JINJA JOINT EXAMINATIONS BOARD

MOCK EXAMINATIONS JULY/AUGUST 2024

545/2 CHEMISTRY

MARKING GUIDE

ASSESMENT GRID

s/n	Basis of assessment	Assessment criteria	scoring
a(i) A	Aim of the experiment	An experiment to investigate the effect of temperature on the rate of reaction between sodium thiosulphate and hydrochloric acid	02
B	Variables of the experiment.	(DV) dependent variable: rate of reaction/ time taken for the cross to disappear. (IV) independent variable: temperature of the reaction. (CV)Controlled variable: volume and concentration of sodium thiosulphate.	03
C	Hypothesis	Increase in temperature produces more sulpur in a specified time. OR More Sulphur is produced at high temperatures.	02
D	Procedure of the experiment with relevant materials.	a) A cross mark was written on a white sheet of paper using blue or black ink pen. b) $50cm^3$ of sodium thiosulphate solution was added into a conical flask and stirred with a thermometer. The initial temperature of the solution was read and recorded. c) $5cm^3$ of hydrochloric acid was added and a stop clock immediately started. The conical flask was swirled carefully and placed over the cross on the white sheet of paper. d) The cross was observed by looking down through the solution from above the conical flask. e) The stop clock was stopped when the cross just became no longer visible and the time read and recorded. f) The components of the conical flask were poured away and the conical flask cleaned thoroughly.	03

		g) Procedures (b) to (f) were repeated but warming the sodium thiosulphate up to 30°C,40°C,50°C and 60°C respectively. h) Values of 1/t were computed.	
f	Risks and mitigation	Risk Use of damaged apparatus that can cause cuts. Mitigation Equipment was inspected before experiment. Risk Acid spills and contact with skin/ body Mitigation Put on lab coat, gloves and closed shoes. Risk Direct inhaling of acid fumes. Mitigation Wearing of a mask.	02

04 scores

Presentation of data

Experiment number	1	2	3	4	5
Temperature of mixture(°C)	RT=24	30.0	40.0	50.0	60.0
Volume of sodium thiosulphate (cm^3)	50.00	50.00	50.00	50.00	50.00
Volume of acid (cm^3)	5.00	5.00	5.00	5.00	5.00
Time taken for the cross to disappear (seconds)	122.0	67.0	43.4	27.9	17.8
Rate of reaction ,1/t (per second)	0.008	0.015	0.023	0.036	0.056

04 scores

Recording of data

01 score

Data analysis and interpretation

A graph of 1/t against temperature is a straight line with a positive gradient. This indicates that rate of reaction increases with increase in temperature.

Conclusion

The higher the temperature of sodium thiosulphate, the higher the rate of reaction and thus the higher the amount of Sulphur produced within a short period of time. 01 score

End

BASIS OF ASSESSMENT

Basis of assessment	Assessment criteria	Scoring
Aim of the experiment	• Aim of experiment with both key words • Aim of experiment with one key word • No aim of the experiment	02 01 00
Variable for the experiment	• Independent, dependent and controlled • Independent and dependent or independent and controlled or dependent and controlled variable. • Independent or dependent or controlled • No variable	03 02 01 00
hypothesis	• Hypothesis related to experiment with both key words. • Hypothesis related to experiment with one key words. • No/ wrong hypothesis of the experiment	02 01 00
Procedure of the experiment	• Relevant material, relevant procedure, coherent procedure of the experiment. • Relevant materials and procedure • Either relevant materials or relevant procedure • No relevant material and procedure	03 02 01 00
Risks and mitigation	• Any one risk identified and mitigated • Any one risk identified or mitigated • No risk identified or mitigated.	02 01 00
Presentation of data	• 2/3 of required sets of data appropriately presented. • 1/3 of required sets of data appropriately presented. • Data appropriately presented without required sets. • Data partially appropriately presented without required sets. • No set of data presented.	04 03 02 01 00
Recording of data	• Appropriate recording of data within the error margin. • Partial appropriate recording of data within the error margin • Appropriate recording of data outside the error margin • Partial appropriate recording of data outside error margin. • No data recorded/ data recorded outside error margin	04 03 02 01 00
Data analysis and interpretation	Method used is: • Appropriate accurate • Appropriate and partially accurate • Appropriate and inaccurate • Inappropriate and inaccurate	03 02 01 00
conclusion	• Conclusion based on data interpretation • No conclusion	01 00

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Recording of data 04 scores

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