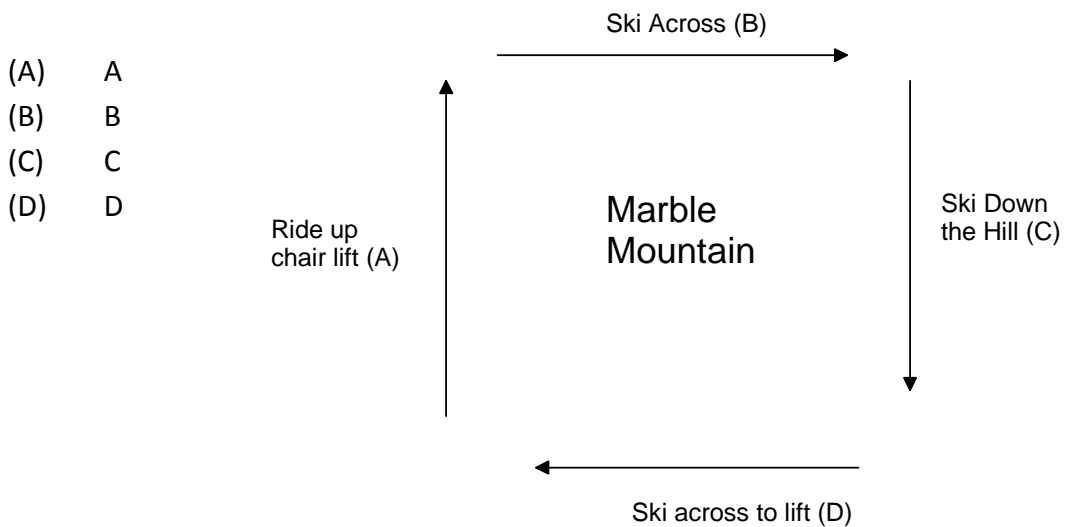
29. Which electrochemical cell would produce a supply of electric charge?



30. Which circuit diagram symbol would be a source of potential difference for a circuit?



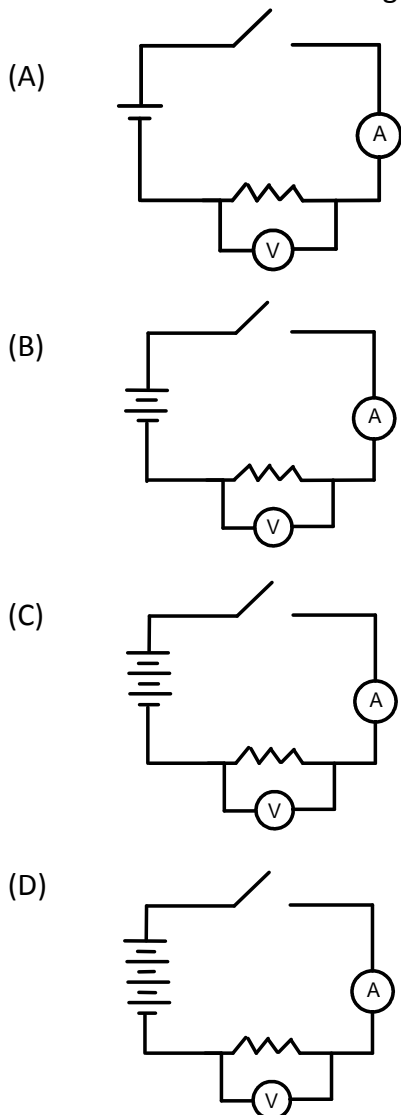
31. Imagine the diagram shown below represents the path of electron flow through a circuit. Which section of the diagram is comparable to turning on a light bulb?



32. Which factor does **NOT** affect the amount of resistance in a wire?

- (A) casing around the wire
- (B) diameter of the wire
- (C) length of the wire
- (D) type of wire

33. Which circuit will have the highest current reading when the switch is closed?



34. A current through a load in a circuit is 1.5 A. If the potential difference across the load is 12 V, what is the resistance of the load?

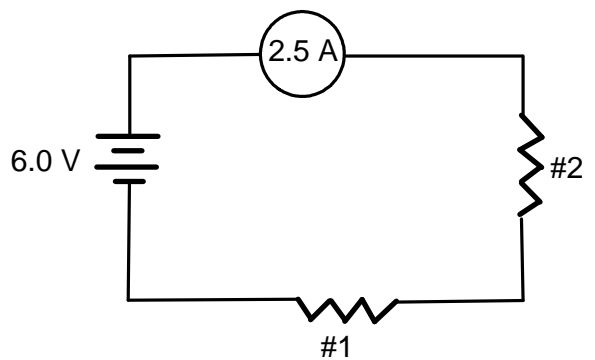
- (A) 0.12 Ω
- (B) 8.0 Ω
- (C) 13.5 Ω
- (D) 18.0 Ω

35. A 220 Ω resistor is connected in series with a 9 V battery in a circuit. According to Ohm's Law, what will happen to the circuit if another 220 Ω resistor is added in series?

- (A) Total current will decrease.
- (B) Total current will increase.
- (C) Total voltage will decrease.
- (D) Total voltage will increase.

36. Which statement is true?

- (A) The current across resistor #1 is 1.25 A.
- (B) The current across resistor #2 is 2.5 A.
- (C) The voltage across resistor #1 is 6.0 V.
- (D) The voltage across resistor #2 is 12 V.



37. Which best describes what would happen if the cells in a flashlight were connected in parallel instead of in series?

	Brightness of Bulb	Life of Cell
(A)	higher	longer
(B)	higher	shorter
(C)	lower	longer
(D)	lower	shorter

38. What is the unit for Power?

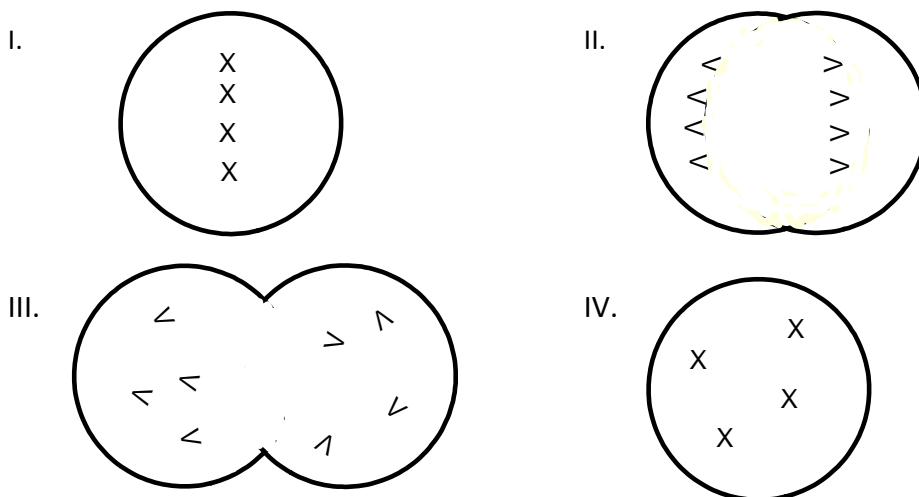
- (A) Coulomb
- (B) Joule
- (C) Ohm
- (D) Watt

39. According to an Energuid label, a new dishwasher uses 340 kW·h per year. If the cost of electricity is 8.5 cents/kW·h, how much would it cost to run the dishwasher for the year?

- (A) \$2.50
- (B) \$25.00
- (C) \$28.90
- (D) \$2890

40. Why is voltage increased or “stepped up” by a transformer at an electrical generating station?
- (A) It decreases current.
 (B) It decreases power.
 (C) It increases current.
 (D) It increases power.
41. The central office of a delivery company that controls the operations of the company is comparable to what part of the cell?
- (A) chromosome
 (B) gene
 (C) nucleus
 (D) trait
42. What comparison best describes the relationship between genes and chromosomes?
- (A) Chromosomes and genes are both like chapters in a book.
 (B) Chromosomes and genes are both like words in a book.
 (C) Chromosomes are a book and genes are the chapters.
 (D) Genes are a book and chromosomes are the chapters.
43. Sun tanning can be harmful because UV rays can cause damage to skin cells. What would the UV rays be an example of?
- (A) heredity
 (B) mutagen
 (C) mutation
 (D) trait

44. Based on the diagram, what is the correct sequence for mitosis?



- (A) I, II, III, IV
 (B) I, II, IV, III
 (C) IV, I, II, III
 (D) IV, I, III, II

45. Which is **NOT** a checkpoint in the cell cycle?

- (A) Cell has been mutated.
- (B) Cell lacks sufficient nutrients for growth.
- (C) DNA has not been replicated.
- (D) DNA is damaged.

46. Which is correct for binary fission?

	# parent cells	Variation in offspring	Amount of energy
(A)	1	Low	Low
(B)	1	High	Low
(C)	2	Low	High
(D)	2	High	High

47. During meiosis, a gamete was produced which had too many chromosomes. In which stage did this error most likely occur?

- (A) Anaphase I
- (B) Metaphase II
- (C) Prophase I
- (D) Telophase II

48. The liver cell of an organism contains 28 chromosomes. How many chromosomes would be found in an egg cell?

- (A) 7
- (B) 14
- (C) 28
- (D) 56

49. Which is correct for complete metamorphosis?

	Type of Reproduction	# stages in life cycle
(A)	Asexual	3
(B)	Asexual	4
(C)	Sexual	3
(D)	Sexual	4

50. Who developed the double helical model of DNA?

- (A) Aristotle
- (B) Bohr and Rutherford
- (C) Mendel
- (D) Watson and Crick

Part II -Total Value: 25 marks

Instructions: Complete all items in this section. Your responses should be clearly presented in a well-organized manner.

51 a) There is a malfunction on the outside of the International Space Station. Without leaving the space station, name and explain two Canadian technologies that could help diagnose and fix the problem. (2)

b) Some people believe that the money spent on space exploration could be better used to solve economic, environmental, and social issues on Earth. Explain two reasons why there is a need for continued support of space exploration. (2)

52 a) Draw a Bohr-Rutherford model for each element (include all subatomic particles). (2)

(i) Sodium

(ii) Carbon

b) Two clear and colourless solutions, lithium carbonate and calcium chloride, are mixed together and stirred. Immediately the mixture becomes white and a white powder begins to settle to the bottom of the beaker.

(i) Is the process of forming the white powder a chemical or physical change? Justify your answer. (1)

(ii) Describe a specific lab procedure which could help you to identify the unknown powder. (1)

c) Susan was in the lab trying to fix a big mistake. Four elements she had been using (Fluorine, Argon, Calcium, and Sodium) were mixed up and were incorrectly placed in four containers labelled A, B, C, and D. She did not know which elements were in each but she knew the following information:

- C and D were electrically conductive but A and B were not
- B was unreactive but the other three were reactive
- C had the same number of valence electrons as Strontium

Determine the identity of Elements A, B, C, and D. Justify your answer. (2)

53 a) During an experiment working with three **charged** objects, the following observations were made and recorded:

- * Object A attracts object C
- * Object A repels object B
- * Object B attracts object C

Determine the possible charges of the three objects. Justify your answers.(2)

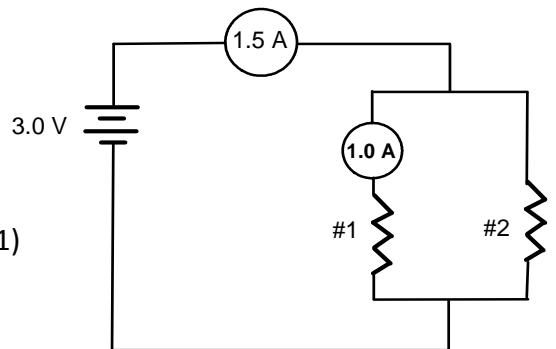
b) (i) A 60 W incandescent light bulb is turned on for 30 minutes. How much energy does it use? (1)

(ii) If the bulb in Part (i) produces 8200 J of useful energy, what is the efficiency of the bulb? (1)

c) In the following circuit, determine:

(i) the voltage across resistor # 1 (1)

(ii) the current across resistor # 2 (1)



54 a) Describe two differences between meiosis and mitosis. (2)

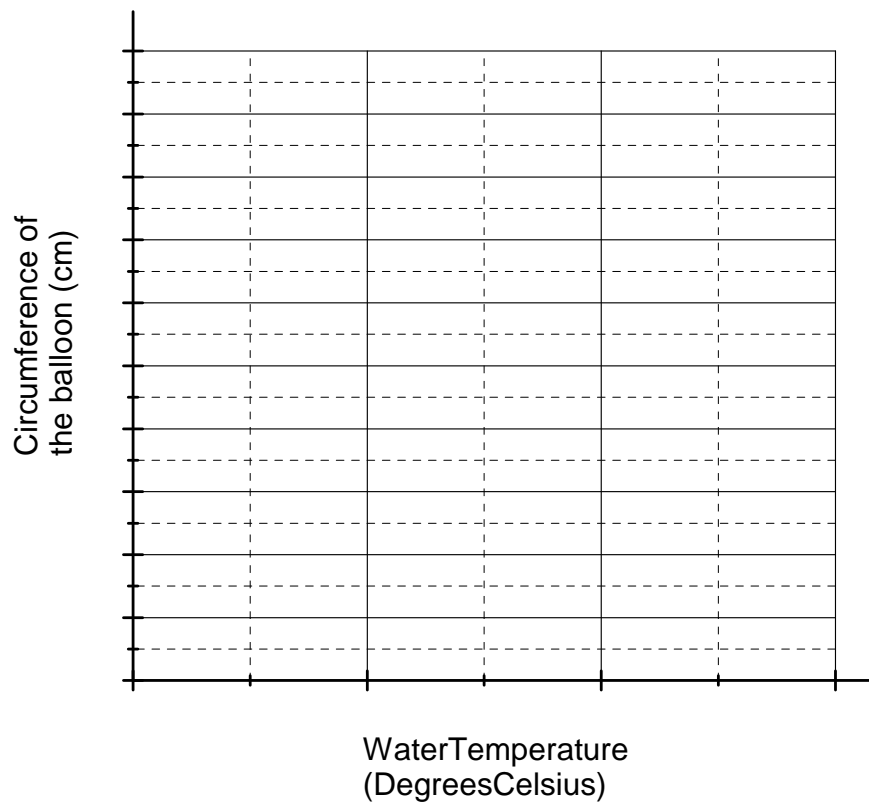
b) Scientists are continually genetically modifying food to meet the needs of society. For example, corn has been modified so it can withstand extreme temperatures. These foods are often found without labels indicating genetic modification. Do you think genetically modified food should be labelled? Defend your answer. (2)

55. Stefan conducted an investigation to determine how water temperature affects the amount of carbon dioxide produced if yeast and sugar are added together. Using the following procedure, he obtained the data in the table shown:

- 0.5 g of yeast and 1 g of sugar was placed in 5 Erlenmeyer flasks.
- He added 100 mL of water to each flask.
- Water in each flask was kept at different temperatures, as indicated in the table.
- The amount of carbon dioxide produced in each flask was recorded by attaching a balloon over the opening of each flask and measuring the circumference of each balloon.
- He forgot to measure the flask which had a water temperature of 30°C .

Water Temperature ($^{\circ}$ C)	CO ₂ produced (circumference of balloon in cm)
5	3
10	7
15	9
20	12
30	?

- a) Make a line graph for Stefan's data – plot the first 4 points, including a line of best fit and appropriate scale on each axis. (2)



- b) For the given information, name two controlled variables for this experiment. (1)
- c) Based on these results, predict the circumference of the balloon on the flask that had a water temperature of 30° C. (1)
- d) Is it reasonable to assume that the relationship between temperature and yeast fermentation would continue for temperatures of 100°C and beyond? Defend your answer. (1)