7.1 Keelektrikan *Electricity*

Buku Teks: m.s. 142 – 152

Pelbagai Bentuk Tenaga
Forms of Enegry

1. Lengkapkan jadual di bawah dengan pelbagai jenis tenaga dan contoh-contohnya. TP 1
Complete the table below with the various types of energy and their examples.

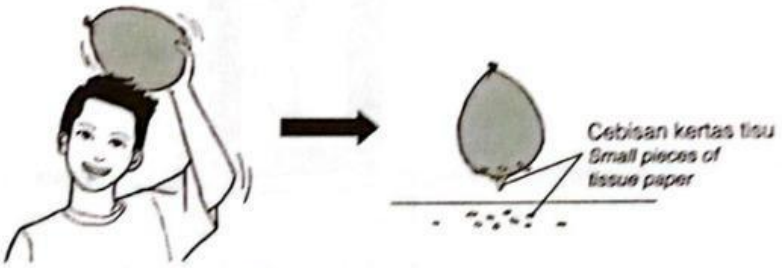
Jenis-jenis tenaga *Types of energy*	Contoh *Examples*
Tenaga bunyi *Sound energy*	(i) Guruh / *Thunder* (ii) Bunyi biola / *Sound of violin*
(a) Kinetic energy	(i) (ii)
(b) Electrical energy	(i) (ii)
(c) Gravitational potential energy	(i) (ii)
(d) Elastic potential energy	(i) (ii)
(e) Light energy	(i) (ii)
(f) Nuclear energy	(i) (ii)
(g) Heat energy	(i) (ii)
(h) Chemical energy	(i) (ii)

2. Jelaskan situasi dalam Rajah 1.1 dan Rajah 1.2 menggunakan pengetahuan anda tentang cas elektrostatik. TP 4

Explain the situation in Diagram 1.1 and Diagram 1.2 using your knowledge in electrostatic charges.

KBAT Menganalisis

(a) Alan menggosok belon beberapa kali pada rambutnya. Apabila belon itu didekatkan kepada cebisan kertas tisu, cebisan kertas tisu tertarik kepada belon.
Alan rubbed a balloon a few times against his hair. When the balloon is brought near some pieces of tissue papers, the pieces are attracted to the balloon.



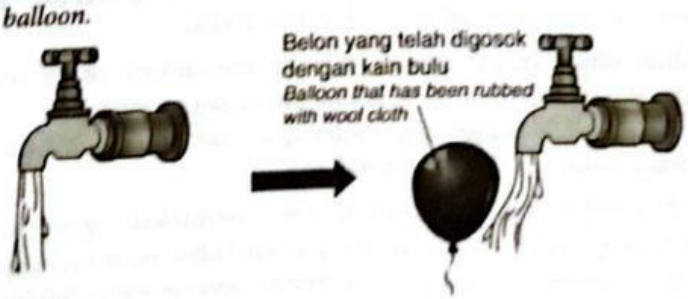
Rajah 1.1 / *Diagram 1.1*

Penjelasan / *Explanation:*

negative | positive | attract | electrons

When rubbed to the hair, the balloon received [ ] from the hair. This enables the balloon to [ ] pieces of tissues paper which are neutral because of the force of attraction between [ ] charges on the tissue paper and the [ ] charges on the balloon.

(b) Apabila sebiji belon yang telah digosok dengan kain bulu didekatkan kepada air yang mengalir, aliran air tersebut terpesong ke arah belon.
When a balloon that has been rubbed with wool cloth is brought near a small stream of water, the stream deflects toward the balloon.



Rajah 1.2 / *Diagram 1.2*

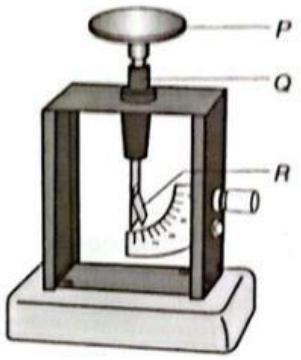
Penjelasan / *Explanation:*

negative | electrons | deflect | positive

When rubbed with a wool cloth. the balloon receives [ ] and becomes negative. When the balloon is brought closer to the water stream, the [ ] charges on the water stream are attracted to the [ ] charges on the balloon. This causes the stream to [ ] towards the balloon.

Elektroskop
Electroscope

3. Rajah 2.1 menunjukkan sebuah elektroskop.
Diagram 2.1 shows an electroscope.



Rajah 2.1 / *Diagram 2.1*

(a) Namakan bahagian-bahagian bertanda *P*, *Q* dan *R*. TP 1
Name the parts labelled P, Q and R.

P : _____

Q : _____

R : _____

(b) Apakah kegunaan elektroskop? TP 1
What is the function of an electroscope?

Detecting the presence of _____ charges on an object.

(c) Nyatakan sama ada pernyataan di bawah **BENAR** atau **PALSU**. TP 2
*State whether the statements below are **TRUE** or **FALSE**.*

(i) Apabila objek bercas positif dibawa mendekati ceper logam elektroskop yang neutral, kerajang emas akan mencapah.
When a positively charged object is brought closer to the metal disc of a neutral electroscope, the gold leaf will rise.

(ii) Apabila objek bercas negatif dibawa mendekati ceper logam elektroskop yang neutral, kerajang emas tidak akan mencapah.
When a negatively charged object is brought closer to the metal disc of a neutral electroscope, the gold leaf will not rise.

(iii) Semakin jauh kerajang emas mencapah, semakin banyak kuantiti cas elektrostatik.
The further the gold leaf diverges, the more the quantity of electrostatic charges.

(iv) Apabila objek bercas negatif dibawa mendekati ceper logam elektroskop yang bercas positif, kerajang emas tidak akan mencapah.
When a negatively charged object is brought closer to the metal disc of a positively charged electroscope, the gold leaf will not rise.

... the gold leaf will not rise.

(d) Rajah 2.2 menunjukkan sebuah eksperimen yang menggunakan elektroskop kerajang emas dalam keadaan berbeza. Lukis kedudukan kerajang emas dalam setiap rajah. TP 2
Diagrams 2.2 shows an experiment using a gold leaf electroscope in different conditions. Draw the position of the gold leaf in each of the diagram.

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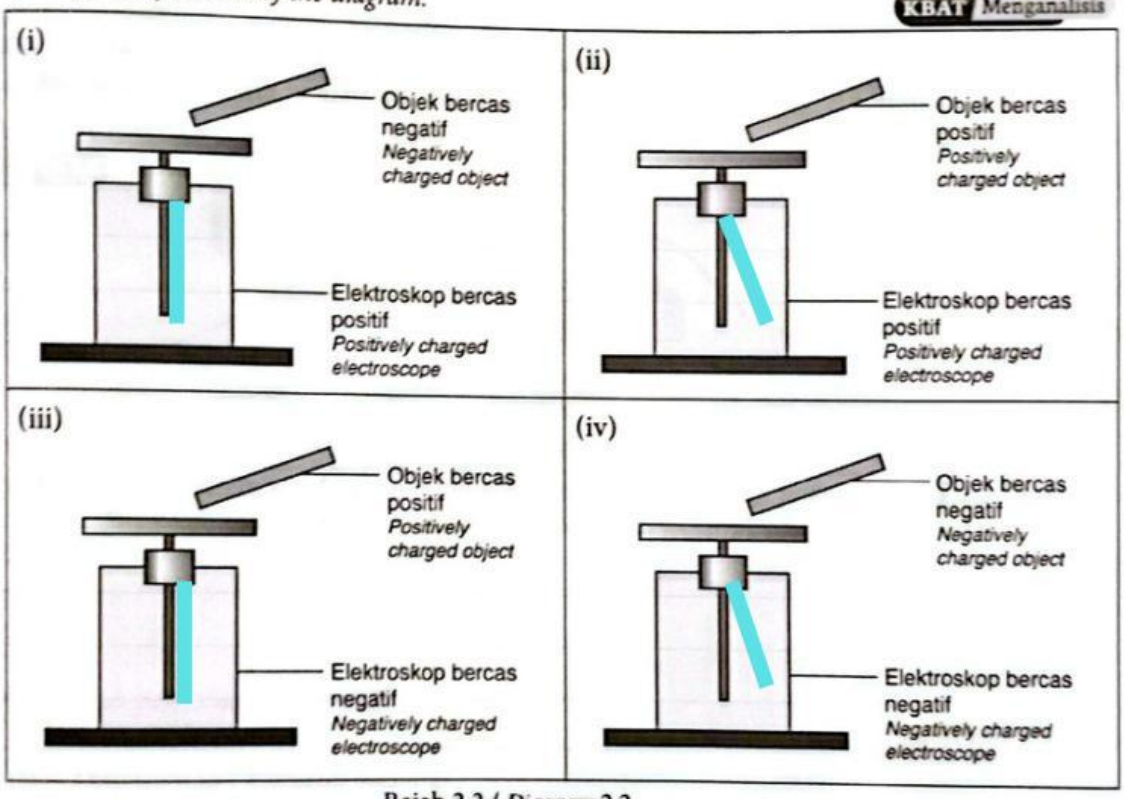


Rajah 2.2 / *Diagram 2.2*

(e) Apakah yang boleh dirumuskan daripada eksperimen di 3(d)? TP 5
What can be summarized from the experiment in 3(d)?

KBAT Menilai

attract repel diverges

Gold leaf _____ when the object brought near to electroscope has the same charge as the electroscope because same charges _____ . Gold leaf does not diverge when the object and electroscope have different charges because different charges _____ .

Contoh Elektrostatik dalam Kehidupan Harian
Example of Electrostatic in Our Daily Life

4. Kilat ialah satu fenomena alam yang sering terjadi.
Lightning is a common natural phenomenon.

(a) Huraikan bagaimana fenomena tersebut berlaku. TP 4
Elaborate on how does the phenomenon happens.

KBAT Menganalisis

During thunderstorm, the _____ between the clouds and air causes the cloud to get _____ charges. The top part of the cloud has _____ charged, while the bottom part of the clouds is _____ charged. The attractive force between the negative charges of the clouds and the positive charges of the Earth forms the _____

negatively lightning friction electric positively

(b) Sekiranya anda berjalan kaki di luar ketika kejadian ribut petir, apakah yang perlu anda lakukan untuk mengelakkan diri daripada terkena panahan kilat? Mengapa? TP 3

If you are walking outside during a thunderstorm, what should you do to prevent yourself from being struck by a lightning? Why?

KBAT Mengaplikasi

Find a _____ such as building or a car that can act as a _____ cage. If the lightning strikes the shelter, the _____ charges will travel through the shelter and _____ the person inside it.

bypass shelter electrical Faraday

(c) Apakah kegunaan konduktor kilat pada bangunan dan bagaimanakah alat ini berfungsi?
What is the use of the lightning conductor on a building and how does it function? TP 2

Lightning conductor can reduce the risks of the building to be _____ by a lightning. It provides a pathway to _____ electric charges from the lightning direct to the _____

struck ground transfer

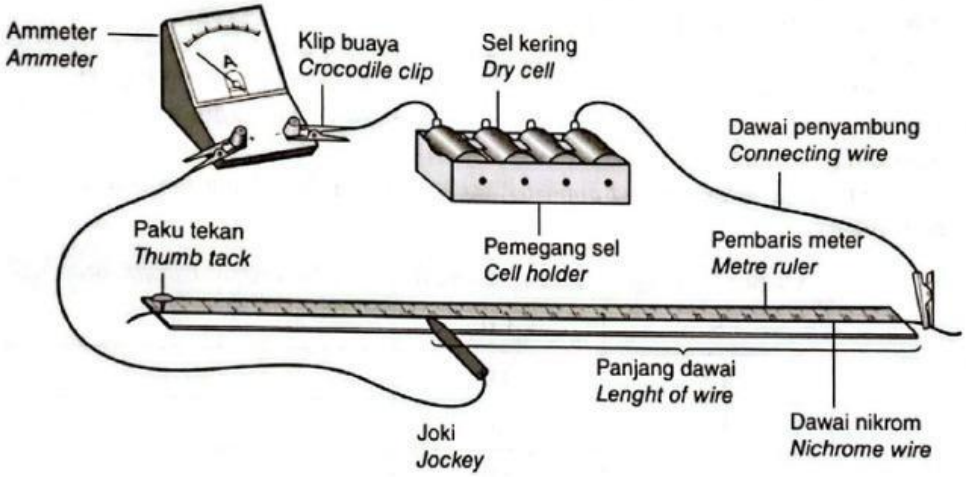
Pengukuran Kuantiti Elektrik
Measuring the Quantity of Electricity

5. Lengkapkan jadual di bawah. TP 1
Complete the table below.

	(a) Arus / *Current*	(b) Voltan / *Voltage*	(c) Rintangan / *Resistance*
Takrif / *Definition*	(i)	(i)	(i)
Unit S.I. / *S.I. Unit*	(ii)	(ii)	(ii)
Alat pengukur / *Measuring instrument*	(iii)	(iii)	(iii)

Hubungan antara Arus, Voltan dan Rintangan
Relationship between Current, Voltage and Resistance

6. Dean menjalankan sebuah eksperimen untuk mengkaji kesan perubahan rintangan terhadap arus elektrik menggunakan litar seperti dalam Rajah 3. Joki diubah kepada beberapa kedudukan untuk menambah panjang dawai nikrom.
Dean is conducting an experiment to investigate the effect of changing resistance on electric current by using circuit in Diagram 3. The Jockey is moved to a few positions to increase the length of the nichrome wire.



Rajah 3 / *Diagram 3*

(a) Nyatakan pemboleh ubah TP 3
State the variables

KBAT Mengaplikasi

(i) Dimalarkan / *Constant variable:*

(ii) Dimanipulasikan / *Manipulated variable:*

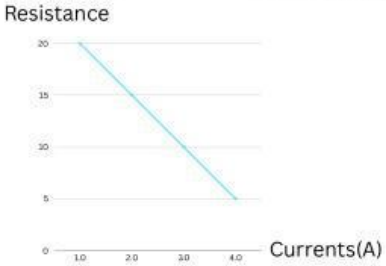
(iii) Bergerak balas / *Responding variable:*

(b) Apakah hipotesis yang mungkin diuji oleh Dean dalam eksperimen ini? TP 4
What is the hypothesis that may be tested by Dean in this experiment?

KBAT Menganalisis

The [ ] the resistance, the smaller the current.

(c) Berdasarkan hipotesis di 6(b), lakarkan graf yang menunjukkan hubungan di antara rintangan dan arus. TP 2
Based on the hypothesis in 6(b), sketch a graph that shows the relationship between resistance and current.



Bab 7

7. Amin menjalankan sebuah eksperimen untuk mengkaji kesan perubahan voltan terhadap arus elektrik menggunakan ammeter, voltmeter, dawai nikrom, empat sel kering berlainan voltan, dawai penyambung dan klip buaya.
Amin carried out an experiment to investigate the effect of changes in voltage towards current by using ammeter, voltmeter, nichrome wire, four dry cells with different voltage, connecting wire and crocodile clip.

(a) Bacaan pada voltmeter dan ammeter direkodkan dalam jadual berikut. Hitung rintangan bagi setiap voltan.
The readings on voltmeter and ammeter are recorded in the table below. Calculate the resistance for each voltage.

Voltan / *Voltage*	Arus / *Current*	Rintangan / *Resistance*
5	1.0	
10	2.0	
15	3.0	
20	4.0	

(b) Nyatakan pemboleh ubah TP 3
State the variables

(i) Dimalarkan / *Constant variable*: KBAT Mengaplikasi

(ii) Dimanipulasikan / *Manipulated variable*:

(iii) Bergerak balas / *Responding variable*:

(c) Apakah hipotesis yang mungkin diuji oleh Amin dalam eksperimen ini? TP 4
What is the hypothesis that may be tested by Amin in this experiment? KBAT Menganalisis

The [ ] the voltage, the greater the current.

(d) Hitung nilai arus jika voltan = 40 V. TP 4
Calculate the value of current when voltage = 40 V. KBAT Mengaplikasi

I =

(e) Berdasarkan hipotesis di 7(c), lakarkan graf yang menunjukkan hubungan di antara voltan dan arus elektrik. TP 2
Based on the hypothesis in 7(c), sketch a graph that shows the relationship between voltage and electric current.