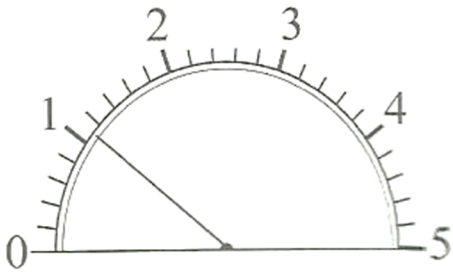


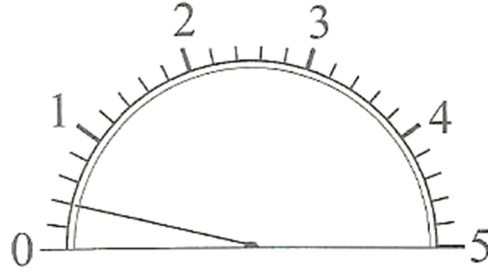
(i) Voltmeter – SPM 2013



Voltmeter reading
Bacaan Voltmeter

Zn - Cu

1.1 V



Voltmeter reading
Bacaan Voltmeter

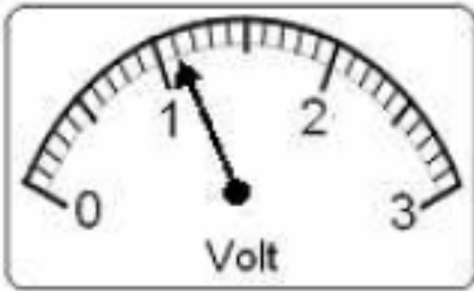
Pb - Cu

0.4 V



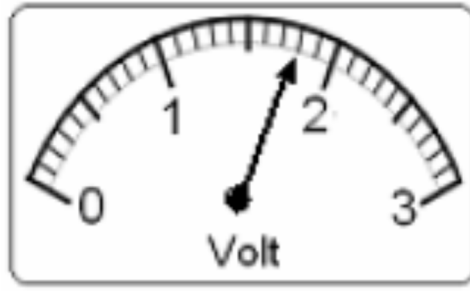
1 DP

**(ii) Voltmeter
Mg and Cu**



1.1 V

N and Cu

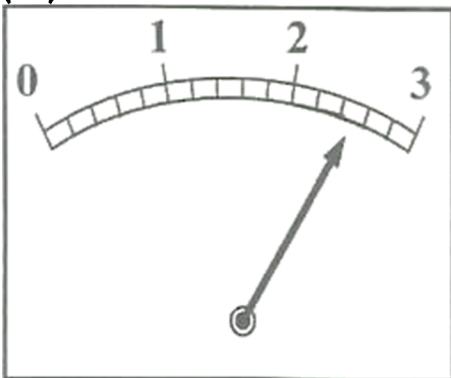


1.8 V

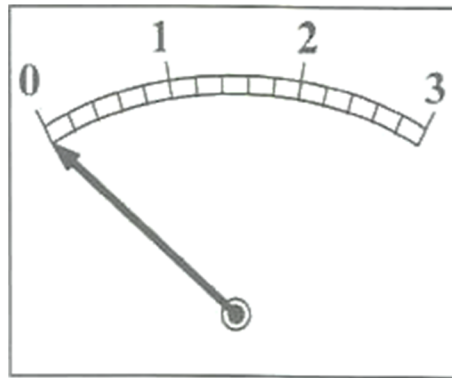


1 DP

(iii) Ammeter – SPM 2014



....2.5... A



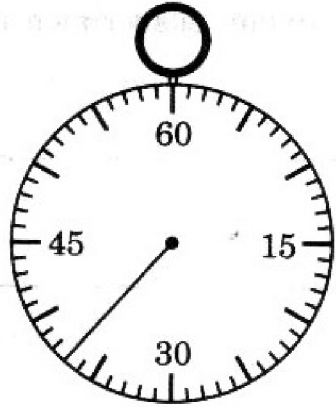
.....0.0... A



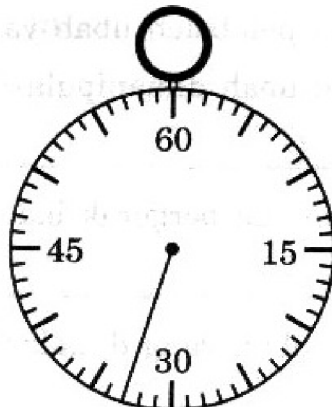
1 DP

(iv) Jam Randik Analog – SPM 2003

Analog Stopwatch



Time, t_4 37.0 s
at 45°C



Time, t_5 _____ s
at 50°C



1 DP

(v) Jam Randik Digital - 2011

Digital Stopwatch



Stopwatch
Jam randik

0
..... s



Stopwatch
Jam randik

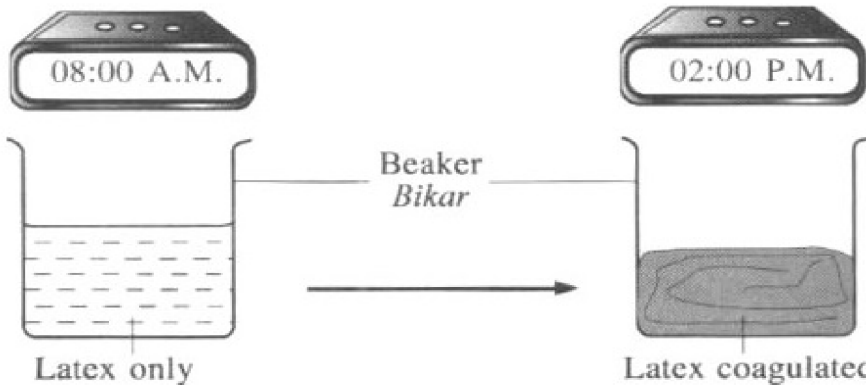
33
..... s



NO DP

(vi) Jam Randik Digital - 2008

Digital Stopwatch - 2008

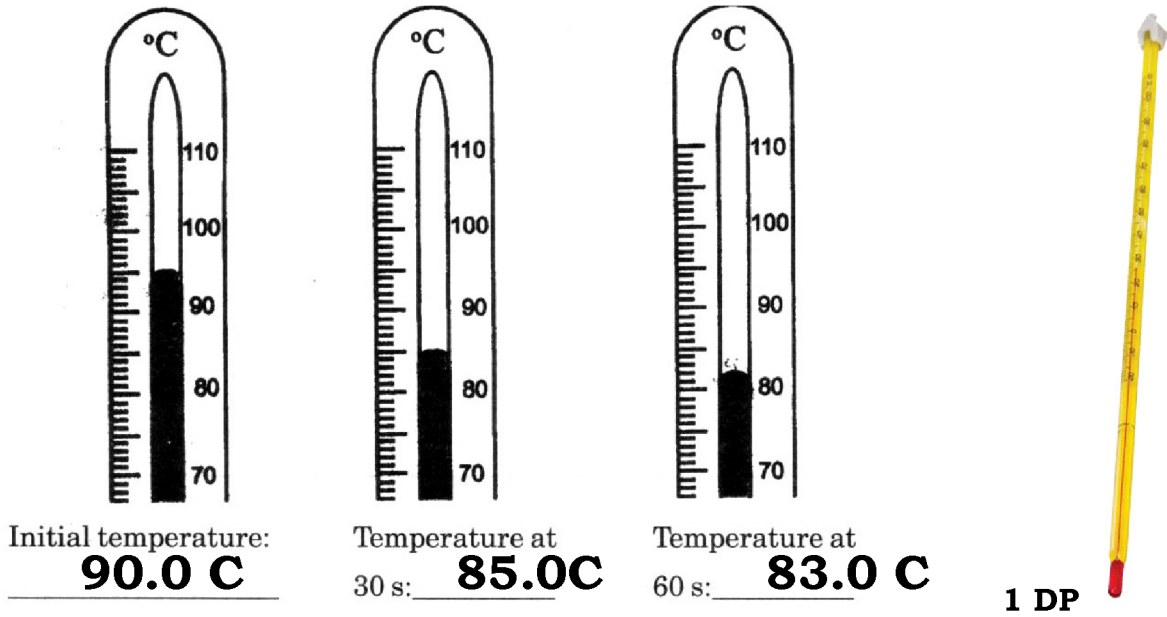


2 DP

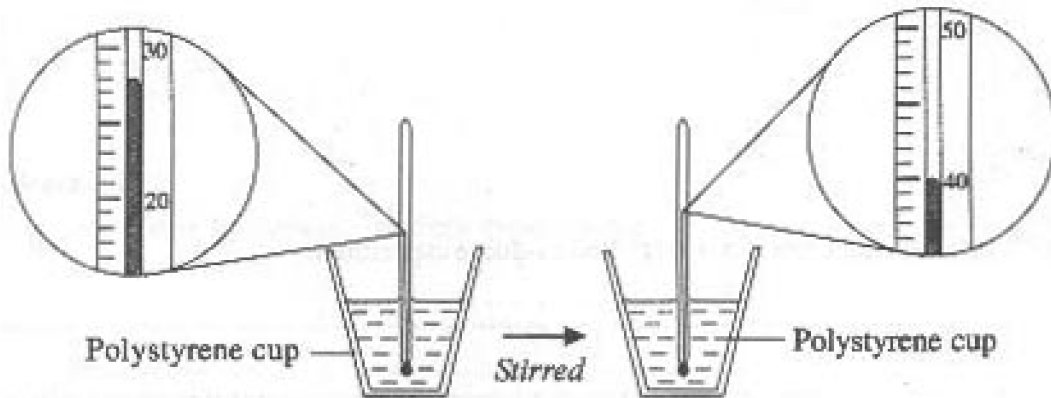
(b) Record the time taken for the latex to coagulate in Set III : **6.00 H**.....
Rekodkan masa yang diambil oleh lateks membeku di dalam set III

(vii) Termometer – SPM 2005

Thermometer



SPM 2006



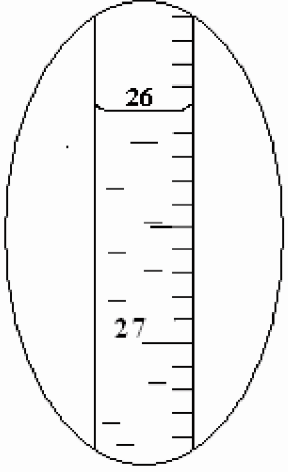
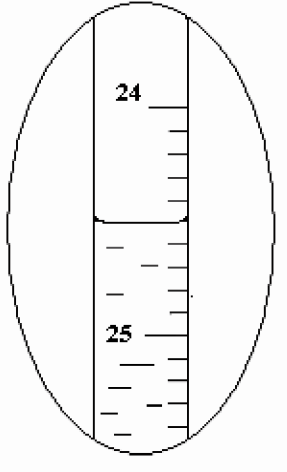
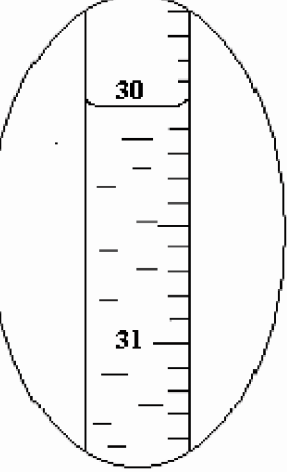
Initial temperature of mixture : **28.0** °C
Suhu awal campuran

Highest temperature of mixture : **40.0** °C
Suhu tertinggi campuran

Change in temperature : **12.0** °C
Perubahan suhu

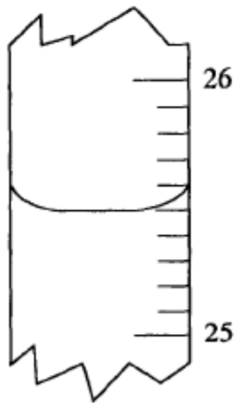
(viii) Buret - Pentitratan

Burette - Titration

Titration Set Set Titratan	1	2	3
Final Burette Reading <i>Bacaan Akhir Buret</i>			
	... 26.00 ...cm ³	... 24.50 ...cm ³	... 30.00 ...cm ³

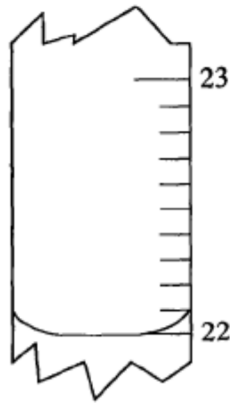
Buret – SPM 2009 - Terbalik

Burette – SPM 2009 - Inverted



At 90 seconds
Pada saat ke-90

25.50 cm³



At 120 seconds
Pada saat ke-120

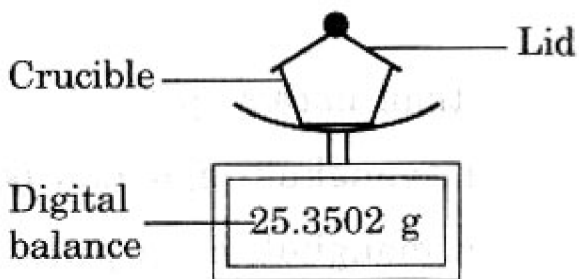
22.00 cm³



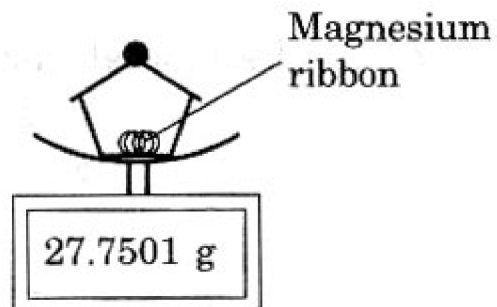
2 DP

(ix) Penimbang elektronik – SPM 2004

Electronic balance



Digital balance
25.3502 g



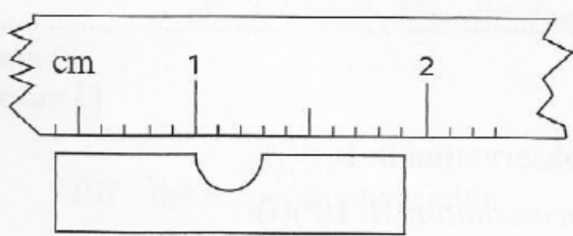
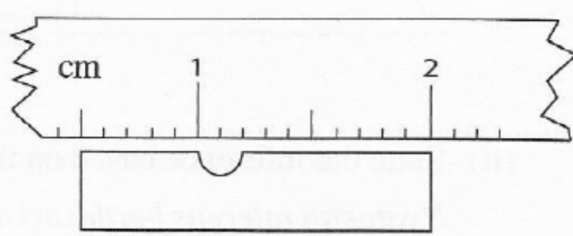
Magnesium ribbon
27.7501 g

(b) Record the reading to **two decimal** places for:
 Catatkan bacaan pada **dua tempat perpuluhan** bagi :

The mass of crucible and lid : **25.35**g
Jisim mangkuk pijar dan penutup

The mass of crucible, lid and magnesium ribbon : **27.75**g
Jisim mangkuk pijar, penutup dan magnesium

(xi) Ruler/ Pembaris – SPM 2017

 <p>Copper block <i>Bongkah kuprum</i></p> <p>3.10 – 1.80 = 1.30 cm</p> <p>Diameter of dent: <i>Diameter lekuk</i></p>	 <p>Bronze block <i>Bongkah gangsa</i></p> <p>3.00 – 1.80 = 1.2 cm</p> <p>Diameter of dent: <i>Diameter lekuk</i></p>
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<https://cikguadura.wordpress.com/>

KESIMPULANNYA
CONCLUSION

	NOTE <i>NOTA</i>	Decimal Place <i>Bilangan titik perpuluhan</i>	Unit <i>Unit</i>
1.	$\frac{1}{\text{Time / masa}}$	3	1/s @ s⁻¹
2.	Burette <i>Buret</i>	2	cm³
3.	Voltmeter * Based on the scale	1	V
4.	Ruler <i>Pembaris</i>	2	cm
5.	Analog Stopwatch <i>Jam Randik Analog</i>	1	s
6.	Thermometer <i>Termometer</i>	1	°C

2. SK 0102: Mengelas/ Classifying

[Sarawak2023]

Tindak balas perlahan <i>Slow reaction</i>	Tindak balas cepat <i>Fast reaction</i>
Fotosintetis <i>Photosynthesis</i>	Pembakaran <i>Combustion</i>
Penapaian glukosa <i>Fermentation of glucose</i>	Pemendakan argentum klorida <i>Precipitation of silver chloride</i>
Pengaratan besi <i>Rusting of iron</i>	

SK0101 : Memerhati/ Observing

SK 0104: Membuat inferens/ Making inference

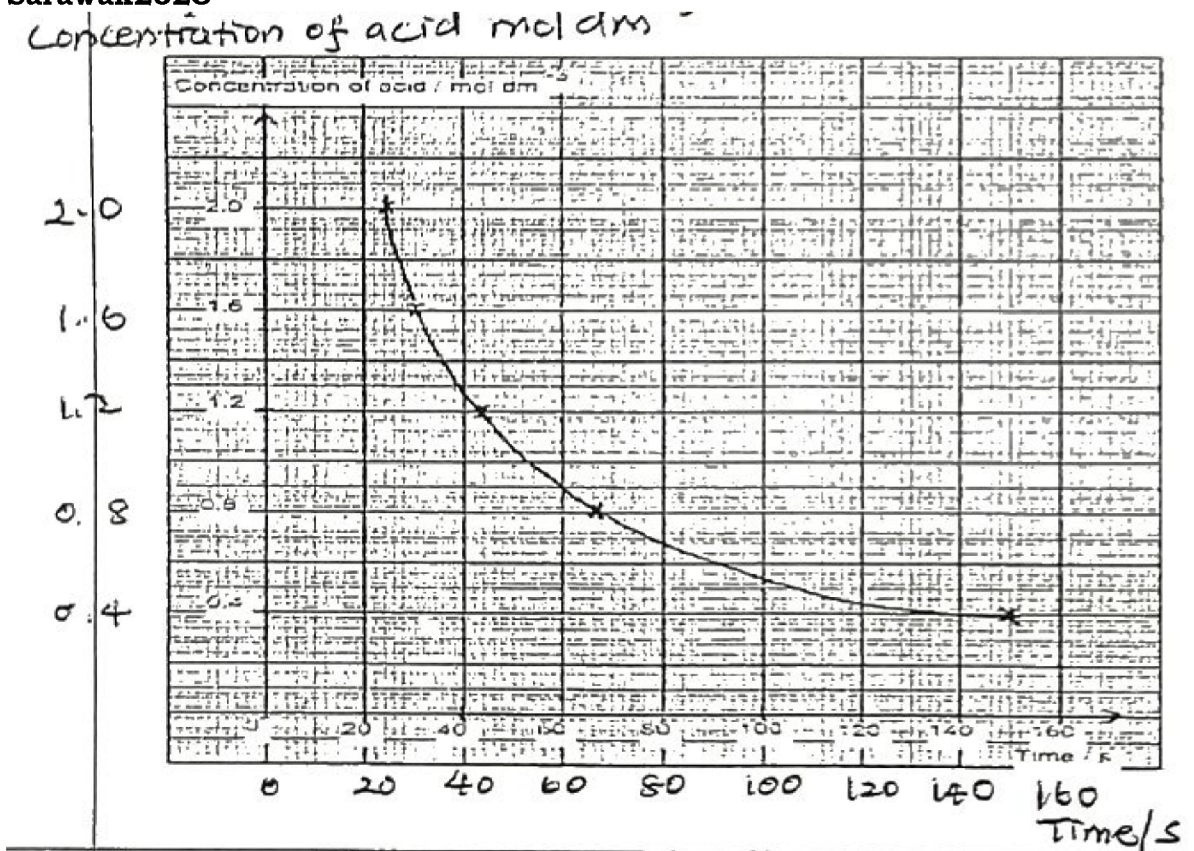
Latihan/ Exercises:

Sarawak2023

Pita magnesium larut sepenuhnya//Pembuakan gas berlaku //
 Gelembung gas tak berwarna terbebas
 Magnesium ribbon dissolves completely//Effervescence occur//
 Colourless gas bubbles is released

SK 0105: Predicting

Sarawak2023



1. Tunjukkan dalam graf/ Show in graph

2. Masa dengan unit yang betul / Time with correct unit

54 s ± 2

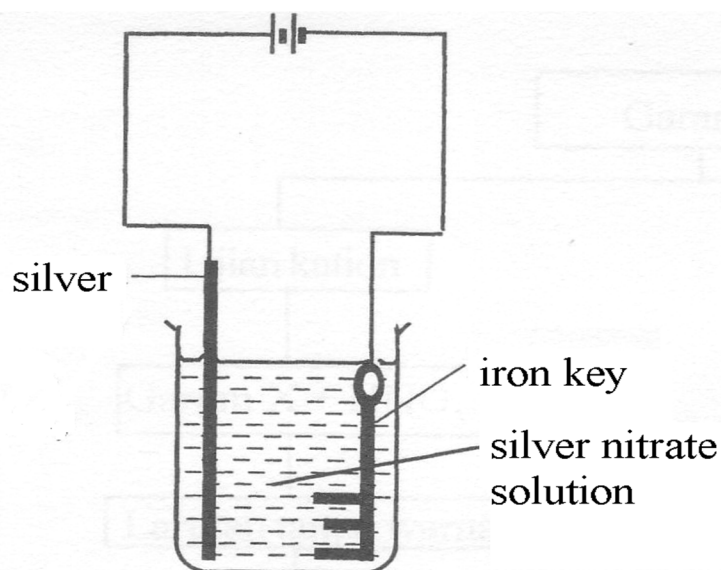
46 s ± 2

SK 0106: Berkomunikasi Communicating/

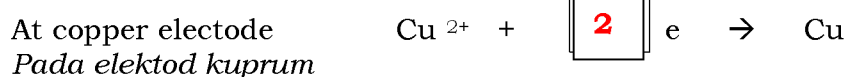
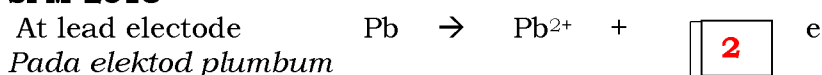
a. SPM 2003

Temperature/ Suhu (°C)	Time / Masa (s)	1/time (s ⁻¹)
30	55.0	0.018
35	48.0	0.021
40	42.0	0.014

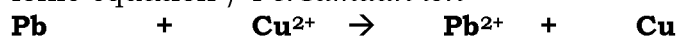
b. SPM 2009:



c. SPM 2013



Ionic equation / Persamaan ion



SK 0107: Menggunakan Perhubungan Ruang dan Masa

Exercise / Latihan:

Sarawak2023

Saiz magnesium berkurang dengan masa

Size of magnesium decreases with time

SK 0108: Interpreting data**SPM2011(g)**

Kelalang kon yang lebih kecil mempunyai luas tapak yang lebih kecil.

Ketebalan sulfur meningkat

Masa yang diambil untuk tanda "X" hilang menjadi lebih singkat

The smaller conical flask has a smaller base area.

The thickness of the sulphur is increased

The time taken for the for the mark "X" to disappear become shorter

SK 0109: Defining operationally.

What is done? When sodium thiosulphate was added into sulphuric acid

Apa yang dilakukan? Bila natrium thisulfat ditambah ke dalam asid sulfurik

What is done? When sodium thiosulphate was added into sulphuric acid

Apa yang dilakukan? Bila natrium thisulfat ditambah ke dalam asid sulfurik

What is observe? Time for mark 'X' not seen / disappear

Apa yang diperhatikan? Masa untuk tanda "X" tidak kelihatan

Operational definition:

Time taken for mark 'X' not seen / to disappear when sodium thiosulphate was added into sulphuric acid

Masa untuk tanda "X" tidak kelihatan bila natrium thisulfat ditambah ke dalam asid sulfurik

a. SPM 2016

Conceptual: <i>Konsep</i>	Rate of reaction is changing of (reactants/ products) per time taken <i>Kadar tindak balas ialah perubahan (bahan/hasil) per masa di ambil</i>
What is done? <i>Apa yang dilakukan?</i>	Mengukur pada sela masa 30 s Merekodkan pada sela masa 30 s <i>Measured at 30 s intervals</i> <i>Recorded at 30s intervals</i>
What is observed? <i>Apa yang diperhatikan?</i>	Jumlah isi padu gas terkumpul Peningkatan bacaan buret <i>The total of volume of gas collected</i> <i>The burette reading</i>
Operational definition: <i>Definisi secara operasi:</i>	Jumlah isi padu gas yang diukur pada sela masa 30 s Bacaan buret direkodkan pada sela masa 30 s <i>The total of gas measured/ recorded at 30 s intervals</i> <i>Burette reading recorded at 30s intervals</i>

SK 0111: Hypothesizing

(a) Difference Observation / Berbeza Pemerhatian

(i) When more electropositive metal coil with iron nail, the iron nail not rust but when less electropositive metal coil with iron nail, the iron nail will rust

*Apabila logam lebih elektropositif dililit pada paku besi, paku besi tidak berkarat
Sebaliknya apabila logam kurang elektropositif dililit pada paku besi. paku besi berkarat*

(ii) When acid was added into latex solution, latex will coagulated else when alkali (ammonia) added into latex solution, latex will not coagulated

*Apabila asid ditambahkan larutan lateks,
lateks akan membeku. Tetapi sebaliknya apabila ammonia/ alkali ditambahkan larutan lateks, lateks tidak akan membeku*

(b) RELATION / Berhubung

The higher the temperature/ the concentration
the higher the rate of reaction

*Semakin tinggi suhu/ kepekatan asid sulfuric
Semakin tinggi kadar tindak balas*

(c) Comparison/ Perbandingan

Alloy is harder than pure metal//

Bronze is harder than copper metall

Aloi lebih keras daripada logam tulen//

Gangsa lebih keras daripada logam kuprum

SPM2003

(e) (i) Manipulasi : Suhu larutan natrium tiosulfat

Manipulated: Temperature of sodium thiosulphate solution

Bergerak balas: Kadar tindak balas antara natrium tiosulfat dan asid hidroklorik//
masa untuk tanda X hilang daripada pandangan

Responding: Rate of reaction between sodium thiosulphate and hydrochloric acid//time
taken for the sign X disappear

Dimalarkan: kepekatan dan isi padu natrium tiosulfat dan asid hidroklorik

Constant: Concentration and volume of sodium thiosulphate solution and hydrochloric acid

(ii) yang dimanipulasikan adalah suhu.

Panaskan natrium tiosulfat pada beberapa suhu dengan mengekalkan kepekatan dan isi padu natrium tiosulfat

dan asid hidroklorik dimalarkan untuk membantu pembolehkan bergerak balas.

Temperature is the manipulated variable.

Heating sodium thiosulphate with several different temperatures by remaining the concentration and volume of sodium thiosulphate

and hydrochloric acid constant helps maintain the responding variable.

(f) Semakin tinggi suhu larutan natrium tiosulfat, semakin tinggi kadar tindak balas di antara natrium tiosulfat dan asid hidroklorik

The higher the temperature of sodium thiosulphate solution, the higher the rate of reaction between sodium thiosulphate and hydrochloric acid