Scientific report writing

Name _____

62

This assessment task is to be complete only after you have viewed the relevant video on the site with your teacher.

Section A – contains 20 multiple choice questions - total marks = 20

Section B – contains 12 short answer questions - total marks = 42

Total marks = 62

All questions should be completed in the space provided in this assessment task.

Scientific calculators, rulers and pencil can be used as well as the VCE Chemistry Data Booklet

Scientific Report Writing – Assessment task

Part A – Multiple Choice Questions

1. In which section of a scientific report would you MOST likely find the statement: "There was a linear trend between the daily amount of light and the height of the seedling"?

A) Introduction
B) Results
C) Discussion
D) Conclusion
E) Abstract

2. What should the hypothesis of a scientific report aim to do?

A) Predict the relationship between IV and DV
B) Summarise the results
C) Describe equipment
D) State the method
E) Provide analysis

3. The independent variable is:

A) What is measured
B) What is changed
C) What stays constant
D) The conclusion
E) The trend

4. The viscosity of three liquids is determined by dropping identical marbles in each liquid as shown in figure 1. What is the independent variable?

A) The time taken for the marble to reach the bottom.
B) The type of liquid.
C) The volume of each liquid.
D) The size and shape of each beaker.
E) The colour of each liquid.

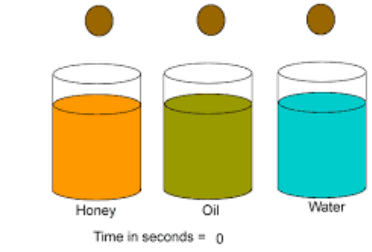


Figure 1 – viscosity experiment setup

5. Which section should include figure 1?

A) Conclusion
B) Aim
C) Method/Procedure
D) Abstract
E) Results

6. The purpose of the section known as the “Aim” is to:

A) describe the equipment
B) state what was investigated
C) predict the outcome
D) explain the trend
E) give background theory

7. A table must include:

A) only units
B) only headings
C) headings, units, ruled borders
D) raw data only
E) a graph that visually communicates the data in the table

8. Consider the graph shown in figure 2. A student was asked to draw a line of best fit. Which statement below is true?

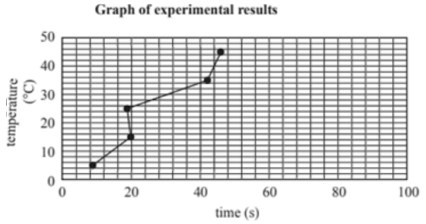


Figure 2 -experimental results

A) The student has drawn a perfect line of best fit.
B) The student should not have joined each point.
C) The graph clearly represents the underlying trend.
D) The student need only connect the min and max points.
E) The line should always be straight.

9. In a discussion, the writer should:

A) describe the trend and errors
B) repeat the aim
C) restate the hypothesis
D) include raw data in a table format
E) only describe equipment

10. The conclusion should:

A) repeat results
B) answer the aim
C) list materials
D) explain background
E) introduce the topic

11. Which referencing format is acceptable in a scientific report?

A) Harvard style
B) Made-up style
C) No references needed
D) Only URLs
E) Only textbook title, and year it was published

12. Random errors can be totally **eliminated** by:

A) changing equipment
B) repeating trials
C) averaging the results
D) using better instruments
E) None of the above

13. Systematic errors are best reduced by:

A) repeating trials
B) adjustments to the procedure and proper calibration of instruments
C) averaging
D) guessing values
E) increasing sample size

14. A hypothesis should NOT:

A) be testable
B) contain personal beliefs
C) predict IV/DV relationship
D) be specific
E) be falsifiable

15. In the procedure, steps should be:

A) vague and unordered
B) in past tense
C) precise, numbered, clear
D) written as paragraphs
E) include analysis

16. Consider the graph shown in figure 3.

A) The dependent variable is the volume of water
B) The independent variable is the volume of water
C) A controlled variable is the volume of water
D) A controlled variable is the height of the plant
E) The independent variable is the height

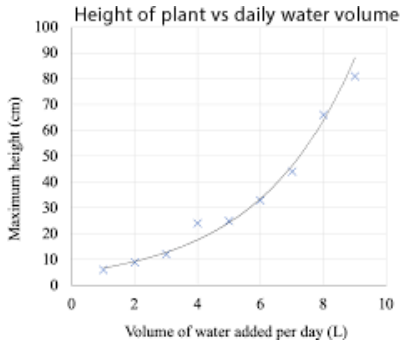


Figure 3 – height of plants vs the amount of daily water provided.

17. Consider the graph shown in figure 3.

A) This is a poor line of best fit as it does not go through all points.
B) The data point at 4 litres should be totally removed as it is an outlier.
C) The data point at 4 litres is most likely indicative of a random error.
D) The data point at 4 litres is most likely indicative of a systematic error.
E) The set of axes used are poorly formatted

18. Which of one the following is crucial in producing results with a high degree of repeatability?

A) The hypothesis.
B) The conclusion.
C) The introduction.
D) The aim.
E) The procedure.

19. Controlled variables:

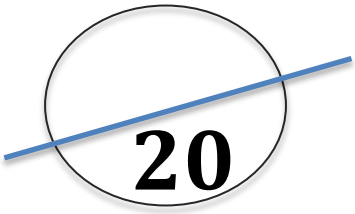
A) remove systematic errors
B) remove an chance of random errors taking place
C) do not always stay constant
D) are not necessary in a scientific investigation as long as results are carefully measured
E) increase the validity of the investigation

20. A bibliography should include:

A) Only websites
B) All sources used
C) Only textbooks
D) Only lab gear
E) Images only

Multiple choice answer sheet.

Circle one correct response



1.	**A**	**B**	**C**	**D**	**E**	**11.**	**A**	**B**	**C**	**D**	**E**
2.	**A**	**B**	**C**	**D**	**E**	**12.**	**A**	**B**	**C**	**D**	**E**
3.	**A**	**B**	**C**	**D**	**E**	**13.**	**A**	**B**	**C**	**D**	**E**
4.	**A**	**B**	**C**	**D**	**E**	**14.**	**A**	**B**	**C**	**D**	**E**
5.	**A**	**B**	**C**	**D**	**E**	**15.**	**A**	**B**	**C**	**D**	**E**
6.	**A**	**B**	**C**	**D**	**E**	**16.**	**A**	**B**	**C**	**D**	**E**
7.	**A**	**B**	**C**	**D**	**E**	**17.**	**A**	**B**	**C**	**D**	**E**
8.	**A**	**B**	**C**	**D**	**E**	**18.**	**A**	**B**	**C**	**D**	**E**
9.	**A**	**B**	**C**	**D**	**E**	**19.**	**A**	**B**	**C**	**D**	**E**
10.	**A**	**B**	**C**	**D**	**E**	**20.**	**A**	**B**	**C**	**D**	**E**

Part B – Short Answer Questions

42

A student sets up an investigation to determine the relationship between temperature of water and the rate of reaction, using an effervescent Panadol tablet. The setup is shown in figure 4, on the right.

Figure 4 – Panadol experimental setup.

1. Write an appropriate aim for the investigation.

_____

_____

_____*1 mark*

2. Write an appropriate hypothesis for this investigation, identifying the IV and DV.

_____

_____

_____

_____

_____*3 marks*

3. Identify one random and one systematic error and explain the difference between the two types of errors.

_____

_____

_____

_____

_____

_____*3 marks*

4. Describe one improvement that would reduce the impact of random errors.

_____

_____

_____

_____

_____*1 mark*

5. Describe one improvement that would reduce systematic error.

_____

_____

_____

_____

_____*1 mark*

6. Given that four trials were conducted at each temperature. write a procedure for the investigation using the experimental setup shown in figure 4.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____ *4 marks*

7. Consider the graph shown in figure 5 representing the data collected during the investigation.
   a. In what section of the report should the **<u>analysis</u>** of this data be included?

      _____*1 mark*_

   b. In the space provided write the section of the report specified in part a. using the data in figure 5 and the procedure in question 6.

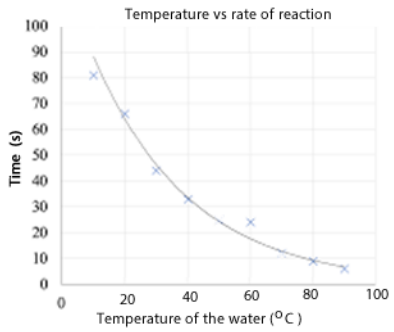


Figure 5 – Graphed data from the temperature vs rate of reaction investigation.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____*5 marks*

c. In the space provided below, draw a properly formatted table of the data presented in figure 5 and indicate in what section of the report the table should be placed in. Only include the **mean** data from temperatures, 10, 20, 30, 40 and 60 *4 marks*

Section of report _____

8. Name five variables that should be tightly controlled in this investigation.
   i. _____*1 mark*
   ii. _____*1 mark*
   iii. _____*1 mark*
   iv. _____*1 mark*
   v. _____*1 mark*

9. Write a conclusion to this investigation.

_____

_____

_____

_____

_____

_____

_____

_____*3 marks*

10. Describe the difference between repeatable and reproducible data and explain what is required for a high degree of reproducibility.

_____

_____

_____

_____

_____

_____

_____

_____

_____*3 marks*

11. Consider the two hypotheses written below by two different students. Discuss why the cannot be excepted as valid hypotheses.

i. "If a plant is happy, then it will grow faster, because happy plants grow faster."

_____

_____

_____

_____*1 mark*

ii. "If more stuff is added to the water used to nourish the plants then they will grow faster because the more stuff that is in the water the more chance plants have of getting the appropriate nutrients with which to photosynthesise"

_____

_____

_____

_____*1 mark*

12. Below are the results of three groups measuring the time taken for an effervescent tablet of a specific brand of Panadol to dissolve at 60 ^{o}C. The literature value indicates it takes 100 seconds to dissolve completely.

Data table 1— three groups, four trials each at 60 ^{o}C.

Group	Trial 1 (s)	Trial 2 (s)	Trial 3 (s)	Trial 4 (s)	Mean (s)
Group A	92.1	92.0	92.2	91.9	**92.05**
Group B	99.8	100.1	99.9	100.0	**99.95**
Group C	107.9	108.0	107.8	108.1	**107.95**

a. Which group has obtained precise and accurate results? _____
Explain

_____

_____

_____

_____*2 marks*

b. Which groups show precise, repeatable, but, inaccurate results? _____
Explain

_____

_____

_____

_____*2 marks*

c. Which group has results with very low precision? _____
Explain

_____

_____

_____*2 marks*