

## Bab 1 Keseimbangan Redoks

### 1.1 Pengoksidaan Dan Penurunan

#### [Perlis2021-13]

13. Antara yang berikut, yang manakah berlaku kepada suatu bahan yang mengalami tindak balas penurunan?

Which of the following happens to a substance that undergoes a reduction reaction?

- |  |   |
|--|---|
| <input checked="" type="checkbox"/> A Menerima elektron<br>Gains of electron | <input type="checkbox"/> C Kehilangan elektron<br>Loses of electron |
| <input type="checkbox"/> B Menerima oksigen<br>Gains of oxygen               | <input type="checkbox"/> D Kehilangan hidrogen<br>Loses of hydrogen |

Commented [AA11]:

#### [Kelantan2021-04]

4. Antara berikut, yang manakah berlaku dalam tindak balas pengoksidaan?  
Which of the following occurs in oxidation reaction

- |  |  |
|--|--|
| <input type="checkbox"/> A Kehilangan oksigen<br>Loss of oxygen    | <input type="checkbox"/> C Penerimaan hidrogen<br>Gain of hydrogen                                   |
| <input type="checkbox"/> B Penerimaan elektron<br>Gain of electron | <input checked="" type="checkbox"/> D Penambahan nombor pengoksidaan<br>Increase in oxidation number |

Commented [AA12]:

#### [Selangor2021-Set02-05]

5. Pernyataan yang manakah mendefinisikan pengoksidaan?  
Which statement defines oxidation?

- |  |  |
|--|--|
| <input type="checkbox"/> A Penerimaan hidrogen<br>Gain of hydrogen                         | <input type="checkbox"/> C Penerimaan elektron<br>Gain of electron         |
| <input type="checkbox"/> B Pengurangan nombor pengoksidaan<br>Decrease in oxidation number | <input checked="" type="checkbox"/> D Penerimaan oksigen<br>Gain of oxygen |

Commented [AA13]:

#### [Kedah2021-Set01-01]

24. Antara berikut, yang manakah berlaku dalam tindak balas penurunan?  
Which of the following occurs in reduction reaction?

- |   |   |
|---|---|
| <input type="checkbox"/> A Menerima oksigen<br>Gain oxygen      | <input checked="" type="checkbox"/> C Penambahan elektron<br>Gain electron                |
| <input type="checkbox"/> B Kehilangan hidrogen<br>Loss hydrogen | <input type="checkbox"/> D Penambahan nombor pengoksidaan<br>Increase in oxidation number |

Commented [AA14]:

**[Terengganu2021-07]**

7. Antara berikut yang manakah merupakan agen penurunan?  
Which of the following is a reducing agent?

- |  |   |
|--|---|
| A Kalium iodida<br>Potassium iodide                                  | C Hidrogen peroksida<br>Hydrogen peroxide |
| B Kalium manganat(VII) berasid<br>Acidified Potassium manganate(VII) | D Ferum(III) sulfat<br>iron(III) sulphate |

Commented [AA15]:

**[Kelantan2021-10]**

10. Antara berikut yang manakah merupakan tindak balas redoks?  
Which of the following is a redox reaction?

- |   |   |
|---|---|
| A Menyalakan dapur gas<br>Igniting the gas stove  | B Tindak balas asid ke atas lateks<br>A reaction of acid on latex |
| C Menggunakan pek sejuk untuk meredakan sakit kaki<br>Using cold pack to relieve muscle pain            |   |
| D Mencuci kotoran yang terkena kotoran berminyak dengan sabun<br>Washing oil-stained clothes using soap |   |

Commented [AA16]:

**[Johor2021-08]**

8. Apakah yang berlaku kepada magnesium apabila terbakar dalam udara? What has happened to magnesium when burnt in the air?

- |  |   |
|--|---|
| A Terima hidrogen<br>Gain of hydrogen  | C Kehilangan elektron<br>Loss of electron                         |
| B Kehilangan oksigen<br>Loss of oxygen | D Pengurangan nombor pengoksidaan<br>Decrease in oxidation number |

**[Melaka2021-22]**

22. Antara tindak balas berikut yang manakah menunjukkan kuprum dioksidakan?  
Which of the following reactions shows that copper is oxidised?

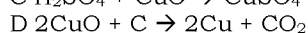
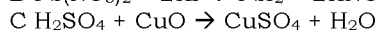
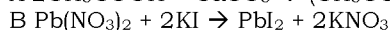
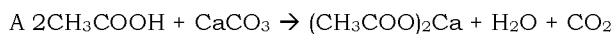
- |  |  |
|--|--|
| A Tindak balas zink dengan kuprum(II) oksida<br>Reaction of zinc with copper(II) oxide   |  |
| B Tindak balas kuprum dengan larutan argentum nitrat<br>Reaction of copper with silver nitrate solution  |  |
| C Elektrolisis larutan kuprum(II) sulfat dengan menggunakan elektrod karbon<br>Electrolysis of copper(II) sulphate solution by using carbon electrodes                 |  |
| D Sel kimia yang terdiri daripada elektrod kuprum dan elektrod zink dalam asid sulfurik cair<br>Chemical cell with copper and zinc electrodes in dilute sulphuric acid |  |

Commented [AA17]:

**[Johor2021-35]**

35. Antara yang berikut, persamaan manakah yang mewakili satu tindak balas redoks?

Which of the following equation represents a redox reaction?



**[Terengganu2021-19]**

19. Yang berikut menunjukkan suatu persamaan ion.

The following shows an ionic equation.



Berdasarkan persamaan tersebut, yang manakah benar?

Based on the equation, which of the following is true?

**A** P dioksidakan.

P is oxidised.

C  $\text{Q}^{2+}$  adalah agen penurunan.

$\text{Q}^{2+}$  is a reducing agent

Commented [AA18]:

B  $\text{P}^{2+}$  adalah agen pengoksidaan.

$\text{P}^{2+}$  is oxidizing agent.

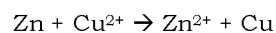
D  $\text{Q}^{2+}$  menderma elektron.

$\text{Q}^{2+}$  donates electrons

**[Selangor2021-Set01-01]**

23. Persamaan berikut menunjukkan persamaan ion bagi tindak balas antara zink dengan larutan kuprum(II) nitrat.

The following equation shows the ionic equation for the reaction between zinc and copper(II) nitrate solution.



Berdasarkan persamaan tersebut, bahan manakah mengalami pengoksidaan?

Based on the equation, which substance undergoes oxidation?

**A** Zn

B  $\text{Cu}^{2+}$

C  $\text{Zn}^{2+}$

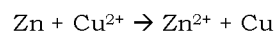
D Cu

Commented [AA19]:

**[Johor2021-27]**

27. Persamaan ion berikut mewakili satu tindak balas redoks.

The following ionic equation represents a redox reaction.



Tindak balas yang manakah boleh diwakili dengan persamaan ion yang diberikan?

Which reaction can be represented using the given ionic equation?

A Campuran serbuk zink oksida dan kuprum dipanaskan dengan kuat  
Mixture of zinc oxide and copper is heated strongly

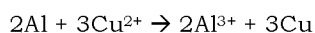
B Larutan zink nitrat dicampurkan dengan larutan kuprum(II) nitrat  
Zinc nitrate solution is mixed with copper(II) nitrate solution

C Kepingan kuprum dicelup ke dalam larutan zink sulfat  
Copper strip is dipped into the zinc sulphate solution.

D Jalur zink direndam ke dalam larutan kuprum(II) nitrat  
Zinc strip is dipped into the copper(II) nitrate solution

**[Negeri Sembilan 2021-25]**

25. Persamaan ion berikut mewakili satu tindak balas redoks.  
The following ionic equation represents a redox reaction.



Pernyataan manakah yang betul?  
Which statement is correct?

A Ion kuprum(II) dioksidakan  
Copper(II) ion is oxidised

B Ion kuprum(II) adalah agen penurunan  
Copper(II) ion is a reducing agent

**C** Atom aluminium mengalami pengoksidaan  
Aluminium atom undergoes oxidation

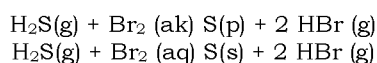
D Atom aluminium menerima elektron  
Aluminium atom receives electrons

Commented [AA110]:

**[Kedah 2021-Set02-14]**

14. Antara berikut, yang manakah benar mengenai persamaan kimia seimbang di bawah ?

Which of the following is true about the balanced chemical equation below?



**A** Hidrogen sulfida alami pengoksidaan dengan kehilangan hidrogen membentuk sulfur

Hydrogen sulphide undergoes oxidation by losing hydrogen forming sulphur

B Bromin alami pengoksidaan dengan kehilangan hidrogen membentuk asid hidrobromik

Bromine undergoes oxidation by losing hydrogen forming hydrobromic acid

C Hidrogen sulfida ialah agen pengoksidaan  
Hydrogen sulphide is an oxidising agent

D Bromin ialah agen penurunan  
Bromine is a reducing agent

Commented [AA111]:

**[Johor2021-40]**

40. Jadual 4 menunjukkan tindak balas kimia dan pemerhatiannya.  
Table 4 shows chemical reactions and its observation.

Tindak balas kimia Chemical reaction	Pemerhatian Observation
Gas hidrogen sulfida, H <sub>2</sub> S dicampurkan dengan gas klorin, Cl <sub>2</sub> Hydrogen sulphide is added with chlorine gas, Cl <sub>2</sub>	Pepejal kuning terbentuk Yellow solid formed
Air klorin, Cl <sub>2</sub> dimasukkan kepada larutan kalium iodide, KI Chlorine water, Cl <sub>2</sub> is added into potassium iodide solution, KI	Larutan tak berwarna bertukar perang Colourless solution turns brown

Antara yang berikut, pernyataan manakah benar tentang gas hidrogen sulfida dan air klorin?

Which of the following statements is true about hydrogen sulphide and chlorine water?

	Hidrogen sulfida Hydrogen sulphide	Air klorin Chlorine water
A	Penurunan nombor pengoksidaan Decrease in oxidation number	Penambahan nombor pengoksidaan Increase in oxidation number
B	Agen pengoksidaan Oxidising agent	Agen penurunan Reducing agent
C	Menerima elektron Receive electron	Membebaskan elektron Release electron
D	Mengalami pengoksidaan Undergoes oxidation	Mengalami penurunan Undergoes reduction

**[SBP2021-29]**

29. Apakah nombor pengoksidaan X dalam ion X<sub>2</sub>O<sub>8</sub><sup>2-</sup> ?  
What is the oxidation number of X in X<sub>2</sub>O<sub>8</sub><sup>2-</sup> ion?

- A -2                      B +2                      C +4                      **D +7**

Commented [AA112]:

**[Selangor2021-Set01-01]**

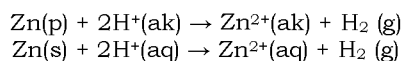
5. Apakah nombor pengoksidaan bagi gas karbon dioksida, CO<sub>2</sub>?  
What is the oxidation number of carbon dioxide, CO<sub>2</sub>?

- A -1                      B -3                      **C 0**                      D +1

Commented [AA113]:

**[Kelantan2021-17]**

17. Persamaan ion berikut menunjukkan tindak balas antara zink dengan asid  
The following ionic equation shows the reaction between zinc and acid



Apakah perubahan nombor pengoksidaan bagi hidrogen?  
What is the change in oxidation number of hydrogen?

A 0 kepada +1  
0 to +1

**C** +1 kepada 0  
+1 to 0

Commented [AAI14]:

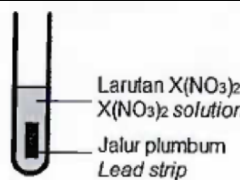
B 0 kepada +2  
0 to +2

D +1 kepada +2  
+1 to +2

**[Terengganu2021-32]**

32. Jadual 3 menunjukkan susunan radas dan pemerhatian untuk mengkaji eksperimen penyesaran logam daripada larutan garamnya.

The table 3 shows the arrangement of the apparatus and observations for studying the metal displacement experiment from its salt solution.

Susunan radas Set-up apparatus	Pemerhatian Observation
	<ul style="list-style-type: none"> <li>• Warna biru larutan X(NO<sub>3</sub>)<sub>2</sub> menjadi pudar The blue color of solution X(NO<sub>3</sub>)<sub>2</sub> fades</li> <li>• Kepingan plumbum menjadi nipis The lead strip become thinner</li> <li>• Pepejal perang terendap di dasar tabung uji Brown solids are deposited at the base of the test tube</li> </ul>

Antara yang berikut, manakah persamaan bagi tindak balas pengoksidaan dan penurunan yang berlaku berdasarkan jadual

Which of the following is oxidation and reduction reactions occurs based on the table

	Pengoksidaan/ Oxidation	Penurunan/ Reduction
A	$\text{Pb}^{2+} + 2\text{e} \rightarrow \text{Pb}$	$\text{Cu}^{2+} + 2\text{e} \rightarrow \text{Cu}$
B	$\text{Cu} \rightarrow \text{Cu}^{2+} + 2\text{e}$	$\text{Pb}^{2+} + 2\text{e} \rightarrow \text{Pb}$
<b>C</b>	$\text{Pb} \rightarrow \text{Pb}^{2+} + 2\text{e}$	$\text{Cu}^{2+} + 2\text{e} \rightarrow \text{Cu}$
D	$\text{Cu}^{2+} + 2\text{e} \rightarrow \text{Cu}$	$\text{Pb} \rightarrow \text{Pb}^{2+} + 2\text{e}$

Commented [AAI15]:

**[Selangor2021-Set01-01]**

20. Unsur M merupakan suatu logam dengan nombor pengoksidaan +1 dan boleh bertindak balas dengan oksigen untuk membentuk sebatian dengan formula  $M_2O$ . Apakah unsur yang mungkin bagi M?

Element M is a metal with oxidation number +1 and can react with oxygen to produce a compound with formula  $M_2O$ . What is the possible element of M?

I Natrium Sodium	II Argentum Silver	III Kalsium Calcium	IV Hidrogen Hydrogen
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<input checked="" type="checkbox"/> A I dan II I and II	<input type="checkbox"/> B I dan IV I and IV	<input type="checkbox"/> C II dan III II and III	<input type="checkbox"/> D III dan IV III and IV
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Commented [AA116]:

**[SBP2021-09]**

9. Antara logam berikut, yang manakah diekstrak dari bijihnya melalui tindak balas penurunan oleh karbon?

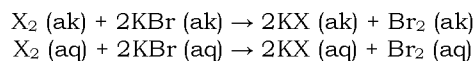
Which of the following metals is extracted from its ore through reduction reaction by carbon ?

A Merkuri Mercury	B Natrium Sodium	<input checked="" type="checkbox"/> C Plumbum Lead	D Argentum Silver
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Commented [AA117]:

**[Kelantan2021-21]**

21. Suatu tindak balas redoks boleh diwakili oleh persamaan berikut  
A redox reaction can be represented by the following equation



Unsur X berada di dalam Kumpulan 17 Jadual Berkala Unsur.  
Apakah yang diperhatikan jika unsur X digantikan dengan iodin?  
Element X is in Group 17 in the Periodic Table of Elements.  
What can be observed if element X is replaced with iodine?

A Larutan tak berwarna terhasil Colourless solution is produced	B Gas perang terhasil Brown gas is produced
--	--

C Warna perang larutan iodin dinyahwarnakan  
Brown colour of the iodine is decolourised

D Tiada perubahan dapat diperhatikan  
No change is observed

Commented [AA118]:

**[Kedah2021-Set02-24] F Bab 9 konsep penukaran Fe<sup>2+</sup> ke Fe<sup>3+</sup> F5B1**

24. Bahan manakah yang boleh digunakan untuk menukarkan Fe<sup>2+</sup> kepada Fe<sup>3+</sup>  
Which substance can be used to convert Fe<sup>2+</sup> to Fe<sup>3+</sup>

A Serbuk zink  
Zinc powder

C Gas sulfur dioksida  
Sulphur dioxide gas

B Air bromin  
Bromine water

D Larutan kalium iodida  
Potassium iodide solution

Commented [AAI19]:

**[Melaka2021-12]**

12. Larutan ion Fe<sup>3+</sup> boleh ditukarkan kepada ion Fe<sup>2+</sup> dengan mencampurkan serbuk zink. Antara berikut, yang manakah dapat menggantikan serbuk zink dalam tindak balas ini?

Fe<sup>3+</sup> ion in solution can be converted to Fe<sup>2+</sup> ions by adding zinc powder. Which of the following can replace zinc powder in this reaction?

A Air bromin  
Bromine water

B Larutan kalium iodida  
Potassium iodide solution

Commented [AAI20]:

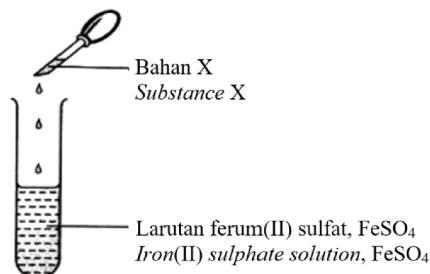
C Larutan kalium heksasianoferrat(II)  
Potassium hexacyanoferrate(II) solution

D Larutan kalium manganat(VII) berasid  
Acidified potassium manganate(VII) solution

**[Perlis2021-26] F5 Bab 01 TB Fe2**

26. Rajah 3 menunjukkan susunan radas suatu eksperimen untuk mengkaji pertukaran ion ferum(II), Fe<sup>2+</sup> kepada ion ferum(III), Fe<sup>3+</sup>.

Diagram 3 shows an apparatus set-up of an experiment to study the conversion of iron(II) ion, Fe<sup>2+</sup> to iron(III) ion, Fe<sup>3+</sup>.



Bahan manakah yang boleh digunakan sebagai bahan X?  
Which substance can be used as substance X?

A Air klorin, Cl<sub>2</sub>  
Chlorine water, Cl<sub>2</sub>

C Larutan kalium nitrat, KNO<sub>3</sub>  
Potassium nitrate, KNO<sub>3</sub> solution

Commented [AAI21]:

B Larutan kalium iodida, KI  
Potassium chloride, KI solution

D Larutan natrium klorida, NaCl  
Sodium chloride, NaCl solution



**[Negeri Sembilan2021-11] F5 Bab 01 TB Fe2**

11. Ion ferum(III) boleh diturunkan kepada ion ferum(II) oleh bahan X. Antara yang berikut, yang manakah bahan X?  
Iron(III) ions can be reduced to iron(II) ions by substance X. Which of the following is substance X?

- A Zink  
Zinc
- B Air bromin  
Bromine water
- C Kalium dikromat(VI) berasid  
Acidified potassium dichromate(VI)
- D Kalium manganat(VII) berasid  
Acidified potassium manganate(VII)

Commented [AAI22]:

**1.2 Keupayaan Elektrod Piawai**

**[Kedah2021-Set01-38]**

38. Jadual menunjukkan keupayaan elektrod piawai bagi ion logam. P, Q, R dan S bukan merupakan simbol sebenar unsur.  
Table shows standard electrode potential of metal ion. P, Q, R and S are not the actual symbols of elements.

Ion logam / logam Metal ion / metal	E° (V)
P <sup>+</sup> / P	+0.80
Q <sup>2+</sup> / Q	-0.76
R <sup>2+</sup> / R	-0.14
S <sup>2+</sup> / S	- 0.25

Berdasarkan maklumat di atas, yang manakah susunan yang betul mengikut urutan menaik kekuatan agen pengoksidaan?  
Based on the above information, which of the following is the correct order of increasing strength of oxidising agent?

- A P,Q,R,S
- B Q,S,R,P
- C R<sup>2+</sup>,S<sup>2+</sup>,Q<sup>2+</sup>,P<sup>+</sup>
- D Q<sup>2+</sup>,S<sup>2+</sup>,R<sup>2+</sup>,P<sup>+</sup>

Commented [AAI23]:

**[Selangor2021-Set02-23]**

23. Jadual 4 menunjukkan nilai keupayaan elektrod piawai, E° bagi argentum, kuprum, ferum dan plumbum.  
Table 4 shows standard electrode potential values, E° for silver, copper, iron and lead.

Set Set	Tindak balas sel setengah Half-cell reaction	E° / V
I	Ag <sup>+</sup> (ak/aq) + e → Ag (p/s)	+ 0.87
II	Cu <sup>2+</sup> (ak/aq) + 2e → Cu (p/s)	+ 0.34
III	Fe <sup>2+</sup> (ak/aq) + 2e → Fe (p/s)	-0.44
IV	Pb <sup>2+</sup> (ak/aq) + 2e → Pb (p/s)	-0.13

Pasangan keupayaan elektrod piawai yang manakah digunakan sebagai sel setengah untuk menghasilkan voltan yang paling tinggi?  
Which pair of these standard electrode potential is used as a half-cell that produces the highest voltage?

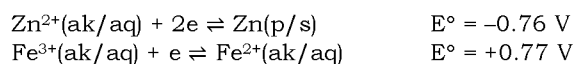
- A 1 dan 11  
I and II
- B I dan IV  
I and IV
- C II dan III  
II and III
- D I dan III  
I and III

Commented [AAI24]:

**[Perlis2021-34]**

34. Nilai keupayaan elektrod piawai,  $E^\circ$  bagi tindak balas sel setengah diberikan seperti di bawah.

The standard electrode potential,  $E^\circ$  for half-cell equations are given below.



Apakah yang dapat disimpulkan daripada maklumat yang diberikan?  
What can be deduced from the given information?

A Nombor pengoksidaan bagi ferum, Fe meningkat dari +2 kepada +3  
The oxidation for ferum, Fe increases from +2 to +3

B Ion ferum(III),  $\text{Fe}^{3+}$  bertindak sebagai agen penurunan  
Iron(III) ion,  $\text{Fe}^{3+}$  act as reducing agent

C Ion zink,  $\text{Zn}^{2+}$  lebih mudah menerima elektron  
Zinc ion,  $\text{Zn}^{2+}$  is easier to receive electron

D Atom zink, Zn mengalami pengoksidaan  
Zinc atom, Zn undergoes oxidation

Commented [AAI25]:

**1.3 sel kimia**

**[Kedah2021-Set02-38]**

38 .Suatu sel elektrokimia terdiri daripada sel-sel setengah yang berikut.  
An Electrochemical cell is made up of the following half cells.

Sel setengah Half cells	$E^\circ$
$\text{Ni}^{2+} / \text{Ni}$	-0.25
$\text{Fe}^{2+} / \text{Fe}$	-0.44

Pernyataan yang manakah benar berdasarkan jadual di atas ?  
Which statement is true based on the above table ?

A Pengoksidaan berlaku di elektrod Ni  
Oxidation occurs at the Ni electrode

B Pengoksidaan berlaku di elektrod Fe  
Oxidation occurs at the Fe electrode

Commented [AAI26]:

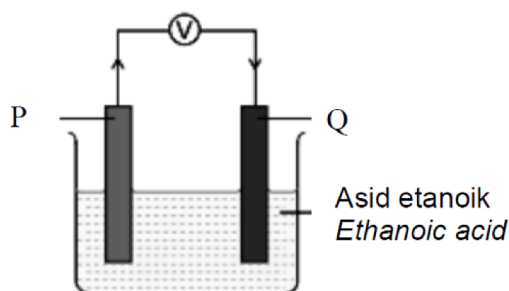
C Ni bertindak sebagai agen penurunan  
Ni act as an reducing agent

D Fe bertindak sebagai agen pengoksidaan  
Fe act as a oxidising agent

**[Melaka2021-35]**

35. Rajah 11 menunjukkan suatu sel kimia dan Jadual 4 menunjukkan nilai keupayaan elektrod piawai sel setengah beberapa logam.

Diagram 11 shows a chemical cell and Table 4 shows standard electrode potential values of half-cells for some metals.



Tindak balas sel setengah Half-cell equations	$E^\circ / V$ (298 K)
$Zn^{2+}(aq) + 2e^- \rightleftharpoons Zn(s)$	-0.76
$Cu^{2+}(aq) + 2e^- \rightleftharpoons Cu(s)$	+0.34
$Ni^{2+}(aq) + 2e^- \rightleftharpoons Ni(s)$	-0.25

Berdasarkan Rajah 11 dan nilai  $E^\circ$  dalam Jadual 4, pasangan manakah yang betul?

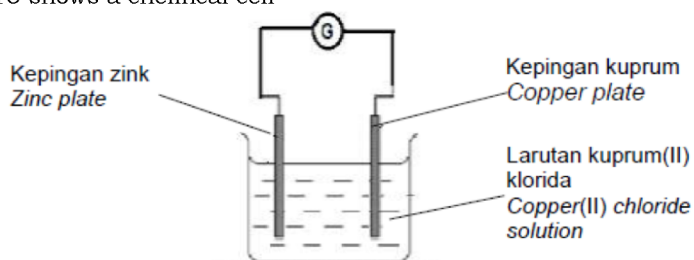
Based on the Diagram 11 and  $E^\circ$  values in Table 4, which pair is matched correctly?

	P	Q
A	Zn	Cu
B	Cu	Ni
C	Ni	Zn

Commented [AAI27]:

**[Kelantan2021-36]**

36. Rajah 13 menunjukkan satu sel kimia  
Diagram 13 shows a chemical cell



Bahan manakah yang mengalami pengoksidaan dan penurunan?  
Which substances undergo oxidation and reduction?

[  $E^\circ$  bagi sel setengah ;  $Zn^{2+} (ak) + 2e \rightarrow Zn(p)$ ,  $E^\circ = - 0.76V$  ]  
 [  $E^\circ$  bagi sel setengah :  $Cu^{2+} (ak) + 2e \rightarrow Cu(p)$  ,  $E^\circ = + 0.34V$  ]

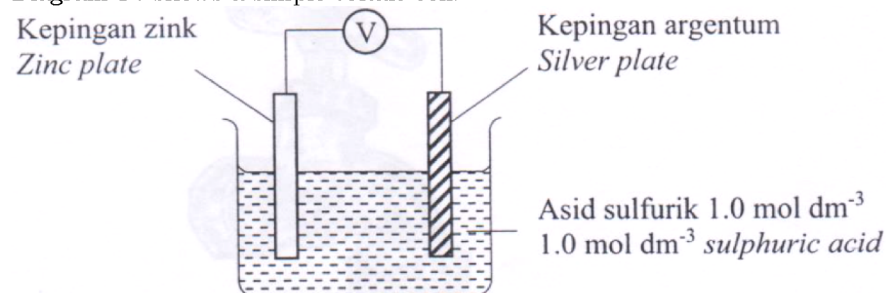
	Pengoksidaan/ Oxidation	Penurunan/ Reduction
A	Kuprum/ Copper	Ion Kuprum(II)/ Copper(II) ion
B	Kuprum/Copper	Ion hidrogen/ Hydrogen ion
<b>C</b>	Zink/ Zinc	Ion Kuprum(II)/ Copper(II) ion
D	Zink/ Zinc	Ion hidrogen/Hydrogen ion

Commented [AAI28]:

**[Negeri Sembilan 2021-39]**

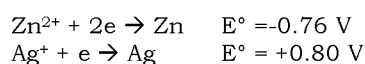
39. Rajah 14 menunjukkan satu sel kimia ringkas.

Diagram 14 shows a simple voltaic cell.



Diberi nilai keupayaan elektrod piawai,  $E^\circ$  bagi dua sel setengah adalah seperti berikut:

Given that standard electrode potential,  $E^\circ$  values of two half-cell as below.



Berapakah nilai voltan bagi sel ini?  
 What is the voltage value for the cell?

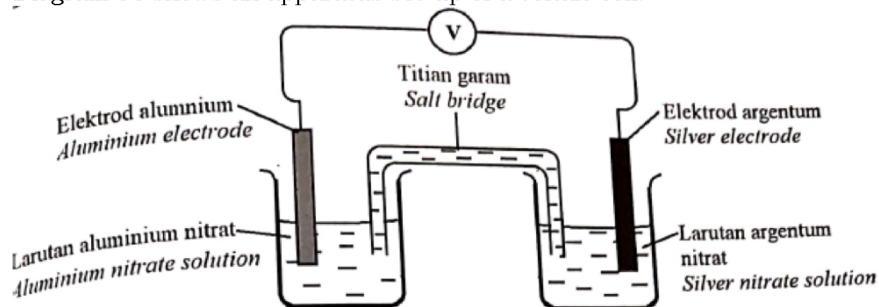
- A +0.04 V      B +0.84 V      **C +1.56 V**      D +2.36 V

Commented [AAI29]:

**[SBP2021-36]**

36. Rajah 36 menunjukkan susunan radas bagi satu Sel kimia.

Diagram 36 shows an apparatus set-up of a voltaic cell.



Jadual 36 menunjukkan nilai keupayaan elektrod piawai,  $E^\circ$  bagi beberapa sel setengah.

Table 36 shows the standard electrode potential values,  $E^\circ$  for some half-cells.

Sel setengah Half-cell	Nilai $E^\circ$ (V) $E^\circ$ value (V)
$\text{Al}^{3+} + 3\text{e} \rightarrow \text{Al}$	-1.66
$\text{Ag}^+ + \text{e} \rightarrow \text{Ag}$	+0.80

Apakah notasi sel bagi sel tersebut? What is the cell notation for the ?

A  $\text{Al}^{3+}(\text{ak}, 1.0 \text{ mol dm}^{-3}) \mid \text{Al}(\text{p}) \parallel \text{Ag}(\text{p}) \mid \text{Ag}^+(\text{ak}, 1.0 \text{ mol dm}^{-3})$   
 $\text{Al}^{3+}(\text{aq}, 1.0 \text{ mol dm}^{-3}) \mid \text{Al}(\text{s}) \parallel \text{Ag}(\text{s}) \mid \text{Ag}^+(\text{aq}, 1.0 \text{ mol dm}^{-3})$

**B**  $\text{Al}(\text{p}) \mid \text{Al}^{3+}(\text{ak}, 1.0 \text{ mol dm}^{-3}) \parallel \text{Ag}^+(\text{ak}, 1.0 \text{ mol dm}^{-3}) \mid \text{Ag}(\text{p})$   
 $\text{Al}(\text{s}) \mid \text{Al}^{3+}(\text{aq}, 1.0 \text{ mol dm}^{-3}) \parallel \text{Ag}^+(\text{aq}, 1.0 \text{ mol dm}^{-3}) \mid \text{Ag}(\text{s})$

C  $\text{Ag}^+(\text{ak}, 1.0 \text{ mol dm}^{-3}) \mid \text{Ag}(\text{p}) \parallel \text{Al}(\text{p}) \mid \text{Al}^{3+}(\text{ak}, 1.0 \text{ mol dm}^{-3})$   
 $\text{Ag}^+(\text{aq}, 1.0 \text{ mol dm}^{-3}) \mid \text{Ag}(\text{s}) \parallel \text{Al}(\text{s}) \mid \text{Al}^{3+}(\text{aq}, 1.0 \text{ mol dm}^{-3})$

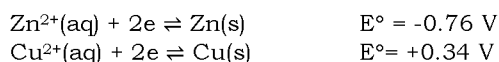
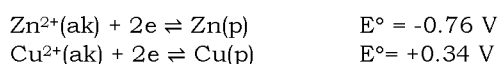
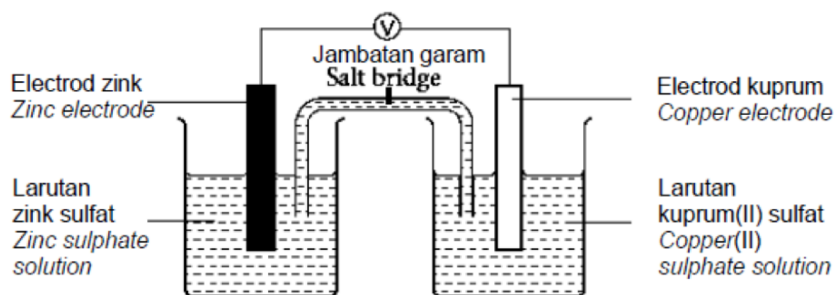
D  $\text{Ag}(\text{p}) \mid \text{Ag}^+(\text{ak}, 1.0 \text{ mol dm}^{-3}) \parallel \text{Al}^{3+}(\text{ak}, 1.0 \text{ mol dm}^{-3}) \mid \text{Al}(\text{p})$   
 $\text{Ag}(\text{s}) \mid \text{Ag}^+(\text{aq}, 1.0 \text{ mol dm}^{-3}) \parallel \text{Al}^{3+}(\text{aq}, 1.0 \text{ mol dm}^{-3}) \mid \text{Al}(\text{s})$

Commented [AAI30]:

**[Kedah2021-Set01-14]**

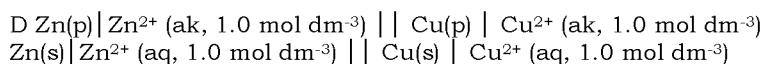
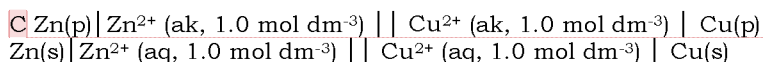
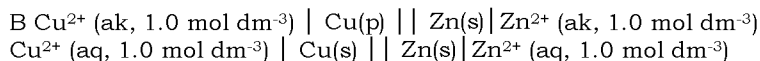
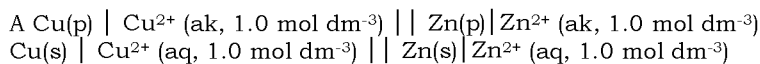
14. Rajah menunjukkan susunan radas bagi sel Daniell dan nilai  $E^\circ$  bagi dua sel setengah.

Diagram shows the apparatus set-up of a Daniell Cell and  $E^\circ$  value for two half-cells.



Antara berikut yang manakah notasi sel bagi sel kimia tersebut?

Which of the following is cell notation of the chemical cell?



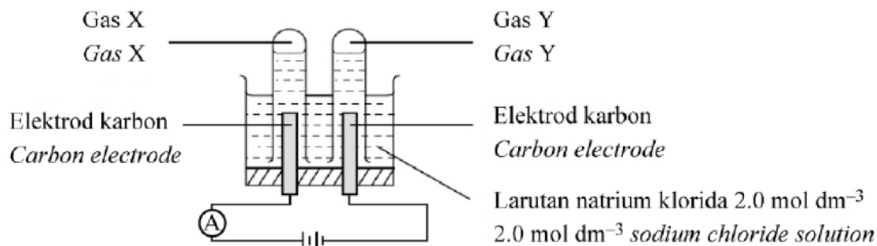
Commented [AAI31]:

**1.4 Sel Elektrolisis**

**[Selangor2021-Set02-38]**

38. Rajah 16 menunjukkan susunan radas untuk mengkaji elektrolisis larutan natrium klorida menggunakan elektrod karbon.

Diagram 16 shows the set-up of the apparatus to study the electrolysis of sodium chloride.



Namakan gas X dan gas Y? / Name the gas X and gas Y?

	Gas X	Gas Y
A	Gas klorin/ Chlorine gas	Gas hidrogen/ Hydrogen gas
B	Gas oksigen/ Oxygen gas	Gas hidrogen /Hydrogen gas
C	Gas hidrogen/ Hydrogen gas	Gas klorin/ Chlorine gas
D	Gas hidrogen/ Hydrogen gas	Gas oksigen/ Oxygen gas

Commented [AAI32]:

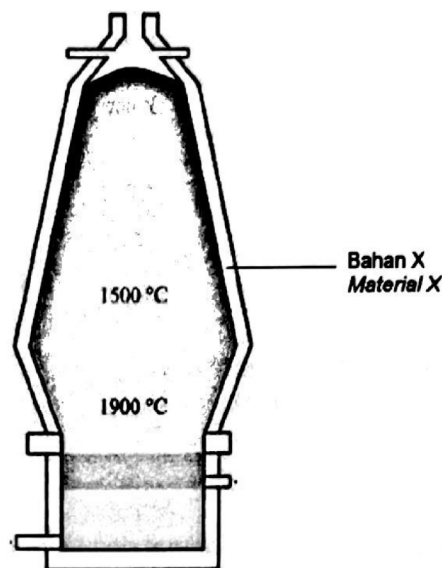
### 1.5 Pengekstrakan Logam Daripada Bijihnya

[Johor2021-19]

19. Rajah 10 menunjukkan relau bagas dan suhu di dalamnya semasa proses pengekstrakan bijih besi. Diagram 10 shows a blast furnace and its temperature during extraction of iron ore.

Apakah sifat bahan X yang membuatnya sesuai untuk digunakan sebagai lapisan dalam relau bagas?

What is the property of material X that make it suitable to be used in the lining of blast furnace?



A Penebat haba  
Heat insulator

B Keras dan kuat  
Hard and strong

C Penebat elektrik  
Electrical insulator




D Lengai terhadap bahan kimia  
Chemically inert

### 1.6 Pengaratan

#### [Negeri Sembilan 2021-26]

26. Jadual 3 menunjukkan susunan radas untuk mengkaji kesan logam X, Y dan Z ke atas pengaratan paku besi.

Table 3 shows the apparatus set-up to investigate the effect of metals X, Y and Z on the rusting of iron.

	I	II	III
	Agar-agar panas dengan kalium heksasianoferrat(III) dan fenolftalein Hot jelly solution with potassium hexacyanoferrate(III) and phenolphthalein		
Eksperimen Experiment	 Paku besi dililit dengan logam X Iron nail coiled with metal X	 Paku besi dililit dengan logam Y Iron nail coiled with metal Y	 Paku besi dililit dengan logam Z Iron nail coiled with metal Z
Pemerhatian Observation	Banyak tompok biru A lot of blue spots	Tompok merah jambu Terbentuk Pink spots are formed	Sedikit tompok biru Small amount of blue

Berdasarkan eksperimen itu, susunan logam yang manakah mengikut tertib keelektropositifan menurun?

Based on the experiment, which arrangement of metals is in descending order of electro positivity?

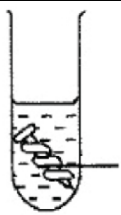
- A Y, Fe, Z, X      B Fe, X, Y, Z      C Z, X, Y, Fe      D Y, Fe, X, Z

Commented [AAI33]:


#### [Selangor 2021-Set01-01]

38. Jadual 2 menunjukkan pemerhatian eksperimen untuk mengkaji kesan logam ke atas pengaratan besi.

Table 2 shows the observation for an experiment to investigate the effect of metals on the rusting of iron.

Tabung uji Test tube	Susunan radas Set-up of apparatus	Pemerhatian Observation
P	 Paku besi dililit dengan logam X Iron nail is coiled with metal X	Tompok merah jambu terbentuk Pink spot is formed



q		Tompok biru jambu terbentuk Blue spot is formed
---	---	--

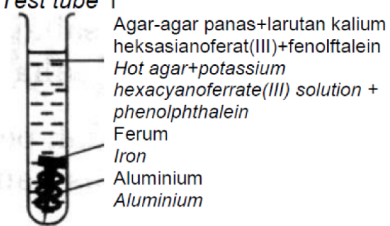
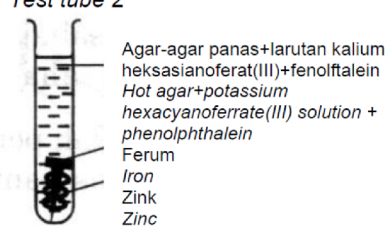
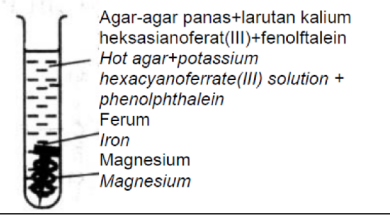
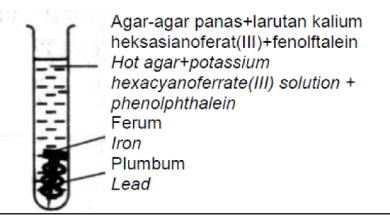
Berdasarkan pemerhatian, susun besi, logam X dan logam Y mengikut tertib menaik keelektropositifan.  
 Based on the observation, arrange iron, metal X and metal Y in ascending order of electropositivity.

- A X, besi, Y                      **B** Y, besi, X                      C Besi, X, Y                      D Besi, Y, X  
 X, iron, Y                      Y, iron, X                      Iron, X, Y                      Iron, Y, X

Commented [AAI34]:

**[Melaka2021-23]**

23. Rajah 6 menunjukkan pasangan logam dalam tabung uji berlainan.  
 Diagram 6 shows four pairs of metals in different test tubes.

<p><b>Tabung uji 1</b> <i>Test tube 1</i></p>  <p>Agar-agar panas+larutan kalium heksasianoferat(III)+fenolftalein  <i>Hot agar+potassium hexacyanoferrate(III) solution + phenolphthalein</i>                  Ferum  <i>Iron</i>                  Aluminium  <i>Aluminium</i></p>	<p><b>Tabung uji 2</b> <i>Test tube 2</i></p>  <p>Agar-agar panas+larutan kalium heksasianoferat(III)+fenolftalein  <i>Hot agar+potassium hexacyanoferrate(III) solution + phenolphthalein</i>                  Ferum  <i>Iron</i>                  Zink  <i>Zinc</i></p>
<p><b>Tabung uji 3</b> <i>Test tube 3</i></p>  <p>Agar-agar panas+larutan kalium heksasianoferat(III)+fenolftalein  <i>Hot agar+potassium hexacyanoferrate(III) solution + phenolphthalein</i>                  Ferum  <i>Iron</i>                  Magnesium  <i>Magnesium</i></p>	<p><b>Tabung uji 4</b> <i>Test tube 4</i></p>  <p>Agar-agar panas+larutan kalium heksasianoferat(III)+fenolftalein  <i>Hot agar+potassium hexacyanoferrate(III) solution + phenolphthalein</i>                  Ferum  <i>Iron</i>                  Plumbum  <i>Lead</i></p>

Selepas satu hari, larutan dalam tabung uji yang manakah berwarna biru?  
 After one day, in which test tube is the solution blue?

- A Tabung uji 1    C Tabung uji 3  
 Test tube 1    Test tube 3  
 B Tabung uji 2    **D** Tabung uji 4  
 Test tube 2    Test tube 4

Commented [AAI35]:

## Bab 2.0 Sebatian Karbon

### 2.1 jenis-jenis sebatian karbon

[Selangor2021-Set01-01]

33. Antara berikut yang manakah sebatian bukan hidrokarbon?  
Which of the following is not a hydrocarbon compound?

- A Alkana  
Alkane
- B Alkena  
Alkene
- C Alkuna  
Alkyne
- D Alkohol  
Alcohol

Commented [AAI36]:

[SBP2021-13]

13 Antara bahan berikut, yang manakah sebatian organik?  
Which of the following substances is an organic compound?

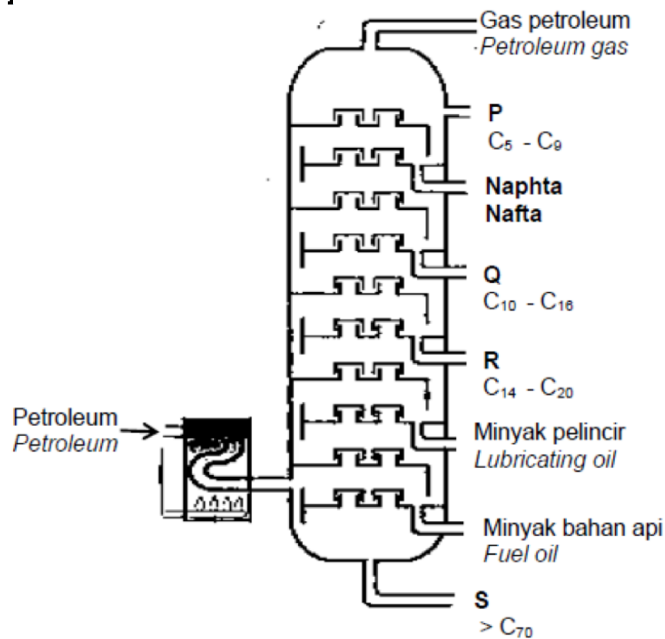
- A Etil propanoat  
Ethyl propanoate
- C Kalsium karbonat  
Calcium carbonate
- B Tungsten karbida  
Tungsten carbide
- D Carbon monoksida  
Carbon monoxide

Commented [AAI37]:

[Kedah2021-Set01-32]

32. Rajah menunjukkan penyulingan berperingkat bagi petroleum.  
Diagram shows the fractional distillation of petroleum.

Antara berikut yang manakah digunakan sebagai bahan api untuk kenderaan berat seperti bas dan lori?  
Which of the following is used as fuel for heavy vehicles such as buses and lorries?



- A P  
B Q  
 C R  
D S

Commented [AAI38]:

**[Perlis2021-14]**

14. Petroleum terdiri daripada hidrokarbon. Bagaimanakah hidrokarbon ini diasingkan?  
Petroleum consists of hydrocarbons. How are these hydrocarbons separated?

A Melalui proses peleburan dan kondensasi.  
Through melting and condensation processes.

B Melalui proses pendidihan dan penyulingan.  
Through boiling and distillation processes.

**C** Melalui proses penyulingan berperingkat dan peretakan.  
Through fractional distillation and cracking processes.

Commented [AAI39]:

**2.2 Siri Homolog**

**[Melaka2021-15] F5 bab 2 2.1**

15. Antara yang berikut, yang manakah hidrokarbon tepu?  
Which of the following is a saturated hydrocarbon?

**A** Alkana  
Alkane

B Alkena  
Alkene

C Alkohol  
Alcohol

D Asid  
karboksilik  
Carboxylic acid

Commented [AAI40]:

**[Kedah2021-Set02-15]**

15. Antara berikut yang manakah formula struktur bagi hidrokarbon tak tepu?  
Which of the following is the structural formula of an unsaturated hydrocarbon?

A	$  \begin{array}{cccc}  & \text{H} & \text{H} & \text{H} & \text{H} \\  &   &   &   &   \\  \text{H} & -\text{C} & -\text{C} & -\text{C} & -\text{C} & -\text{H} \\  &   &   &   &   \\  & \text{H} & \text{H} & \text{H} & \text{H}  \end{array}  $	C	$  \begin{array}{cccc}  & \text{H} & \text{H} & \text{H} & \text{O} \\  &   &   &   &    \\  \text{H} & -\text{C} & -\text{C} & -\text{C} & -\text{C} & -\text{OH} \\  &   &   &   & \\  & \text{H} & \text{H} & \text{H} &  \end{array}  $
B	$  \begin{array}{cccc}  & \text{H} & \text{H} & \text{H} & \text{H} \\  &   &   &   &   \\  \text{H} & -\text{C} & -\text{C} & -\text{C} & =\text{C} & -\text{H} \\  &   &   & & \\  & \text{Cl} & \text{H} & &  \end{array}  $	<b>D</b>	$  \begin{array}{cccc}  & \text{H} & \text{H} & \text{H} & \text{H} \\  &   &   &   &   \\  \text{H} & -\text{C} & =\text{C} & -\text{C} & -\text{C} & -\text{H} \\  & & &   &   \\  & & & \text{H} & \text{H}  \end{array}  $

Commented [AAI41]:

**[Melaka2021-25]**

25. Which of the following is the structural formula of an unsaturated hydrocarbon?

Antara berikut yang manakah formula struktur hidrokarbon tak tepu?

A	$\begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \\   \quad   \quad   \\ \text{H} - \text{C} = \text{C} - \text{C} - \text{H} \\   \\ \text{H} \end{array}$	C	$\begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \\   \quad   \quad   \\ \text{H} - \text{C} - \text{C} = \text{C} - \text{H} \\   \\ \text{Cl} \end{array}$
B	$\begin{array}{c} \text{H} \quad \text{H} \quad \text{O} \\   \quad   \quad    \\ \text{H} - \text{C} - \text{C} - \text{C} - \text{OH} \\   \quad   \\ \text{H} \quad \text{H} \end{array}$	D	$\begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \\   \quad   \quad   \\ \text{H} - \text{C} - \text{C} - \text{C} - \text{H} \\   \quad   \quad   \\ \text{H} \quad \text{H} \quad \text{H} \end{array}$

Commented [AAI42]:

**[Selangor2021-Set01-01]**

12. Antara berikut yang manakah merupakan formula molekul bagi propanol?  
Which of the following is the molecular formula for propanol?

A  $\text{C}_3\text{H}_6$

B  $\text{C}_3\text{H}_8$

C  $\text{C}_3\text{H}_8\text{O}$

D  $\text{C}_3\text{H}_8\text{O}_2$

Commented [AAI43]:

**[Selangor2021-Set02-33]**

33. Maklumat berikut adalah tentang sebatian organik P.  
The following information is about organic compound P.

- Mempunyai 3 atom karbon  
Has 3 carbon atoms
- Bertindak balas dengan zink untuk menghasilkan gas hidrogen  
Reacts with zinc to produce hydrogen gas
- Larut dalam air  
Soluble in water

Apakah nama sebatian organik P?

What is the name of the organic compound P?

A Propena  
Propene

B Propanol  
Propanol

C Propana  
Propane

D Asid  
propanoik  
Propanoic acid

Commented [AAI44]:

**2.3 Sifat Kimia Dan Saling Pertukaran Antara Siri Homolog**

**[Selangor2021-Set02-12] F Bab 10 karbon F5b2 alkena**

12. Jadual 3 menunjukkan keadaan fizikal bagi dua alkena.  
Table 3 shows the physical state of two alkenes.

Alkena Alkene	Keadaan fizikal pada suhu bilik Physical state at room temperature
Butena Butene	Gas
Heksena Hexene	Cecair Liquid

Butena dan heksena merupakan ahli dalam siri homolog alkena.  
Pernyataan yang manakah menerangkan dengan tepat perbezaan keadaan fizikal pada suhu bilik?  
Butene and hexene are members in the homologous series of alkenes.  
Which statement accurately describes the difference of physical states at room temperature?

A Daya tarikan antara molekul heksena adalah lebih kuat daripada daya tarikan antara molekul butena

The attraction forces between hexene molecules are stronger than attraction forces between butene molecules

B Saiz molekul heksena adalah lebih besar daripada molekul butena  
The size of hexene molecule is bigger than butene molecule

C Molekul butena menyerap kurang tenaga haba berbanding dengan molekul heksena

Butene molecules absorb less heat energy compared to the hexene molecules

D Kurang tenaga haba diperlukan untuk mengatasi daya tarikan yang lebih lemah antara molekul heksena

Less heat energy is required to overcome the weaker attraction forces between hexene molecules

Commented [AAI45]:

**[Kelantan2021-22]**

22. Etena dapat dibezakan daripada etana kerana etena dapat  
Ethene can be differentiate from ethane because ethene can

	Etena Ethene	Etana Ethane
A	Larut dalam air Soluble in water	Tidak larut dalam air Insoluble in water
B	Tidak terbakar dalam udara Does not burn in the air	Terbakar dalam udara burning in the air
C	Bertindak balas dengan alkohol React with alcohol to produce ester	Tidak bertindak balas dengan alkohol Does not react with alcohol to produce ester
D	Melunturkan warna perang air bromin Bleaching the brown colour of bromine water	Warna perang air bromin tidak dilunturkan The brown color of bromine water is not bleached

Commented [AAI46]:

**[Negeri Sembilan2021-12]**

12. Antara yang berikut, bahan manakah yang digunakan untuk membezakan antara heksana dan heksena?

Which substance is used to differentiate between hexane and hexene?

- A Air kapur  
Lime water
- B Air bromin  
Bromine water
- C Fenolftalein  
Phenolphthalein
- D Asid fosforik  
Phosphoric acid

Commented [AAI47]:

**[Negeri Sembilan2021-40]**

40. Jadual 4 menunjukkan maklumat bagi dua sebatian organik R dan S. Table 4 shows the information of two organic compounds R and S.

Sebatian organik Organic compounds	Information Maklumat
R	<ul style="list-style-type: none"> <li>• Tidak larut dalam air Insoluble in water</li> <li>• Menyahwarnakan warna perang air bromin Decolourises brown colour of bromine</li> </ul>
S	<ul style="list-style-type: none"> <li>• Larut campur dengan air dalam semua bahagian Miscible with water in all proportions</li> <li>• Terbakar dengan nyalaan biru menghasilkan karbon dioksida dan air Burns with blue flame to produce carbon dioxide and water</li> </ul>

Berdasarkan maklumat yang diberi, formula struktur manakah mempunyai ciri yang sama seperti di atas?

Based on the information given, which structural formula has the same characteristics as a above?

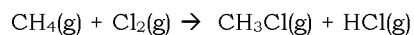
	R	S
A		
B		

Commented [AAI48]:

C	$  \begin{array}{c}  \text{H} \quad \text{H} \quad \text{H} \\    \quad   \quad   \\  \text{H}-\text{C}-\text{C}-\text{C}-\text{H} \\    \quad   \quad   \\  \text{H} \quad \text{H} \quad \text{H}  \end{array}  $	$  \begin{array}{c}  \text{H} \quad \text{H} \quad \text{H} \\    \quad   \quad   \\  \text{H}-\text{C}-\text{C}-\text{C}-\text{O}-\text{H} \\    \quad   \quad   \\  \text{H} \quad \text{H} \quad \text{H}  \end{array}  $
D	$  \begin{array}{c}  \text{H} \quad \text{H} \quad \text{H} \\    \quad   \quad   \\  \text{H}-\text{C}-\text{C}-\text{C}-\text{O}-\text{H} \\    \quad   \quad   \\  \text{H} \quad \text{H} \quad \text{H}  \end{array}  $	$  \begin{array}{c}  \text{H} \quad \text{H} \quad \text{H} \\    \quad   \quad   \\  \text{H}-\text{C}-\text{C}-\text{C}-\text{H} \\    \quad   \quad   \\  \text{H} \quad \text{H} \quad \text{H}  \end{array}  $

**[Perlis2021-19]**

19. Persamaan berikut mewakili tindak balas antara etana dengan gas klorin.  
The following chemical equation represents the reaction of ethane with chlorine gas.



Apakah nama tindak balas itu?/ What is the name of the reaction?

A Pembakaran  
Combustion

C Pempolimeran  
Polymerisation

B Penambahan  
Additional

D Penukargantian  
Substitution

Commented [AAI49]:

**[Johor2021-09]**

9. Antara pernyataan berikut, yang manakah benar mengenai alkuna?  
Which of the following statements is true about alkyne?

I Larut dalam pelarut organik  
Dissolve in organic solvent

II Merupakan hidrokarbon tepu  
Saturated hydrocarbon

III Tidak mengkonduksikan elektrik  
Cannot conduct electricity

IV Mempunyai takat didih yang rendah berbanding alkena  
Has lower boiling point than alkene

A I dan II/ I and II  
B I dan III/ I and III

C II dan IV/ II and IV  
D III dan IV/ III and IV

**[Kelantan2021-25]**

25. Sebatian P mempunyai ciri-ciri seperti berikut:  
Compound P has the characteristics as follow:

- Sangat larut dalam air  
Very soluble in water
- Boleh disediakan daripada alkena  
Can be prepared from an alkene

Apakah kemungkinan sebatian P? / What is probably compound P?

- A  $C_2H_5COOCH_3$     B  $CH_3COONa$     C  $C_3H_7COOH$     **D  $C_2H_5OH$**

Commented [AAI50]:

**[Melaka2021-14]**

14. Apakah hasil-hasil yang terbentuk apabila etanol terbakar dengan lengkap dalam udara berlebihan?  
What are the products formed when ethanol burns completely in excess air?

**A** Air dan gas karbon dioksida  
Water and carbon dioxide gas

Commented [AAI51]:

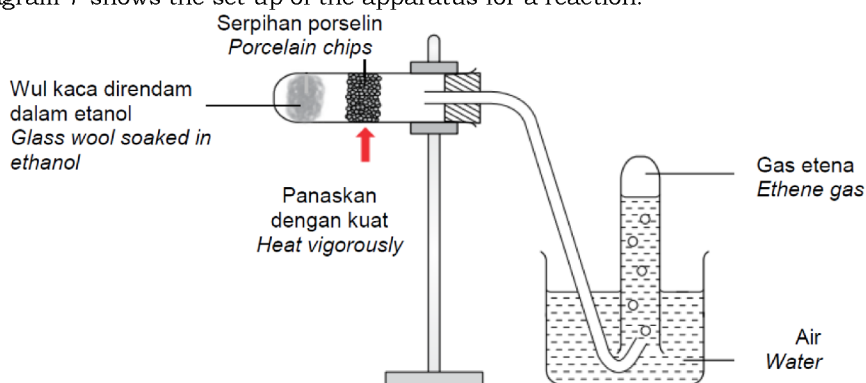
B Air, karbon dan gas karbon dioksida  
Water, carbon and carbon dioxide gas

C Air, gas karbon monoksida dan gas karbon dioksida  
Water, carbon monoxide and carbon dioxide

D Air, karbon, gas karbon monoksida dan gas karbon dioksida  
water, carbon, carbon monoxide gas and carbon dioxide gas

**[Melaka2021-24]**

24. Rajah 7 menunjukkan susunan radas bagi satu tindak balas.  
Diagram 7 shows the set up of the apparatus for a reaction.



Apakah tindak balas itu? / What is the reaction?

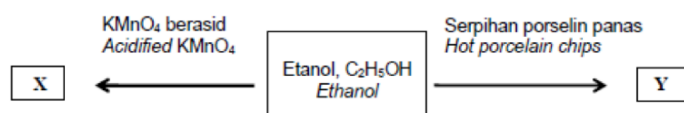
- A Pengesteran/ Esterification    **C** Pendehidratan/ Dehydration  
B Peretakan/ Cracking    D Pengoksidaan/ Oxidation

Commented [AAI52]:



**[Kedah2021-Set02-27]**

27. Rajah berikut menunjukkan tindak balas kimia bagi etanol.  
Diagram shows the chemical reactions of ethanol.



Antara berikut yang manakah merupakan formula struktur bagi sebatian X dan Y?

Which of the following is the structural formula of compound X and Y?

	X	Y
A	$\begin{array}{c} \text{O} \\    \\ \text{CH}_3 - \text{C} - \text{OH} \end{array}$	$\begin{array}{c} \text{H} \quad \text{H} \\   \quad   \\ \text{H} - \text{C} = \text{C} - \text{H} \end{array}$
B	$\begin{array}{c} \text{O} \\    \\ \text{CH}_3 - \text{CH}_2 - \text{C} - \text{OH} \end{array}$	$\begin{array}{c} \text{H} \quad \text{H} \\   \quad   \\ \text{H} - \text{C} = \text{C} - \text{H} \end{array}$
C	$\begin{array}{c} \text{O} \\    \\ \text{CH}_3 - \text{C} - \text{OH} \end{array}$	$\begin{array}{c} \text{H} \quad \text{H} \\   \quad   \\ \text{H} - \text{C} - \text{C} - \text{H} \\   \quad   \\ \text{H} \quad \text{H} \end{array}$
D	$\begin{array}{c} \text{O} \\    \\ \text{CH}_3 - \text{CH}_2 - \text{C} - \text{OH} \end{array}$	$\begin{array}{c} \text{H} \quad \text{H} \\   \quad   \\ \text{H} - \text{C} - \text{C} - \text{H} \\   \quad   \\ \text{H} \quad \text{H} \end{array}$

Commented [AAI53]:

**[Perlis2021-20]**

20. Antara yang berikut, yang manakah persamaan antara etena dan alkohol?  
Which of the following is the similarity between ethene and alcohol?

A Larut di dalam air  
Dissolve in water

B Menyahwarnakan air bromin, Br<sub>2</sub>  
Decolourise bromine water, Br<sub>2</sub>

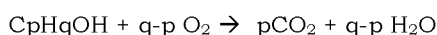
C Menyahwarnakan larutan kalium manganat(VII) berasid, KMnO<sub>4</sub>  
Decolourise acidified potassium manganate(VII), KMnO<sub>4</sub> solution

Commented [AAI54]:

D Menghasilkan nyalaan berjelaga apabila terbakar dengan oksigen berlebihan  
Produce sooty flame when burn in excess oxygen

**[Kedah2021-Set02-01]**

32. Persamaan berikut menunjukkan pembakaran lengkap bagi alkohol.  
The following equation represents the complete combustion of alcohol.



Apakah nilai bagi p dan q  
What is the value of p and q?

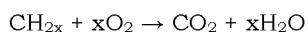
	p	q
A	1	3
<b>B</b>	2	5
C	3	7
D	4	9

Commented [AAI55]:

**[Kelantan2021-30]**

30. Pembakaran lengkap bagi satu hidrokarbon diwakili oleh persamaan yang berikut:

The complete combustion of a hydrocarbon is represented by the following equation:



Apakah nilai x?  
What is the value of x?

- A 5                      B 4                      C 3                      **D 2**

Commented [AAI56]:

**[Terengganu2021-33]**

33. Apabila 9.2 g etanol terbakar dengan lengkap di dalam oksigen berlebihan, gas karbon dioksida dan air dihasilkan, Kira isipadu gas karbon dioksida yang dibebaskan.

When 9.2 g of ethanol burns completely in excess oxygen, carbon dioxide gas and water are produced, Calculate the volume of carbon dioxide gas released.

[Jisim atom relatif/Relative atomic mass : H=1, C=12, O=16;

isipadu molar gas/ molar volume of gas = 24 dm<sup>3</sup> mol<sup>-1</sup> pada keadaan bilik/at room condition]

- A 4.8 dm<sup>3</sup>                      **B 9.6 dm<sup>3</sup>**                      C 48 dm<sup>3</sup>                      D 72 dm<sup>3</sup>

Commented [AAI57]:

**[SBP2021-34]**

34. 66.0 g gas propana, C<sub>3</sub>H<sub>8</sub> mengalami pembakaran lengkap dalam oksigen. Apakah isi padu gas karbon dioksida yang terhasil pada keadaan bilik?

[Jisim atom relatif :H=1,C=12,O=16;

Isi padu molar pada keadaan bilik = 24 dm<sup>3</sup> mol<sup>-1</sup>]

66.0 g of propane, C<sub>3</sub>H<sub>8</sub> gas undergoes complete combustion oxygen.

What is the volume of carbon dioxide gas produced at room?

[Relative atomic mass :H = 1,C = 12,O=16;

Molar volume at room conditions = 24 dm<sup>3</sup> mol<sup>-1</sup>]

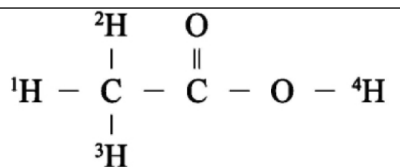
- A 33.6 dm<sup>3</sup>                      B 36.0 dm<sup>3</sup>                      C 100.8 dm<sup>3</sup>                      **D 108.0 dm<sup>3</sup>**

Commented [AAI58]:

**[Selangor2021-Set01-01]**

18. Rajah 5 menunjukkan formula struktur bagi asid etanoik.  
Diagram 5 shows the structural formula of ethanoic acid.

Antara berikut atom hidrogen yang manakah akan terlibat dalam tindak balas kimia?  
Which of the following hydrogen atom will be involved in a chemical reaction?



A  ${}^1\text{H}$

B  ${}^2\text{H}$

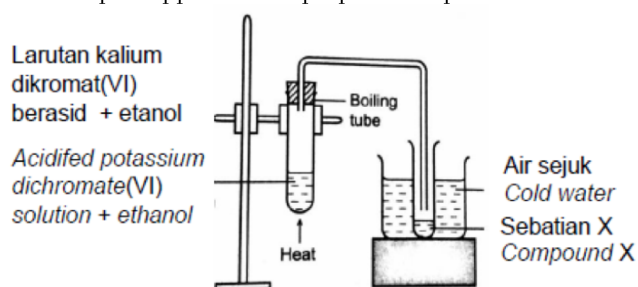
C  ${}^3\text{H}$

**D  ${}^4\text{H}$**

Commented [AAI59]:

**[Kedah2021-Set01-27]**

27. Rajah menunjukkan susunan radas untuk menyediakan sebatian X.  
Diagram shows set-up of apparatus to prepare compound X.



Antara yang berikut manakah yang benar tentang sebatian X?  
Which of the following statement is true about compound X?

I Mempunyai formula am  $\text{C}_n\text{H}_{2n}$   
Has general formula  $\text{C}_n\text{H}_{2n}$

II Mempunyai kumpulan berfungsi  $-\text{COOH}$   
Has functional group of  $-\text{COOH}$

III Bertindak balas dengan magnesium menghasilkan gas hidrogen  
Reacts with magnesium to produce hydrogen gas

IV Bertindak balas dengan hidrogen pada  $180\text{ }^\circ\text{C}$  dalam kehadiran nikel menghasilkan alkana  
Reacts with hydrogen at  $180\text{ }^\circ\text{C}$  in the presence of nickel to produce alkane

A I dan III  
I and III

**C II dan III**  
II and III

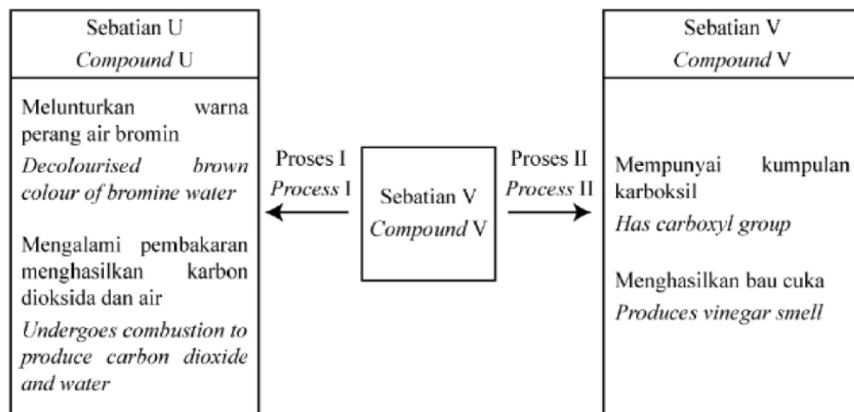
Commented [AAI60]:

B I dan IV  
I and IV

D II dan IV  
II and IV

**[Selangor2021-Set01-01]**

39. Rajah 13 menunjukkan dua proses melibatkan sebatian W.  
Diagram 13 shows two processes involving compound W.



Rajah 13  
Diagram 13

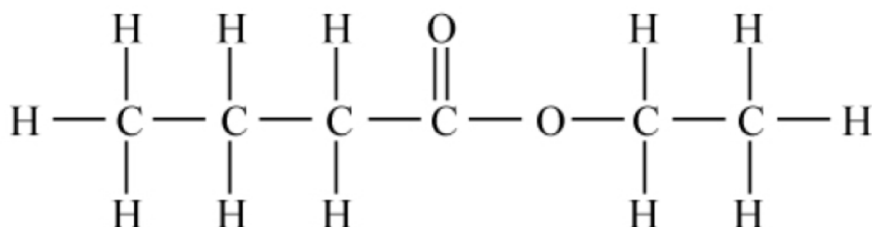
Formula struktur yang manakah yang mewakili sebatian W?  
Which structural formula represents compound W?

A	$\begin{array}{c} \text{H} \quad \text{H} \\   \quad   \\ \text{H}-\text{C}=\text{C}-\text{H} \end{array}$	C	$\begin{array}{c} \text{H} \quad \text{O} \\   \quad    \\ \text{H}-\text{C}-\text{C}-\text{OH} \\   \\ \text{H} \end{array}$
B	$\begin{array}{c} \text{H} \quad \text{H} \\   \quad   \\ \text{H}-\text{C}-\text{C}-\text{H} \\   \quad   \\ \text{H} \quad \text{H} \end{array}$	D	$\begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \\   \quad   \quad   \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{OH} \\   \quad   \quad   \\ \text{H} \quad \text{H} \quad \text{H} \end{array}$

Commented [AAI61]:

**[Selangor2021-Set02-18]**

18 Rajah 5 menunjukkan formula struktur yang mewakili satu bahan perisa makanan.  
Diagram 5 shows a structural formula which represents a food flavouring substance.



Antara yang berikut, yang manakah boleh digunakan untuk membuat perisa tersebut? Which of the following can be used to make the flavouring!

A Butanol dan asid etanoik  
Butanol and ethanoic acid

C Propanol dan asid etanoik  
Propanol and ethanoic acid

B Propanol dan asid propanoik  
Propanol and propanoic acid

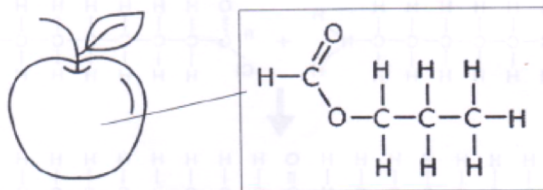
D Etanol dan asid butanoik  
Ethanol and butanoic acid

Commented [AAI62]:

**[Negeri Sembilan2021-27]**

27. Rajah 6 menunjukkan formula struktur suatu ester yang terkandung dalam epal.

Diagram 6 shows the structural formula of an ester contained in an apple.



Apakah nama ester tersebut mengikut sistem penamaan IUPAC?  
What is the name of the ester based on IUPAC system nomenclature?

A Metil butanoat  
Methyl butanoate

C Metil propanoat  
Methyl propanoate

B Butil metanoat  
Butyl methanoate

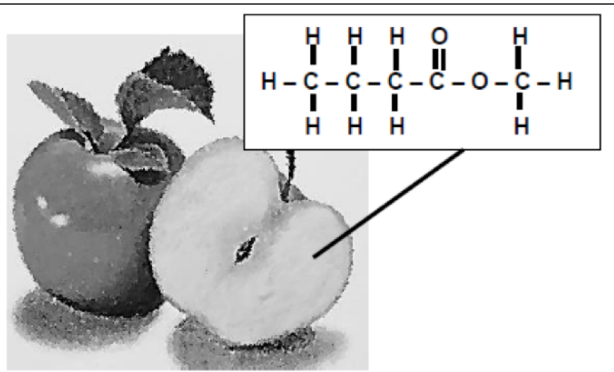
D Propil metanoat  
Propyl methanoate

Commented [AAI63]:

**[Kedah2021-Set01-15]**

15. Rajah menunjukkan formula struktur bagi ester yang menghasilkan bau wangi yang terdapat pada epal hijau.

Diagram shows the structural formula of ester that produces the fragrant smell found in green apple.



Alia hendak menyediakan ester tersebut di dalam makmal.  
Antara berikut yang manakah boleh digunakan untuk menyediakan ester itu?  
Alia wants to prepare the ester in laboratory.  
Which of the following can be used to prepare the ester?

A Asid butanoik dan metanol  
Butanoic acid and methanol

C Asid metanoik dan butanol  
Methanoic acid and butanol

B Asid butanoik dan butanol  
Butanoic acid and butanol

D Asid metanoik dan metanol  
Methanoic acid and methanol

Commented [AAI64]:

**[Terengganu2021-08]**

8. Antara berikut, yang manakah merupakan ahli dalam kumpulan ester? Which of the following are the members of esters?

I etil metanoat  
ethyl methanoate

III Asid propanoik  
Propanoic acid

II Asid butanoik  
Butanoic acid

IV metil pentanoate  
methyl pentanoate

A I dan II/ I and II

C III dan IV/ III and IV

B II dan III/ II and III

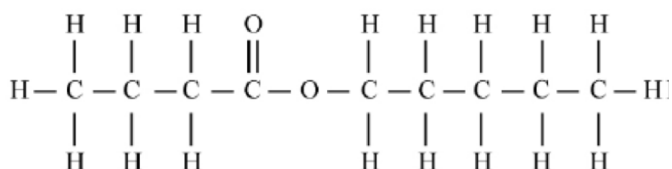
D I dan IV/ I and IV

Commented [AAI65]:

**[Selangor2021-Set01-01] F Bab 10 ester F5B2**

36. Rajah 12 menunjukkan formula struktur bagi suatu sebatian yang digunakan sebagai perisa pisang tiruan.

Diagram 12 shows a structural formula of a compound that is used as an artificial banana flavouring.



Apakah bahan tindak balas bagi menghasilkan sebatian ini?

What is the reactants used to produce this compound?

A Butanol + asid butanoik  
Butanol + butanoic acid

C Pentanol + asid butanoik  
Pentanol + butanoic acid

B Butanol + asid pentanoik  
Butanol + pentanoic acid

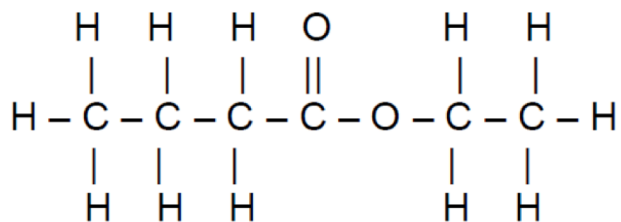
D Pentanol + asid pentanoik  
Pentanol + pentanoic acid

Commented [AAI66]:

**[Melaka2021-26]**

26. Rajah 8 menunjukkan formula struktur bagi suatu sebatian karbon.

Diagram 8 shows the structural formula of a carbon compound.



Sebatian ini terhasil daripada tindak balas antara

The compound is produced by the reaction between

A etanol dengan asid propanoik  
ethanol and propanoic acid

C propanol dengan asid etanoik  
propanol and ethanoic acid

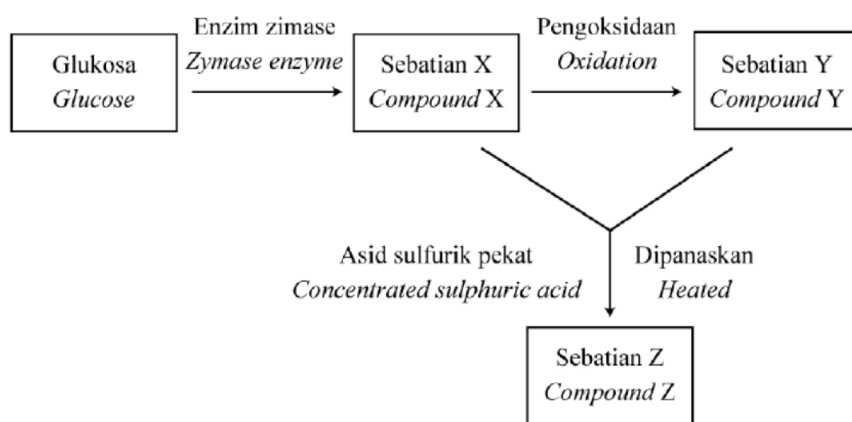
**B** etanol dengan asid butanoik  
ethanol and butanoic acid

D butanol dengan asid etanoik  
butanol and ethanoic acid

Commented [AAI67]:

**[Selangor2021-Set02-39]**

39. Rajah 17 menunjukkan penukaran sebatian X kepada sebatian Y. Sebatian X adalah cecair tanpa warna, mudah meruap dan larut di dalam air. Diagram 17 shows the conversion of compound X into compound Y. Compound X is a colourless liquid, volatile easily and soluble in water.



Tindak balas antara sebatian X dan sebatian Y untuk menghasilkan sebatian Z.

Apakah sebatian Z?

Reaction between compound X and compound Y to produce compound Z. What is compound Z?

A Etanol/ Ethanol

C Metil propanoat/ /Methyl propanoate

B Asid etanoik/ Ethanoic acid

**D** Etil etanoat/ Ethyl ethanoate

Commented [AAI68]:

**2.4 Isomer Dan Penamaan Mengikut Iupac**

**[Terengganu2021-20]**

20.  $C_4H_8$  ialah formula molekul bagi isomer M dan N.

Antara pernyataan berikut, yang manakah benar tentang M dan N?

$C_4H_8$  is the molecular formula for isomer M and N.

Which of the following statements is true about M and N?

A Sifat fizik yang sama  
Similar physical properties

C Formula struktur yang sama  
Similar structure formula

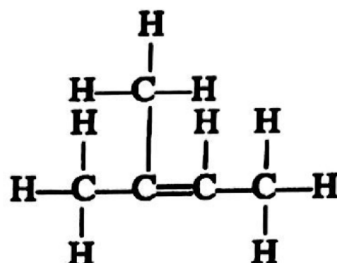
**B** Sifat kimia yang sama  
Similar chemical properties

D Jisim molekul relatif yang berbeza  
Different relative molecular masses

Commented [AAI69]:

**[Johor2021-20]**

20. Rajah 11 menunjukkan formula struktur bagi satu sebatian karbon. Diagram 11 shows the structural formula for a carbon compound.



Antara berikut, yang manakah merupakan penamaan IUPAC untuk sebatian itu?

Which of the following is the IUPAC nomenclature for the compound?

A 3-metilbut-2-ena  
3-methylbut-2-ene

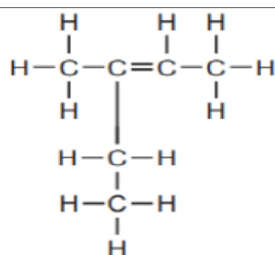
B 2-metilbut-1-ena  
2-methylbut-1-ene  
C 2-metilbut-2-ene

2-methylbut-2-ene

D 3-metilbut-3-ena  
3-methylbut-3-ene

**[Kelantan2021-19]**

19. Rajah 6 menunjukkan formula struktur bagi satu isomer alkena. Diagram 6 shows the structural formula of an isomer for an alkene.



Namakan isomer itu berdasarkan sistem penamaan IUPAC. Name the isomer according to the IUPAC nomenclature system.

A 2-metilbut-2-ena  
2-methylbut-2-ene

B 3-metilpent-2-ena  
3-methylpent-2-ene

C 3-metilpent-3-ena  
3-methylpent-3-ene

D 2,2-dimetilbut-2-ena  
2,2-dimethylbut-2-ene

Commented [AAI70]:

**[SBP2021-27]**

27. Antara berikut yang manakah isomer bagi butena? Which of the following are isomer for butene?

I		III	
II		IV	



- A I dan II                      B I dan II                       C II dan III                      D II dan IV  
I and II                      I and III                      II and III                      II and IV

Commented [AAI71]:

**[Selangor2021-Set02-36]**

36. Antara berikut, yang manakah isomer bagi sebatian yang mempunyai formula molekul  $C_4H_9OH$ ?

Which of the following are isomers of compound that has molecular formula of  $C_4H_9OH$ ?

- I 2-metilpropan-1-ol                      III 2-metilpropan-2-ol  
2-methylpropan-1-ol                      2-methylpropan-2-ol

- II Propan-2-ol                      IV 3-metilbutan-2-ol  
Propan-2-ol                      3-methylbutan-2-ol

- A I dan II                       B I dan III                      C II dan IV                      D III dan IV  
I and II                      I and III                      II and IV                      III and IV

Commented [AAI72]:

**Bab 3.0 Termokimia**

**3.1 Perubahan Haba Dalam Tindak Balas**

**[SBP2021-14]**

14. Antara proses berikut, yang manakah menyerap haba daripada persekitaran?  
Which of the following processes absorbs heat from surroundings?

- A Respirasi                      B Pengaratan                      C Pembakaran                       D Fotosintesis  
Respiration                      Rusting                      Combustion                      Photosynthesis

Commented [AAI73]:

**[Terengganu2021-09]**

9. Tindak balas manakah yang menyerap haba dari persekitaran?  
Which reaction absorbs heat from the surrounding?

A Zink ditambahkan ke dalam asid sulfurik  
Zinc is added into sulphuric acid

B Air ditambahkan kepada pepejal ammonium nitrat  
Water is added to solid ammonium nitrate

Commented [AAI74]:

C Air ditambahkan kepada pepejal natrium hidroksida  
Water is added to solid sodium hydroxide

D Zink ditambahkan ke dalam larutan kuprum(II) sulfat  
Zinc is added into copper(II) sulphate solution

**[Perlis2021-16]**

16. Antara yang berikut, yang manakah betul tentang tindak balas endotermik?  
Which of the following is correct for an endothermic reaction?

A Bekas menjadi panas.  
The container becomes hotter.

**B** Suhu campuran tindak balas menurun.  
The temperature of the mixture decreases.

C Tenaga haba dibebaskan ke persekitaran.  
Heat energy is released to the surroundings.

D Tenaga haba ditukar kepada tenaga kinetik.  
The heat energy is converted to kinetic energy.

Commented [AAI75]:

**[Johor2021-21]**

21. Antara yang berikut pernyataan manakah benar mengenai tindak balas endotermik?

Which of the following statements is true about endothermic reaction?

A Haba yang diserap dalam pemecahan ikatan adalah sama dengan haba yang dibebaskan dalam pembentukan ikatan  
Heat absorbed in breaking bond is equal to heat released in bond formation

B Jumlah kandungan tenaga bahan tindak balas adalah lebih tinggi daripada jumlah kandungan tenaga hasil tindak balas.  
Total energy content of reactants is higher than total energy content of products.

C Sedikit haba yang diserap atau dibebaskan dalam pemecahan ikatan dan pembentukan ikatan

A little heat is absorbed or released in bond breaking and bond formation

D Haba yang diserap dalam pemecahan ikatan adalah lebih tinggi daripada haba yang dibebaskan dalam pembentukan ikatan  
Heat absorbed in bond breaking is higher than heat released in bond formation

**[Negeri Sembilan2021-13]**

13. Antara yang berikut, zarah yang manakah menyerap tenaga haba apabila dilarutkan dalam air?

Which of the following particles absorb heat energy when dissolves in water?

A Natrium karbonat  
Sodium carbonate

C Kalium hidroksida  
Potassium hydroxide

B Magnesium sulfat  
Magnesium sulphate

**D** Ammonium klorida  
Ammonium chloride

Commented [AAI76]:

**[Selangor2021-Set01-06]**

6. Antara berikut yang manakah benar tentang tindak balas endotermik?  
Which of the following is true about an endothermic reaction?

A Bekas menjadi semakin panas  
The container becomes hot

B Nilai  $\Delta H$  mempunyai tanda negatif  
The value of  $\Delta H$  has negative sign

C Jumlah kandungan tenaga dalam bahan tindak balas lebih tinggi daripada hasil tindak balas

The total energy content of reactants is higher than products

D Haba yang diserap untuk memutuskan ikatan lebih tinggi daripada haba yang dibebaskan semasa membentuk ikatan baharu

Heat absorbed to break the bonds is higher than the heat release during the formation of the new bond

Commented [AA177]:

**[Negeri Sembilan 2021-28]**

28. Antara yang berikut, yang manakah benar tentang tindak balas endotermik dan tindak balas eksotermik?

Which of the following is true about endothermic reaction and exothermic reaction?

	Tindak balas endotermik Endothermic reaction	Tindak balas eksotermik Exothermic reaction
A	Membebaskan tenaga haba Releases heat energy	Menyerap tenaga haba Absorb heat energy
B	Suhu persekitaran meningkat The surrounding temperature increases	Suhu persekitaran menurun The surrounding temperature decreases
C	Jumlah kandungan tenaga bahan tindak balas lebih tinggi berbanding jumlah kandungan tenaga hasil tindak balas Total energy content of reactants is higher than the total energy content of products	Jumlah kandungan tenaga bahan tindak balas lebih rendah berbanding jumlah kandungan tenaga hasil tindak balas Total energy content of reactants is lower than the total energy content of products
D	Tenaga haba yang diserap semasa pemecahan ikatan lebih banyak berbanding tenaga haba yang dibebaskan semasa pembentukan ikatan Heat energy absorbed during bond breaking is more than heat energy released during bond formation	Tenaga haba yang diserap semasa pemecahan ikatan kurang berbanding tenaga haba yang dibebaskan semasa pembentukan ikatan Heat energy absorbed during bond breaking is less than heat energy; released during bond formation

Commented [AA178]:

**[Kedah2021-Set01-16]**

16. Zara menambahkan satu spatula serbuk ammonium nitrat ke dalam bikar berisi 100 cm<sup>3</sup> air suling. Apabila serbuk ammonium nitrat larut dalam air, bikar menjadi sejuk. Antara berikut yang manakah menerangkan pemerhatian tersebut?

Zara add a spatula of ammonium nitrate powder into a beaker filled with 100 cm<sup>3</sup> of distilled water. When the ammonium nitrate powder dissolves in water, the beaker becomes cold. Which of the following explain the observation?

A Haba diserap daripada air  
Heat is absorbed from the water

B Haba dibebaskan ke dalam air  
Heat is released into the water

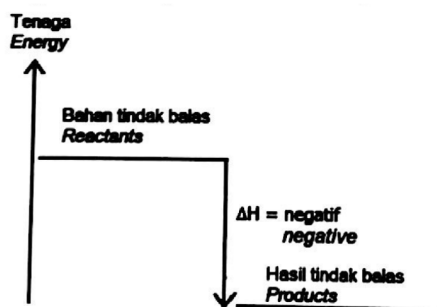
C Tindak balas eksotermik berlaku  
An exothermic reaction occurs

Commented [AAI79]:

**[Johor2021-10]**

10. Rajah 5 menunjukkan satu gambar rajah aras tenaga bagi satu tindak balas.

Diagram 5 shows an energy level diagram for a reaction.



Apakah tindak balas itu?  
What is the reaction?

A Tindak balas antara asid hidroklorik dan natrium hidrogen karbonat  
Reaction between hydrochloric acid and sodium hydrogen carbonate

B Tindak balas antara asid hidroklorik dan natrium karbonat  
Reaction between hydrochloric acid and sodium carbonate

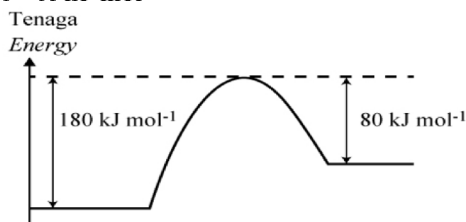
C Penguraian zink nitrat apabila dipanaskan  
Decomposition of zinc nitrate when heated

D Melarutkan ammonium nitrat dalam air  
Dissolving ammonium nitrate in water

**[Selangor2021-Set01-01]**

24. Rajah 6 menunjukkan gambar rajah profil tenaga bagi tindak balas antara P dan Q.

Diagram 6 shows the energy profile diagram for the reaction between P and Q.



Berapakah nilai bagi X? / What is the value of X?

A + 80

**B** + 100

C + 180

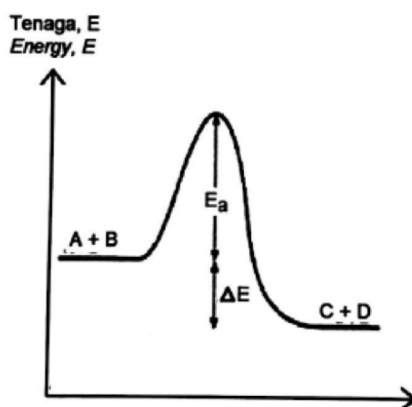
D -180

Commented [AAI80]:

**[Johor2021-06]**

6. Rajah 4 menunjukkan gambar rajah profil tenaga bagi satu tindak balas eksotermik. Antara yang berikut, yang manakah betul tentang rajah tersebut?

Diagram 4 shows an energy profile diagram of an exothermic reaction. Which of the following is true about the diagram?



A C + D ialah bahan tindak balas  
C + D are the reactants

C  $E_a$  ialah tenaga pengaktifan  
 $E_a$  is activation energy

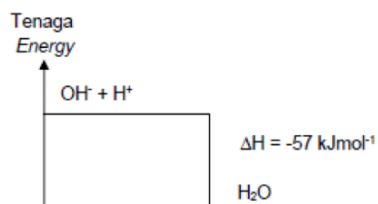
B A + B ialah hasil tindak balas  
A + B are the products

D  $\Delta E$  ialah haba yang diserap  
 $\Delta E$  is heat is absorbed

**[Melaka2021-29]**

29. Rajah 9 menunjukkan satu gambar rajah aras tenaga. Diagram 9 shows an energy level diagram.

Berdasarkan Rajah 9, boleh disimpulkan bahawa  
Based on Diagram 9, it can be concluded that



**A** haba peneutralan ialah  $-57 \text{ kJ mol}^{-1}$ .  
the heat of neutralization is  $-57 \text{ kJ mol}^{-1}$ .

Commented [AAI81]:

B  $57 \text{ kJ}$  tenaga diperlukan untuk tindak balas ini.  
 $57 \text{ kJ}$  of energy is needed for the reaction.

C hasil tindak balas mengandungi lebih banyak tenaga daripada bahan tindak balas.  
the products of reaction contain more energy than the reactants.

D suhu pada akhir tindak balas lebih rendah daripada suhu awal tindak balas.  
the temperature at the end of the reaction is lower than that at the beginning of the reaction.

**[Kelantan2021-26]**

26. Rajah 7 menunjukkan gambar rajah aras tenaga bagi penguraian kalsium karbonat.

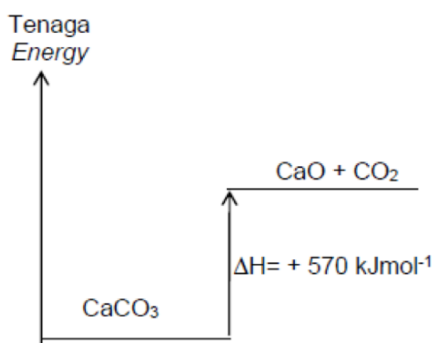
Diagram 7 shows an energy level diagram for the decomposition of calcium carbonate

Pernyataan manakah yang boleh

dirumuskan daripada Rajah 7?

Which statement can be deduced from

Diagram 7?



A Tindak balas itu adalah eksotermik

The reaction is exothermic

B Haba diserap dalam tindak balas itu

Heat is absorbed in the reaction

C Bahan tindak balas mempunyai lebih tenaga daripada hasil tindak balas

The reactant has more energy than the products

D Jumlah tenaga bagi bahan tindak balas dan hasil tindak balas adalah 570 kJ

Total energy of the reactant and the products is 570 kJ

Commented [AAI82]:

**[Selangor2021-Set01-01]**

32. Kaki Bazli terseliuh ketika sedang menggemburkan tanah kebunnya. Bazli meminta anaknya untuk mengambil bahan X dari stor dan mencampurkannya ke dalam beg plastik yang mengandungi air. Anaknya menggoncangkan beg plastik itu dan menekap ke atas bahagian yang terseliuh.

Apakah bahan X?

Bazli's leg was sprained while loosening the soil in his farm. Bazli asked his son to take substance X from the store and mix it into a plastic bag containing water.

His son shake the plastic bag and pressed it onto the injured part.

What is substance X?

A Ammonium nitrat

Ammonium nitrate

C Kalsium oksida

Calcium oxide

B Kalsium klorida

Calcium chloride

D Asid formik

Formic acid

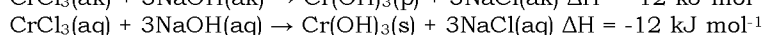
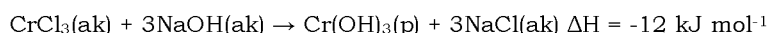
Commented [AAI83]:

### 3.2 Haba Tindak Balas

#### [Kedah2021-Set02-40]

40. Ion kromium(III) yang dimendakkan oleh larutan natrium hidroksida membentuk kromium(III) hidroksida.

Chromium (III) ions precipitated by sodium hydroxide solution form chromium (III) hydroxide.



Berapakah isi padu larutan natrium hidroksida  $1.0 \text{ mol dm}^{-3}$  yang perlu digunakan untuk tindak balas menghasilkan  $1.2 \text{ kJ}$  haba?

What is the volume of  $1.0 \text{ mol dm}^{-3}$  sodium hydroxide solution that should be used for the reaction to produce  $1.2 \text{ kJ}$  of heat?

A  $25 \text{ cm}^3$

B  $50 \text{ cm}^3$

C  $75 \text{ cm}^3$

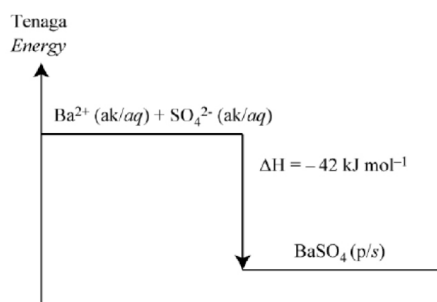
D  $100 \text{ cm}^3$

Commented [AAI84]:

#### [Selangor2021-Set02-01]

32. Rajah 13 menunjukkan aras tenaga bagi tindak balas pemendakan barium sulfat.

Diagram 13 shows energy level for the precipitation reaction of barium sulphate.



Berapakah haba yang dibebaskan apabila  $48 \text{ g}$  barium sulfat terbentuk? [Jisim atom relatif: Ba = 137, S = 32, O=16]

How much heat is released when  $48 \text{ g}$  of barium sulphate is formed? [Relative atomic mass: Ba = 137, S = 32, O=16]

A  $0.865 \text{ kJ}$

B  $86.5 \text{ kJ}$

C  $865.0 \text{ kJ}$

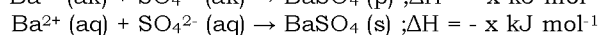
D  $8.65 \text{ kJ}$

Commented [AAI85]:

#### [Kedah2021-Set01-35]

35. Persamaan termokimia berikut mewakili tindak balas pemendakan antara ion barium dan ion sulfat.

The following thermochemical equation represents the precipitation reaction between barium ion and sulphate ion.



Penyataan yang manakah benar mengenai persamaan di atas?

Which of the following statements is true about the above equation?

- A Mendakan kuning terbentuk  
Yellow precipitate is formed
- B Tindak balas endotermik berlaku  
An endothermic reaction occurs
- C Haba diserap dari persekitaran  
Heat is absorbed from the surroundings
- D** Suhu akhir campuran lebih tinggi daripada suhu awal  
Final temperature of mixture is higher than initial temperature

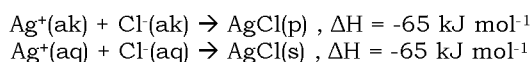
Commented [AAI86]:

**[Johor2021-36]**

36. Apabila 50 cm<sup>3</sup> larutan plumbum(II) nitrat 2.0 mol dm<sup>-3</sup> ditambahkan kepada 50 cm<sup>3</sup> natrium sulfat 2.0 mol dm<sup>-3</sup>, suhu bertambah sebanyak 10°C. Apakah nilai haba pemendakan? [Muatan haba tentu larutan = 4.2 J g<sup>-1</sup> °C<sup>-1</sup>; Ketumpatan larutan = 1.0 g cm<sup>-3</sup>]
- When 50 cm<sup>3</sup> of 2.0 mol dm<sup>-3</sup> lead(II) nitrate was added to 50 cm<sup>3</sup> of 2.0 mol dm<sup>-3</sup> of sodium sulphate, the temperature increased by 10 °C. What is the value of heat of precipitation? [Specific heat capacity of solution = 4.2 J g<sup>-1</sup> °C<sup>-1</sup>; Density of solution 1.0 g cm<sup>-3</sup>]
- A - 21 kJ mol<sup>-1</sup>      B + 21 kJ mol<sup>-1</sup>      C - 42 kJ mol<sup>-1</sup>      D + 42 kJ mol<sup>-1</sup>

**[Melaka2021-27]**

27. Persamaan ion berikut menunjukkan tindak balas antara ion Ag<sup>+</sup> dan ion Cl<sup>-</sup>. The following ionic equation shows the reaction between Ag<sup>+</sup> and Cl<sup>-</sup> ions.



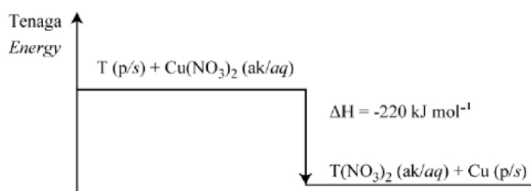
- Antara berikut, pernyataan manakah yang betul?  
Which of the following is the correct statement?

- A Tindak balas endotermik berlaku  
Endothermic reaction occurs
- B** Haba dibebaskan ke persekitaran  
Heat is released to the surroundings
- C Suhu hasil tindak balas berkurang  
The temperature of the product decreases
- D 65 kJ haba diserap apabila 1 mol argentum klorida terbentuk  
65 kJ of heat absorbed when 1 mole of silver chloride is formed

Commented [AAI87]:

**[Selangor2021-Set01-01]**

40. Rajah 14 menunjukkan gambar rajah aras tenaga bagi tindak balas antara 50 cm<sup>3</sup> larutan kuprum(II) nitrat 0.2 mol dm<sup>-3</sup> dengan logam T berlebihan. [Muatan haba tentu larutan = 4.2 J g<sup>-1</sup> °C<sup>-1</sup>]



- Diagram 14 shows the energy level diagram for the reaction between 50 cm<sup>3</sup> of 0.2 mol dm<sup>-3</sup> copper(II) nitrate solution with excess metal T. [Specific heat capacity of solution = 4.2 J g<sup>-1</sup> °C<sup>-1</sup>]



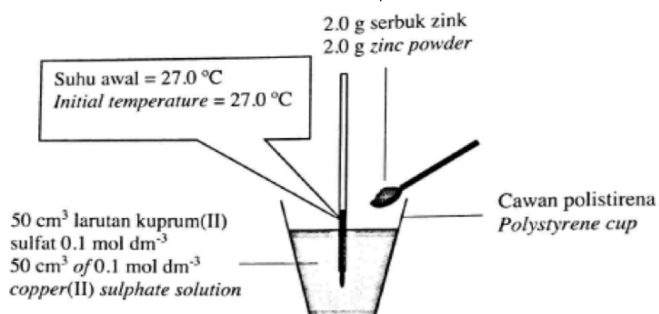
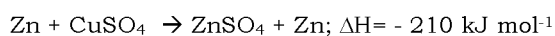
Apakah perubahan suhu bagi tindak balas tersebut?  
What is the temperature change in the reaction?

- A 4.5°C                      B 7.5°C                      C 8.6°C                      **D 10.5°C**

Commented [AAI88]:

**[SBP2021-37]**

37. Rajah 37 menunjukkan susunan radas untuk menentukan haba penyesaran kuprum. Persamaan termokimia berikut mewakili tindak balas tersebut. Diagram 37 shows an apparatus set-up to determine the heat of displacement of copper. The following thermochemical equation represents the reaction.



Berapakah suhu tertinggi yang dicapai dalam tindak balas itu?

[Jisim atom relatif: Zn = 65; Muatan haba tentu bagi larutan = 4.2 J g<sup>-1</sup> °C<sup>-1</sup>; Ketumpatan larutan = 1.0 g cm<sup>-3</sup>]

What is the highest temperature reached in the reaction?

[Relative atomic mass : Zn = 65;

Specific heat capacity of solution = 4.2 J g<sup>-1</sup> °C<sup>-1</sup>;

Density of solution = 1.0 g cm<sup>-3</sup>]

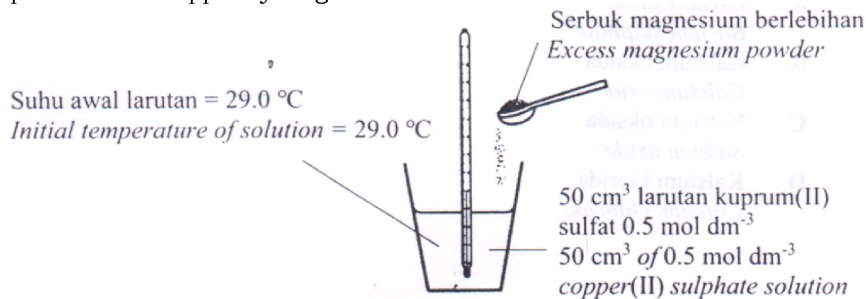
- A 5.0 °C                      B 30.0 °C                      **C 32.0 °C**                      D 57.0 °C

Commented [AAI89]:

**[Negeri Sembilan2021-37]**

37. Rajah 12 menunjukkan satu eksperimen dijalankan untuk menentukan haba penyesaran kuprum oleh magnesium.

Diagram 12 shows an experiment carried out to determine the heat of displacement of copper by magnesium.



Suhu tertinggi yang direkodkan ialah 70.0°C.

Apakah haba penyesaran untuk kuprum?

[Muatan haba tentu air = 4.2 J g<sup>-1</sup> °C<sup>-1</sup>, ketumpatan air = 1.0 g cm<sup>-3</sup>]

The highest temperature recorded is 70.0°C.

What is the heat of displacement for copper?

[Specific heat capacity of water = 4.2 J g<sup>-1</sup> °C<sup>-1</sup>, density of water = 1.0 g cm<sup>-3</sup>]

A - 243.6 kJ mol<sup>-1</sup>

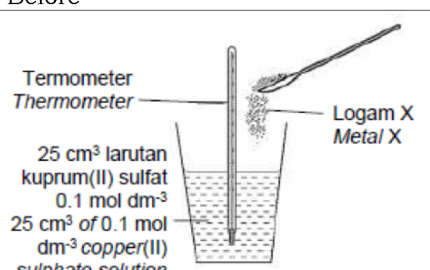
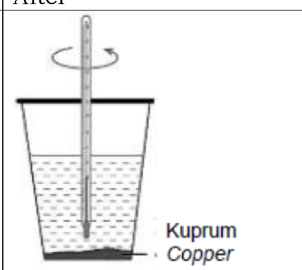
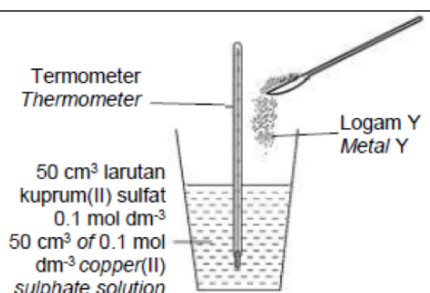
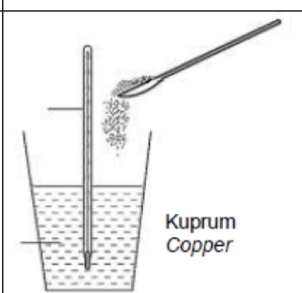
**B** - 344.4 kJ mol<sup>-1</sup>

C - 588.0 kJ mol<sup>-1</sup>

Commented [AAI90]:

**[Kelantan2021-40]**

40. Rajah 15 menunjukkan dua set eksperimen yang dijalankan ke atas 25 cm<sup>3</sup> larutan kuprum(II) sulfat. Serbuk logam magnesium dimasukkan secara berlebihan. Diagram 15 shows two sets of experiment conducted on 25 cm<sup>3</sup> of 0.1 mol dm<sup>-3</sup> copper(II) sulphate solution. Magnesium powders are added in excess.

Set	Sebelum Before	Selepas After
I	 <p>Termometer Thermometer</p> <p>25 cm<sup>3</sup> larutan kuprum(II) sulfat 0.1 mol dm<sup>-3</sup></p> <p>25 cm<sup>3</sup> of 0.1 mol dm<sup>-3</sup> copper(II) sulphate solution</p> <p>Logam X Metal X</p>	 <p>Kuprum Copper</p>
	Suhu awal = 28.0°C Initial temperature = 28.0°C	Suhu tertinggi = 33.0°C Highest temperature = 33.0°C
	Haba penyesaran, ΔH = -42.0 kJ mol <sup>-1</sup> Heat of displacement, ΔH = -42.0 kJ mol <sup>-1</sup>	
II	 <p>Termometer Thermometer</p> <p>50 cm<sup>3</sup> larutan kuprum(II) sulfat 0.1 mol dm<sup>-3</sup></p> <p>50 cm<sup>3</sup> of 0.1 mol dm<sup>-3</sup> copper(II) sulphate solution</p> <p>Logam Y Metal Y</p>	 <p>Kuprum Copper</p>
	Suhu awal = 28.0°C Initial temperature = 28.0°C	Suhu tertinggi = 39.0°C Highest temperature = 39.0°C
	Haba penyesaran, ΔH = -92.4 kJ mol <sup>-1</sup> Heat of displacement, ΔH = -92.4 kJ mol <sup>-1</sup>	

Antara yang berikut yang manakah menerangkan tentang kedua-dua set eksperimen tersebut dengan betul?  
Which of the following are the statements that describe the two sets of the experiment correctly?

I Jumlah kandungan tenaga hasil tindak lebih tinggi daripada jumlah kandungan tenaga bahan tindak balas bagi kedua-dua set eksperimen.  
Total energy content of the products is more than the total energy of the reactants for both sets of the experiment.

II Kedua-dua set eksperimen menyerap haba dari persekitaran  
Both of the sets of experiment are absorb heat from the surrounding.

III Perubahan haba tindak balas dalam Set II lebih tinggi berbanding Set I  
Heat change in the reaction in Set II is higher than Set I.

IV Y lebih elektropositif daripada X.  
Y more electropositive than X

A I dan II  
I and II

B I dan III  
I and III

C II dan IV  
II and IV

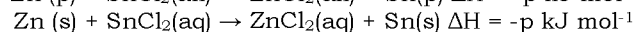
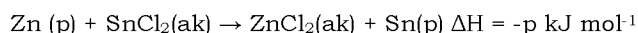
**D III dan IV**  
III and IV

Commented [AAI91]:

**[Kedah2021-Set02-16]**

16. Apabila zink ditambahkan ke dalam larutan stanum(II) klorida, tindak balas berikut berlaku.

When zinc is added to a solution of tin (II) chloride, the following reaction occurs.



Antara takrifan berikut, yang manakah betul tentang haba tindak balas tersebut?

Which of the following definitions is correct about the heat of the reaction?

A Haba diserap apabila 1 mol ion stanum(II) berubah kepada atom stanum  
Heat is absorbed when 1 mole of tin(II) ions is converted to stanum atoms

B Haba diserap apabila 1 mol zink klorida dihasilkan  
Heat is absorbed when 1 mole of zinc chloride is produced

C Haba dibebaskan apabila 1 mol zink klorida dihasilkan  
Heat is released when 1 mole of zinc chloride is produced

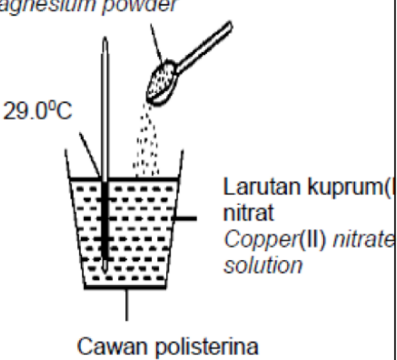
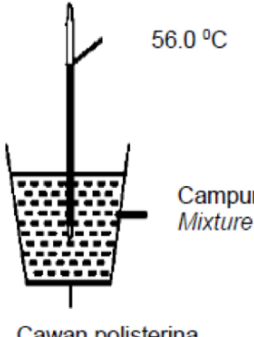
D Haba dibebaskan apabila 1 mol stanum(II) disesarkan daripada larutan stanum(II) klorida

Heat is released when 1 mole of tin(II) is displaced from a solution of tin(II) chloride

**[Kedah2021-Set01-40]**

40. Rajah menunjukkan bacaan termometer apabila serbuk magnesium berlebihan ditambah kepada 50 cm<sup>3</sup> larutan kuprum(II) nitrat 0.5 mol dm<sup>-3</sup> dalam suatu cawan polistirena.

Diagram shows the thermometer readings when excess magnesium powder is added into 50 cm<sup>3</sup> of 0.5 mol dm<sup>-3</sup> copper(II) nitrate solution in a polystyrene cup.

Sebelum eksperimen Before experiment	Selepas eksperimen After experiment
<p>Serbuk magnesium Magnesium powder</p>  <p>29.0°C</p> <p>Larutan kuprum(II) nitrat Copper(II) nitrate solution</p> <p>Cawan polisterina Polystyrene cup</p>	 <p>56.0 °C</p> <p>Campuran Mixture</p> <p>Cawan polisterina Polystyrene cup</p>

Berapakah haba penyesaran bagi tindak balas ini?

What is the heat of displacement for the reaction?

[Muatan haba tentu air =  $4.2 \text{ J g}^{-1} \text{ }^\circ\text{C}^{-1}$  ; Ketumpatan air =  $1.0 \text{ g cm}^{-3}$ ]

[Specific heat of capacity =  $4.2 \text{ J g}^{-1} \text{ }^\circ\text{C}^{-1}$  ; Density of water =  $1.0 \text{ g cm}^{-3}$ ]

A  $-226.8 \text{ kJ mol}^{-1}$

B  $-243.6 \text{ kJ mol}^{-1}$

C  $-470.48 \text{ kJ mol}^{-1}$

D  $-5670.0 \text{ kJ mol}^{-1}$

Commented [AAI92]:

**[Terengganu2021-34]**

34. Tindak balas antara  $25.0 \text{ cm}^3$  asid hidroklorik dengan  $25.0 \text{ cm}^3$  larutan natrium hidroksida membebaskan haba sebanyak 2100 J. Berapakah perubahan suhu campuran itu?

The reaction between  $25.0 \text{ cm}^3$  of hydrochloric acid and  $25.0 \text{ cm}^3$  of sodium hydroxide solution releases the heat of 2100 J. What is the temperature change of the mixture?

[Muatan haba tentu larutan =  $4.2 \text{ J g}^{-1} \text{ }^\circ\text{C}^{-1}$ ; ketumpatan larutan =  $1 \text{ g cm}^{-3}$ ].

[Specific heat capacity of solution =  $4.2 \text{ J g}^{-1} \text{ }^\circ\text{C}^{-1}$ ; density of solution =  $1 \text{ g cm}^{-3}$ ].

A  $1.0 \text{ }^\circ\text{C}$

B  $2.0 \text{ }^\circ\text{C}$

**C  $10.0 \text{ }^\circ\text{C}$**

D  $20.0 \text{ }^\circ\text{C}$

Commented [AAI93]:

**[Selangor2021-Set02-24]**

24.

**57 kJ haba dibebaskan apabila 1 mol air terbentuk daripada peneutralan antara 1 mol asid hidroklorik dan 1 mol natrium hidroksida.**

**57 kJ of heat is released when 1 mol of water is formed from the neutralisation between 1 mol of hydrochloric acid and 1 mol of sodium hydroxide.**

Pasangan asid dan alkali manakah yang menghasilkan haba peneutralan yang lebih tinggi daripada haba peneutralan bagi asid hidroklorik dan natrium hidroksida?

Which pair of acid and alkali produces higher heat of neutralisation than heat of neutralisation for hydrochloric acid and sodium hydroxide?

- A 1 mol asid sulfurik dan 1 mol natrium hidroksida  
1 mol of sulphuric acid and 1 mol of sodium hydroxide
- B 1 mol asid nitrik dan 1 mol kalium hidroksida  
1 mol of nitric acid and 1 mol of potassium hydroxide
- C 1 mol asid etanoik dan 1 mol kalium hidroksida  
1 mol of ethanoic acid and 1 mol of potassium hydroxide
- D 1 mol asid hidroklorik dan 1 mol larutan ammonia  
1 mol of hydrochloric acid and 1 mol of ammonia solution

Commented [AAI94]:

**[Kelantan2021-33]**

33. Jadual 4 menunjukkan haba peneutralan bagi dua asid monoprotik yang berlainan, P dan Q dengan larutan kalium hidroksida.

Table 4 shows the heat of neutralisation of two different monoprotic acids, P and Q, with potassium hydroxide solution.

Set	Jenis asid Type of acid	Jenis alkali Type of alkali	Haba peneutralan Heat of neutralisation
I	50 cm <sup>3</sup> 1.0 mol dm <sup>-3</sup> asid monoprotik P. 50 cm <sup>3</sup> of 1.0 mol dm <sup>-3</sup> monoprotic acid P.	50 cm <sup>3</sup> larutan kalium hidroksida 1.0 mol dm <sup>-3</sup> 50 cm <sup>3</sup> of 1.0 mol dm <sup>-3</sup> potassium hydroxide solution	- 57.0 kJ mol <sup>-1</sup>
II	50 cm <sup>3</sup> 1.0 mol dm <sup>-3</sup> asid monoprotik Q. 50 cm <sup>3</sup> of 1.0 mol dm <sup>-3</sup> monoprotic acid Q.	50 cm <sup>3</sup> larutan kalium hidroksida, 1.0 mol dm <sup>-3</sup> 50 cm <sup>3</sup> of 1.0 mol dm <sup>-3</sup> potassium hydroxide solution	- 54.0 kJ mol <sup>-1</sup>

Berdasarkan maklumat dalam Jadual 4, apakah P dan Q?

Based on the information in Table 4, what is P and Q ?

	Set I	Set II
A	Asid nitrik/ Nitric acid	Asid sulfurik/ Sulphuric acid
B	Asid etanoik/ Ethanoic acid	Asid fosforik/ Phosphoric acid
C	Asid nitrik/ Nitric acid	Asid etanoik/ Ethanoic acid
D	Asid hidroklorik/ Hydrochloric acid	Asid nitrik/ Nitric acid

Commented [AAI95]:

**[Melaka2021-16]**

16. Antara tindak balas peneutralan berikut yang manakah membebaskan haba yang paling kurang?

Which of the following neutralization reactions releases the least heat?

A Asid nitrik dan natrium hidroksida  
Nitric acid and sodium hydroxide

B Asid sulfurik dan kalium hidroksida  
Sulphuric acid and potassium hydroxide

C Asid etanoik dan natrium hidroksida  
Ethanoic acid and sodium hydroxide

D Asid hidroklorik dan kalium hidroksida  
Hydrochloric acid and potassium hydroxide

Commented [AAI96]:

**[SBP2021-26]**

26. Antara berikut, persamaan kimia yang manakah mewakili tindak balas yang menghasilkan haba peneutralan yang paling tinggi?

Which of the following chemical equations represents a reaction that produces the highest heat of neutralisation?

A  $\text{HCl} + \text{NH}_3 \rightarrow \text{NH}_4\text{Cl}$

B  $\text{HCl} + \text{NaOH} \rightarrow \text{NaCl} + \text{H}_2\text{O}$

C  $\text{CH}_3\text{COOH} + \text{NH}_3 \rightarrow \text{CH}_3\text{COONH}_4$

D  $\text{CH}_3\text{COOH} + \text{NaOH} \rightarrow \text{CH}_3\text{COONa} + \text{H}_2\text{O}$

Commented [AAI97]:

**[Selangor2021-Set02-40]**

40. 1 376 kJ haba dibebaskan apabila 1 mol etanol dibakar dengan lengkap dalam oksigen berlebihan.

Berapakah jisim etanol yang perlu dibakar untuk menghasilkan haba yang dapat memanaskan 200 g air daripada suhu 30°C ke 80°C?

[Muatan haba tentu air = 4.2 J g<sup>-1</sup> °C<sup>-1</sup>, Ketumpatan air = 1 g cm<sup>-3</sup>,

Jisim molar etanol = 46 g mol<sup>-1</sup>]

1 376 kJ of heat is released when 1 mol of ethanol is completely burnt in excess oxygen.

How much mass of ethanol need to be burned to produce heat that can heat up 200 g of water from 30°C to 80°C?

[Specify heat capacity of water = 4.2 J g<sup>-1</sup> °C<sup>-1</sup>, Density of water = 1 g cm<sup>-3</sup>,

Molar mass of ethanol = 46 g mol<sup>-1</sup>]

A 46.00 g

B 1404.07 g

C 1.40 g

D 6.55 g

Commented [AAI98]:

**[Perlis2021-31]**

31. Maklumat berikut menunjukkan keputusan bagi satu eksperimen untuk menentukan perubahan haba bagi pembakaran propanol, C<sub>3</sub>H<sub>7</sub>OH.

The following information shows the results of an experiment to determine the heat change for the combustion of propanol, C<sub>3</sub>H<sub>7</sub>OH.

Isi padu air dalam bekas kuprum Volume of water in the copper container	300 cm <sup>3</sup>
Suhu awal air dalam bekas kuprum Initial temperature of water in the copper container	27.5°C
Suhu tertinggi air dalam bekas kuprum Highest temperature of water in the copper container	68.5°C

Berapakah haba yang dibebaskan oleh pembakaran propanol, C<sub>3</sub>H<sub>7</sub>OH?

[Muatan haba tentu air = 4.2 J g<sup>-1</sup> °C<sup>-1</sup>, Ketumpatan air = 1 g cm<sup>-3</sup>]

What is the heat released by the combustion of propanol, C<sub>3</sub>H<sub>7</sub>OH?

[Specific heat capacity of water = 4.2 J g<sup>-1</sup> °C<sup>-1</sup>, Water density = 1 g cm<sup>-3</sup>]

- A 34.65 kJ      **B 51.66 kJ**      C 86.31 kJ      D 120.96 kJ

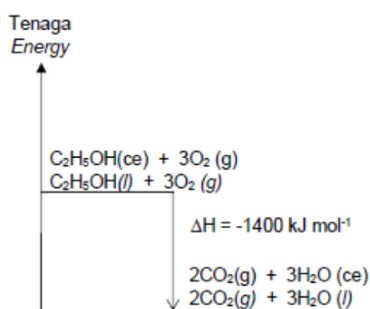
Commented [AAI99]:

**[Kedah2021-Set02-35]**

35. Perubahan tenaga yang berlaku semasa pembakaran etanol ditunjukkan dalam rajah.

The energy changes that occur during the combustion of ethanol are shown in the diagram.

Dalam tindak balas yang berlaku, In the reaction that happen,



- A 1400 kJ haba diserap  
1400 kJ of heat is absorbed

- B suhu persekitaran menurun  
the environment temperature decreases

- C** haba pembakaran etanol ialah -1400 kJ mol<sup>-1</sup>  
the heat of combustion of ethanol is -1400 kJ mol<sup>-1</sup>

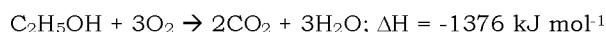
Commented [AAI100]:

- D Jumlah kandungan tenaga kimia hasil tindak balas adalah lebih tinggi berbanding kandungan tenaga kimia bahan tindak balas.  
The total chemical energy content of the reaction product is higher than the chemical energy content of the reaction reactant.

**[Terengganu2021-21]**

21. Persamaan termokimia bagi pembakaran lengkap etanol, C<sub>2</sub>H<sub>5</sub>OH ditunjukkan di bawah.

Thermochemical equation below shows the complete combustion of ethanol, C<sub>2</sub>H<sub>5</sub>OH.



Pilih pernyataan yang benar bagi persamaan termokimia tersebut.

Choose the correct statement for the thermochemical equation.

A Pembakaran lengkap etanol tidak memerlukan gas oksigen.

Complete combustion of ethanol does not need oxygen gas.

B Pembakaran lengkap etanol menghasilkan gas karbon dioksida sahaja.

Complete combustion of ethanol produced carbon dioxide gas only.

C 1376 kJ haba diserap apabila 1 mol etanol terbakar lengkap dalam oksigen berlebihan.

1376 kJ heat is absorb when 1 mole of ethanol is burnt in excess oxygen.

D 1376 kJ haba dibebaskan apabila 1 mol etanol terbakar lengkap dalam oksigen berlebihan

1376 k J heat is released when 1 mole of ethanol is burnt in excess oxygen.

Commented [AAI101]:

**[Melaka2021-36]**

36. Yogurt disediakan dengan mencampurkan 20.0 cm<sup>3</sup> jus limau ke dalam

200.0 cm<sup>3</sup> susu segar. Didapati suhu yogurt meningkat sebanyak 2.0°C.

Berapakah jumlah haba yang dibebaskan?

Gunakan maklumat muatan haba tentu yogurt = X J g<sup>-1</sup> C<sup>-1</sup>.

Anggapkan 1 cm<sup>3</sup> larutan sama dengan 1 gram larutan.

Yogurt is prepared by adding 20.0 cm<sup>3</sup> of lime juice into 200.0 cm<sup>3</sup> of fresh milk.

It is found that the temperature of the yogurt increases by 2.0 °C.

What is the total amount of heat released?

Use the information that the specific heat capacity of yogurt = X J g<sup>-1</sup> C<sup>-1</sup>.

Assume that 1 cm<sup>3</sup> of solution is equal to 1 gram of solution.

A 40X J

B 220X J

C 400X J

D 440X J

Commented [AAI102]:

**12 Bab 4.0 Polimer**

**4.1 Polimer**

**[Perlis2021-15]**

15. Bahan manakah adalah polimer semulajadi?

Which substance is a natural polymer?

A Politena/ Polythene

B Polipropena/ Polypropene

C Poliisoprena/ Polyisoprene

D Polineoprena/ Polyneoprene

Commented [AAI103]:



**[Johor2021-12]**

12. Antara yang berikut, bahan manakah merupakan polimer?  
Which of the following substances is a polymer?

- A Isoprena/ Isoprene  
B Neoprena/ Neoprene  
C Asid amino/ Amino acid  
D Tetrafluoroetena/Tetrafluoroethene

**[Kedah2021-Set02-36]**

36. Polimer X merupakan molekul rantai panjang yang terbentuk dari ulangan unit glukosa. Antara berikut, yang manakah polimer X?  
Polymer X is a long chain molecule made up from repeating unit of glucose.  
Which of the following is polymer X?

- A Kanji/ Starch  
B Protein/ Protein  
C Getah asli/ Natural rubber  
D Polivinil klorida/ Polyvinyl chloride

Commented [AA1104]:

**[Kedah2021-Set01-06]**

6. Antara berikut, bahan manakah merupakan polimer semulajadi?  
Which of the following substance is a natural polymer?

- A Polipropena/ Polypropene  
B Poliisoprena/ Polyisoprene  
C Polietilena/ Polyethylene  
D Polistirena/ Polystyrene

Commented [AA1105]:

**[Kedah2021-Set02-06]**

6. Antara berikut, yang manakah polimer sintetik?  
What is the following is synthetic polymer?

- A Selulosa/ Cellulose  
B Susu getah/ Latex  
C Polistirena/ Polystyrene  
D Kanji/ Starch

Commented [AA1106]:

**[Kelantan2021-39]**

39. Antara berikut yang manakah contoh polimer Elastomer  
Which of the following is an example of an Elastomer polymer

- A Bakelit  
Bakelite  
B Melamina  
Melamine  
C Polivinil klorida  
Polyvinyl chloride  
D Getah stirena-butadiena (SBR)  
Styrene-butadiene rubber (SBR)

Commented [AA1107]:

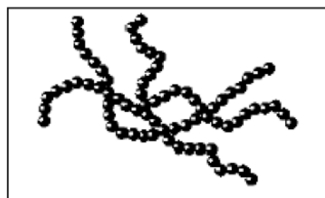
**[Johor2021-25] F5 Bab 04 polimer**

25. Antara yang berikut, bahan yang manakah terhasil daripada pempolimeran kondensasi?  
Which of the following materials produce from condensation polymerisation?

- A Polietena/ Polyethene  
B Terilena/ Terylene  
C Getah asli / Natural rubber  
D Polistirena / Polystyrene

**[Kedah2021-Set01-18]**

18. Rajah menunjukkan struktur bagi polimer Q.  
Diagram shows the structure of polymer Q.



Antara berikut, yang manakah sifat bagi polimer Q?  
Which of the following is a property of polymer Q?

A Terurai atau hangus apabila dipanaskan dan tidak dapat dikitar semula  
Disintegrate or burn upon heating and cannot be recycled

B Dapat diacu berulang-kali selepas dipanaskan dan boleh dikitar semula  
Can be repeatedly remoulded upon heating and can be recycled

C Dapat diregang dan kembali kepada bentuk asal selepas dilepaskan  
Can be stretched and can return to their original shape when released

Commented [AAI108]:

**[Kedah2021-Set01-36]**

36. Antara berikut, yang manakah betul tentang polimer dan kegunaannya?  
Which of the following are correct about polymer and its uses?

	Polimer Polymer	Kegunaan Uses
A	Polietena Polyethene	Botol plastik Plastic bottle
B	Polipropena Polypropene	Paip air Pipe water
C	Polikloroetena Polychloroethene	Pembungkus makanan Food container
D	Polistirena Polystyrene	Tekstil Textile

Commented [AAI109]:

**[Kedah2021-Set02-18]**

18. Rajah di bawah menunjukkan sekaki payung. P  
diperbuat daripada  
Diagram shows an umbrella. P is made up of



- A Polistirena/ Polystyrene
- B Melamina/ Melamine
- C Nilon/ Nylon
- D Bakelit/ Bakelite

Commented [AAI110]:



Antara yang berikut, yang manakah monomer bagi polimer tersebut?  
Which of the following is the monomer of the polymer?

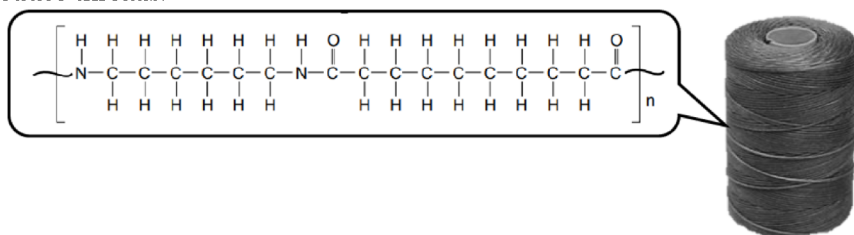
A		C	
B		D	

Commented [AAI113]:

**[Melaka2021-37]**

37. Rajah 12 menunjukkan formula struktur bagi sebatian Z yang digunakan dalam penghasilan benang.

Diagram 12 shows the structural formula of compound Z which is used to produce threads.



Apakah kelebihan benang jenis ini?  
What is the advantage of this type of thread?

A Reaktif  
Reactive

C Tidak mudah terbakar  
Not flammable

B Ringan  
Lightweight

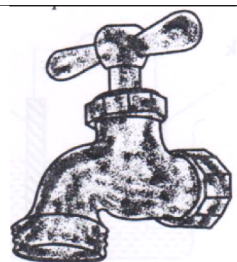
D Tidak terbiodegradasi  
Non-biodegradable

Commented [AAI114]:

**[Negeri Sembilan2021-38]**

38. Rajah 13 menunjukkan pili besi yang berkarat.  
Diagram 13 shows a rusted iron tap.

Antara polimer yang berikut, yang manakah boleh menggantikan besi supaya pili air tidak akan terkakis?  
Which of the following polymers can replace iron so that the water tap will not corrode?



A Bakelit  
Bakelite

C Polivinil klorida (PVC)  
Polyvinyl chloride (PVC)

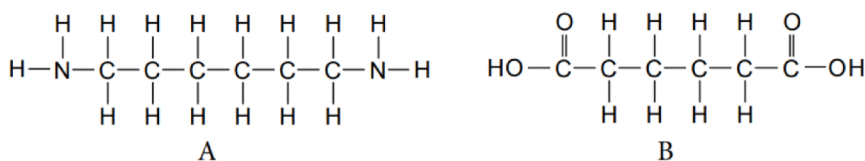
Commented [AAI115]:

B Melamina  
Melamine

D Getah stirena-butadiena (SBR)  
Styrene-butadiene Rubber (SBR)

**[Perlis2021-18]**

18. Rajah 2 menunjukkan formula struktur bagi dua monomer, A dan B.  
Diagram 2 shows the structural formulae of two monomers, A and B.



Monomer A dan B mengalami tindak balas pempolimeran kondensasi untuk menghasilkan suatu polimer.

Apakah produk lain yang dihasilkan selain polimer?

Monomers A and B undergo a condensation polymerisation reaction to produce a polymer. What is the by-product produced besides the polymer?

A Air  
Water

B Tiada  
None

C Hidrogen  
Hydrogen

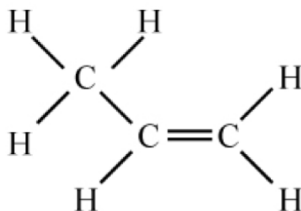
D Ammonia  
Ammonia

Commented [AAI116]:

**[Selangor2021-Set01-01]**

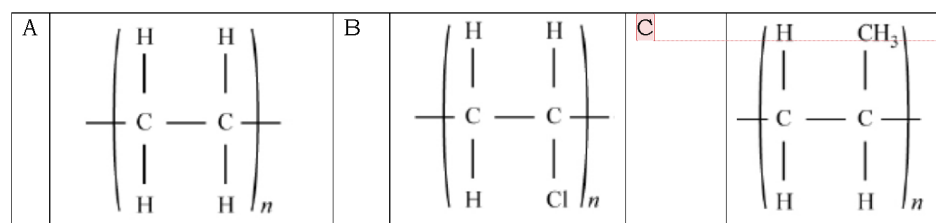
34 Rajah 10 menunjukkan formula struktur bagi suatu monomer.

Diagram 10 shows the structural formula of a monomer.



Antara berikut yang manakah formula struktur bagi polimer terbentuk?

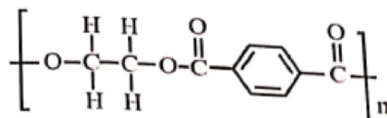
Which of the following is the structural formula for the polymer formed?



Commented [AAI117]:

**[SBP2021-28]**

28. Rajah 28 menunjukkan formula struktur bagi polimer P  
Diagram 28 shows the structural formula P.



Antara pernyataan berikut, yang manakah betul tentang polimer P?

Which of the following statements are correct about polymer P?

I Polimer P dihasilkan melalui tindak balas pempolimeran kondensasi  
Polymer P is produced through condensation polymerisation reaction

II Monomer bagi polimer P terdiri daripada siri homolog berbeza  
Monomer of polymer P consists of different homologous series

III Polivinil klorida dihasilkan daripada tindak balas yang sama dengan polimer P  
Polyvinyl chloride is produced through the same type of reaction as polymer P

IV Kumpulan berfungsi monomer bagi polimer P adalah ikatan ganda dua antara atom karbon  
The functional group of the monomer of polymer P is double bond between carbon atoms

- A I dan II                      B I dan III                      C II dan III                      D II dan IV  
I and II                          I and III                          II and III                          II and IV

Commented [AAI118]:

**[Selangor2021-Set02-34]**

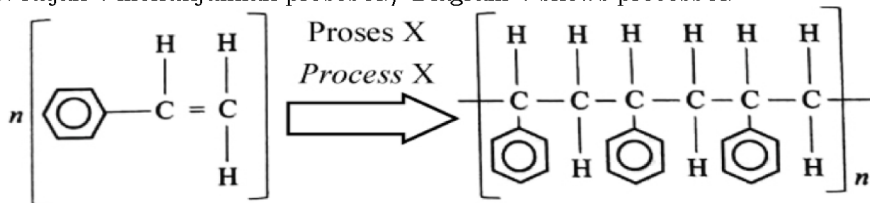
34. Pasangan monomer dan polimer manakah yang betul?  
Which monomer and polymer pair is correct?

	Monomer/ Monomer	Polimer/ Polymer
A	Isoprena/ Isoprene	Polipropena/ Polypropene
B	Glukosa/ Glucose	Getah asli/Natural rubber
C	Asid amino/ Amino acid	Protein/Protein
D	Propena/ Propene	Selulosa/ Cellulose

Commented [AAI119]:

**[Selangor2021-Set01-01]**

13. Rajah 4 menunjukkan proses X./ Diagram 4 shows process X.



Apakah proses X?/ What is process X?

- A Pengesteran/ Esterification
- B Pempolimeran/ Polymerisation
- C Penghidrogenan/ Hydrogenation
- D Pengoksidaan/ Oxidation

Commented [AAI120]:

#### 4.2 Getah Asli

##### [Selangor2021-Set01-01]

19. Apabila suatu bahan R ditambahkan pada lateks, proses penggumpalan lateks menjadi perlahan. Apakah R?

When a substance R is added to latex, the process of coagulation of latex slows down. What is R?

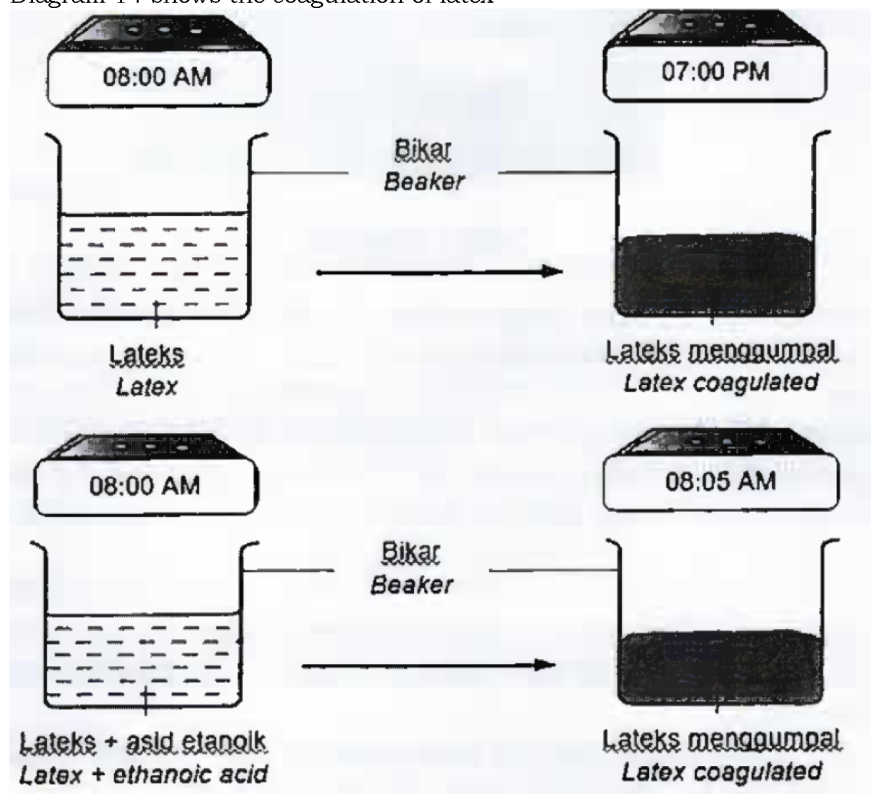
- A Air/ Water
- B Etanol/ Ethanol
- C Asid etanoik/ Ethanoic acid
- D Akueus ammonia/ Ammonia aqueous

Commented [AAI121]:

##### [Terengganu2021-39]

39. Rajah 14 menunjukkan proses penggumpalan lateks.

Diagram 14 shows the coagulation of latex



Berdasarkan rajah diberi, alasan manakah menerangkan situasi tersebut?  
Based on statement given, which reason explained the situation?

**A** Proses pengumpulan lateks secara semula jadi disebabkan rembesan asid laktik dalam kuantiti yang sedikit oleh bakteria dan menyebabkan proses pengumpulan lateks mengambil masa yang lebih lama berbanding lateks dengan penambahan bahan penggumpal.  
Coagulation of latex naturally is due secretion of lactic acid in a very small quantity by bacteria cause the coagulation to takes place very slowly compared to latex when coagulant is added.

Commented [AA1122]:

**B** Proses pengumpulan lateks secara semula jadi mengambil masa lebih lama disebabkan kurang perlanggaran zarah getah antara satu sama lain berbanding lateks dengan penambahan bahan penggumpal.  
Coagulation of latex naturally takes longer time because the collision between latex particles is decrease compared to latex when coagulant is added.

**C** Bakteria di udara tidak dapat memasuki lateks dan menyebabkan proses pengumpulan lateks secara semula jadi mengambil masa lebih lama berbanding lateks dengan penambahan bahan penggumpal.  
Bacteria in the air cannot enter the latex and cause coagulation of latex naturally takes longer time compared to latex when coagulant is added.

**D** Kehadiran ion hidroksida, OH<sup>-</sup> oleh bakteria menyebabkan proses pengumpulan lateks mengambil masa yang lebih lama berbanding lateks dengan penambahan bahan penggumpal.  
The presence of hydroxide ion, OH<sup>-</sup> by bacteria cause the coagulation to takes place very slowly compared to latex when coagulant is added.

**[Selangor2021-Set02-13]**

13 Seorang penoreh getah mendapati lateks menggumpal selepas beberapa jam. Apakah yang perlu dia lakukan untuk mengelakkan lateks daripada menggumpal?

A rubber tapper finds that latex coagulates after several hours.  
What should he do to prevent the latex from coagulating?

**A** Tambah larutan ammonia ke dalam lateks  
Add ammonia solution into the latex

Commented [AA1123]:

**B** Cairkan lateks dengan menambahkan sedikit air  
Dilute the latex by adding some water

**C** Tambah cuka ke dalam lateks  
Add vinegar into the latex

**D** Tambah garam biasa ke dalam lateks  
Add table salt into the latex



**[Terengganu2021-35]**

35. Ladang Green Eagle merupakan sebuah ladang getah yang mengeksport lateks dalam keadaan cecair ke luar negeri. Apakah arahan yang mesti diberikan oleh pengurus ladang kepada para penoreh untuk mengekalkan lateks dalam keadaan tersebut?  
Green Eagle Farm is a rubber plantation that exports latex in liquid form abroad. What instructions must the farm manager give to the tappers to keep the latex in such condition?

A Tambahkan larutan asid nitrik ke dalam mangkuk susu getah  
Add the nitric acid solution to the latex bowl

B Bersihkan mangkuk susu getah sebelum pokok getah ditoreh  
Clean the latex bowl before the rubber tree is tapped

C Tambahkan larutan ammonia ke dalam mangkuk susu getah  
Add the ammonia solution to the latex bowl

D Tambahkan larutan kalsium nitrat ke dalam mangkuk susu getah  
Add the calcium nitrate solution to the latex bowl

Commented [AAI124]:

**4.3 Getah Sintetik**

**[Negeri Sembilan2021-14]**

14. Rajah 5 menunjukkan satu gelang getah.  
Diagram 5 shows a rubber band.



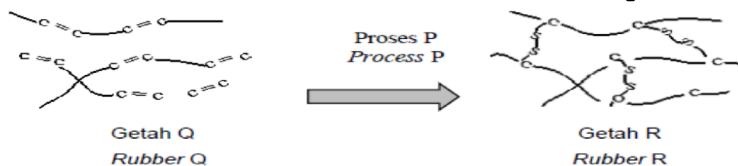
Antara yang berikut yang manakah bukan ciri gelang getah tersebut?  
Which of the following is not the property of the rubber band?

- A Kenyal/ Elastic
- B Kalis air/ Waterproof
- C Penebat elektrik/ Electrical insulator
- D Tahan pengoksidaan/ Resistant to oxidation

Commented [AAI125]:

**[Kelantan2021-06]**

6. Rajah 1 menunjukkan penukaran getah Q kepada getah R melalui Proses P  
Diagram 1 shows the conversion of rubber Q to rubber R through Process P



Antara berikut, yang manakah menerangkan tujuan Proses P?  
Which of the following explains the purpose of Process P?

- A Mengurangkan kekenyalan getah  
To reduce the elasticity of rubber
- B Meningkatkan takat lebur getah**  
To increase the melting point of rubber
- C Mengurangkan saiz molekul getah  
To decrease the size of rubber molecules
- D Meningkatkan pengoksidaan getah  
To increase the oxidation of rubber

Commented [AA1126]:

**[Johor2021-22]**

22. Jadual 1 menunjukkan keputusan satu eksperimen untuk mengkaji ciri-ciri getah.

Table 1 shows results of an experiment to investigate the property of rubber.

Jenis jalur getah Type of rubbers	Getah ter Vulkan Vulcanised rubber	Getah tidak ter Vulkan Unvulcanised rubber
Panjang awal (mm) Initial length (mm)	55	55
Panjang semasa pemberat digantungkan (mm) Length during the weight is hung (mm)	68	73
Panjang jalur selepas pemberat dialihkan (mm) Length after removal of weight (mm)	55	60

Antara yang berikut, pernyataan manakah benar?  
Which of the following statement is true?

- A Getah ter Vulkan kurang tahan terhadap haba daripada getah tidak ter Vulkan  
Vulcanised rubber is less resistant to heat than un vulcanised rubber
- B Getah ter Vulkan lebih mudah teroksidasi daripada getah tidak ter Vulkan  
Vulcanised rubber oxidises more easily than un vulcanised rubber
- C Getah ter Vulkan lebih lembut daripada getah tidak ter Vulkan  
Vulcanised rubber is softer than unvulcanised rubber
- D Getah ter Vulkan lebih kenyal daripada getah tidak ter Vulkan  
Vulcanised rubber is more elastic than un vulcanised rubber

**[Johor2021-37]**

37. Tayar kenderaan adalah antara produk getah sintetik utama yang perlu dilupuskan dalam kuantiti yang banyak. Pelupusan tayar secara tidak lestari mengakibatkan pencemaran terhadap alam sekitar. Antara yang berikut, kaedah manakah yang terbaik mengurangkan isu pencemaran alam sekitar?

Vehicle tyres are among the products of synthetic rubber that need to be disposed of in large quantities. Unsustainable disposal of tyres results in environmental pollution.

Which of the following is the best method to reduce the issue of environmental pollution?

A Tayar diguna semula dan dikitar semula.

Tyres are reused and recycled.

B Menimbus tayar terpakai di dalam tanah.

Bury the used tyres in the ground.

C Menggunakan tayar terpakai sebagai bekas pasu.

Using used tyres as vases.

D Tayar dijadikan tukun tiruan dalam industri perikanan.

Tyres are used as artificial reefs in the fishing industry.

**[Kedah2021-Set02-20]**

20. Seorang pelajar menjalankan suatu eksperimen. Dia ingin menghasilkan jalur getah yang lebih tahan panas dan lebih elastik. Dia mencelupkan jalur getah ke dalam bikar yang mengandungi disulfur diklorida dan bahan X.

Apakah bahan X?

A student carries out an experiment. He wants to produce a rubber strip that is more resistant to heat and more elastic. He dips the rubber strip in a beaker containing disulphur dichloride and substance X.

What is substance X?

A Larutan ammonia  
Ammonia solution

C Asid etanoik  
Ethanoic acid

B Metilbenzena  
Methylbenzene

D Larutan natrium klorida  
Sodium chloride solution

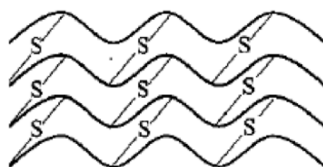
**[Kedah2021-Set01-20]**

20. Rajah menunjukkan struktur getah T.

Diagram shows structure of rubber T.

Antara berikut yang manakah merupakan sifat getah T?

Which of the following is the property of rubber T?



A Mudah melekit apabila dipanaskan  
Easily sticky when heated

B Mudah teroksida  
Easily oxidized

C Kenyal  
Elastic

D Lembut  
Soft

Commented [AAI127]:

**[SBP2021-15]**

15. Apakah kelebihan getah semula jadi berbanding getah sintetik?  
What is the advantage of natural rubber compared to synthetic rubber?

A Tahan kepada bahan kimia  
Resistant to chemicals

B Tahan kepada haba yang tinggi  
Resistant to high heat

C Lebih tahan terhadap pengoksidaan  
More resistant towards oxidation

D Mengambil masa singkat untuk terurai secara biologi  
Takes a short time to decompose biologically

Commented [AAI128]:

**[Selangor2021-Set02-19]**

19. Getah memainkan peranan penting dalam pembangunan ekonomi negara kita. Salah satu kegunaan getah ialah membuat tayar seperti yang ditunjukkan dalam Rajah 6.  
Rubber plays an important role in the development of our country's economy. One of the uses of rubber is making tyres as shown in Diagram 6.



Bahan yang digunakan untuk membuat tayar ialah getah tervulkan, iaitu getah asli ditambahkan dengan sulfur.

Apakah yang berlaku apabila sulfur ditambahkan ke dalam getah asli?  
The material used to make tyres is vulcanised rubber, which is natural rubber added with sulphur.

What happens when sulphur is added into natural rubber?

A Molekul getah menggelongsor lebih mudah antara satu sama lain  
Rubber molecules slide more easily over each other

**B** Atom sulfur membentuk rangkai silang antara molekul getah  
Sulphur atoms form cross-links between rubber molecules

Commented [AAI129]:

C Takat lebur getah berkurangan  
The melting point of rubber decreases

D Kekenyalan getah meningkat  
Elasticity of rubber increases

**[SBP2021-38]**

38. Dialog berikut menunjukkan perbincangan dalam satu mesyuarat antara pengurus dan pekerja kila yang mengeluarkan produk berasaskan getah  
The following dialogue shows a discussion in a meeting between a manager and employee of a factory that produces rubber-based products.

Pekerja kilang: Bos, tangan saya gatal disebabkan oleh pendedahan berlebihan kepada sulfur semasa menghasilkan produk berasaskan getah  
Factory worker : Boss, my hands are itchy due to over exposure to sulphur during the production of rubber-based products

Pengurus : Saya nasihatkan awak untuk segera berjumpa dengan doktor.  
Manager : I advise you to see the doctor immediately.

Pekerja kilang: Ok bos  
Factory worker : Ok Boss

Pengurus : Pada pendapat awak, apakah kaedah alternatif untuk mengatasi masalah tersebut?

Manager : In your opinion, what is the alternative method to overcome this problem?

Penyelidik Kilang : Pasukan kami akan mencari kaedah tersebut secepat mungkin.

Factory researcher: Our team will find the method as soon as possible.

Apakah yang boleh dilakukan oleh penyelidik itu untuk menyelesaikan masalah tersebut?

What can the researcher do to overcome the problem?

A Gantikan dengan asid  
Replace with acid

**C** Gantikan dengan oksida logam  
Replace with metal oxide

Commented [AAI130]:

B Gantikan dengan stirena  
Replace with styrene

D Gantikan dengan pelarut organik  
Replace with organic solvent

## Bab 5.0 Kimia Konsumer Dan Industri

### 5.1 Minyak Dan Lemak

#### [Kelantan2021-01]

1. Lemak tak tepu boleh ditukarkan kepada lemak tepu melalui proses X. Apakah X?

Unsaturated fats can be converted to saturated fats through the X process. What is X?

- |  |  |
|--|--|
| <input checked="" type="radio"/> A Penghidrogenan<br>Hydrogenation | <input type="radio"/> C Pendehidratan<br>Dehydration |
| <input type="radio"/> B Penghalogenan<br>Halogenation              | <input type="radio"/> D Penggantian<br>Substitution  |

Commented [AAI131]:

#### [Kedah2021-Set02-28]

28. Antara pernyataan berikut, yang manakah betul tentang lemak dan minyak?  
Which of the following shows the correct classification of fats and oils?

I Lemak dan minyak merupakan ester  
Fats and oils are esters

II Lemak dan minyak diperolehi daripada sumber haiwan  
Fats and oils are obtained from animal sources

III Lemak ialah pepejal dan minyak ialah cecair pada suhu bilik  
Fats are solids and oils are liquids at room temperature

IV Lemak tak tepu boleh ditukarkan kepada lemak tepu melalui proses pengoksidaan  
Unsaturated fats can be converted to saturated fats through the process of oxidation

- |  |   |  |  |
|--|---|--|--|
| <input type="radio"/> A I dan II<br>I and II | <input checked="" type="radio"/> B I dan III<br>I and III | <input type="radio"/> C II dan IV<br>II and IV | <input type="radio"/> D III dan IV<br>III and IV |
|--|---|--|--|

Commented [AAI132]:

### 5.2 Bahan Pencuci

#### [Johor2021-30]

30. Rudi telah mencuci baju dengan menggunakan air telaga tetapi kesan kotoran masih ada.

Antara yang berikut, pernyataan manakah yang paling tepat menerangkan situasi itu?

Rudi has washed his clothes using water from the well but the dirt is still there. Which of the following statements is the most accurately describe the situation?

A Terdapat ion  $\text{Ca}^{2+}$  dan ion  $\text{Mg}^{2+}$  dalam air telaga  
There are  $\text{Ca}^{2+}$  ions and  $\text{Mg}^{2+}$  ions in the well water

B Menggunakan kuantiti detergen yang sedikit  
Use a small quantity of detergent

C Kewujudan garam tak terlarutkan  
The presence of insoluble salts

D Air telaga terlalu sejuk  
The well water is too cold

**[Perlis2021-23]**

23. Seorang kanak-kanak telah tertumpah kuah kari di atas bajunya. Kotoran itu sangat sukar ditanggalkan setelah dicuci dengan sejenis detergen.

Bahan tambah manakah yang perlu ditambah ke dalam detergen baharu bagi memastikan kotoran itu dapat ditanggalkan?

A child spilled curry gravy on his shirt. The stain was very hard to remove after being washed with a type of detergent.

Which additive should be added into a new detergent to make sure the stain can be removed?

A Protease  
Protease

C Natrium karbonat  
Sodium carbonate

B Natrium silikat  
Sodium silicate

D Bahan pendarfluor  
Fluorescent dyes

Commented [AAI133]:

**[Kelantan2021-13]**

13. Rajah 5 menunjukkan proses penyediaan detergen melalui beberapa peringkat

Diagram 5 shows the preparation of detergent through several steps

Peringkat 1 : Pensulfonan  
Step 1 : Sulphonation

Rantai Panjang alkohol + Bahan P → Asid alkil sulfonik + Air  
Long-chain alcohol + Substance P → Alkyl sulphonik acid + Water

Peringkat 2 : Peneutralan  
Step 2 : Neutralisation

Asid alkil sulfonik + Bahan Q → Natrium alkil sulfat + Air  
Alkyl sulphonik acid + Substance Q → Sodium alkyl sulphate + Water

Apakah bahan P dan Q?/ What is substances P and Q?

	Bahan P Substance P	Bahan Q Substance Q
A	Asid sulfurik Sulphuric acid	Larutan natrium hidroksida Sodium hydroxide solution
B	Asid palmitik Palmitic acid	Larutan natrium klorida Sodium chloride solution

Commented [AAI134]:

C	Asid hidroklorik Hydrochloric acid	Larutan natrium hidroksida Sodium chloride solution
D	Asid nitrik Nitric acid	Larutan natrium klorida Sodium hydroxide solution

**[Kedah2021-Set01-28]**

28. Antara berikut, yang manakah betul tentang sabun?

Which of the following is correct about soap?

I Bahagian hidrofobik sabun larut dalam gris  
The hydrophobic part of soap dissolves in grease

II Sabun membentuk kekat dalam air lembut  
Soap form scum in soft water

III Sabun disediakan melalui hidrolisis lemak dalam keadaan alkali  
Soap is prepared through the hydrolysis of fats in alkaline conditions

IV Sabun mengurangkan kebolehan air untuk membasahi permukaan kain  
Soap reduces the ability of water to wet the surface of cloth

A I dan II  
I and II

**B** I dan III  
I and III

C II dan IV  
II and IV

D III dan IV  
III and IV

Commented [AAI135]:

**[Selangor2021-Set01-07]**

7. Antara berikut yang manakah formula struktur bagi detergen?

Which of the following is the structural formula of detergent?

A	$\begin{array}{c} \text{O} \\    \\ \text{R}-\text{O}-\text{S}-\text{OH} \\    \\ \text{O} \end{array}$	C	$\begin{array}{c} \text{O} \\    \\ \text{R}-\text{C}-\text{OH} \end{array}$
<b>B</b>	$\begin{array}{c} \text{O} \\    \\ \text{R}-\text{O}-\text{S}-\text{ONa} \\    \\ \text{O} \end{array}$	D	$\begin{array}{c} \text{O} \\    \\ \text{R}-\text{C}-\text{ONa} \end{array}$

Commented [AAI136]:

**[Selangor2021-Set02-07]**

7. Mengapakah natrium klorida digunakan dalam penyediaan sabun?

Why is sodium chloride used in the preparation of soap?

**A** Mengurangkan keterlarutan sabun  
To reduce the solubility of soap

B Mempercepatkan tindak balas saponifikasi  
To speed up the saponification reaction

Commented [AAI137]:



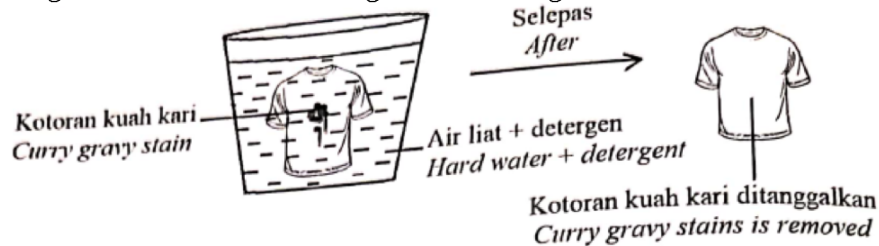
C Melembutkan sabun  
To soften the soap

D Menghasilkan sabun yang berbuih dengan mudah  
To produce soap which can foams easily

**[SBP2021-30]**

30. Rajah 30 menunjukkan pemerhatian ke atas tindakan pencucian oleh detergen.

Diagram 30 shows the cleansing action of detergent.



Antara berikut, yang manakah bahan tambah dalam detergen yang menyebabkan perubahan itu?

Which of the following additives in detergent: causes the changes?

- A Pemutih optik/ Optical whitener
- B Enzim biologi/ Biological enzyme
- C Agen antienapan/ Anti-suspension agent
- D Agen pengawal buih / Foam control agent

Commented [AA1138]:

**5.3 Bahan Tambah Makanan**

**[Negeri Sembilan2021-15]**

15. Antara bahan tambah makanan berikut, yang manakah digunakan untuk memekatkan jem?

Which of the following food additives is added to thicken jam?

- A Pektin/ Pectin
- B Aspartam/ Aspartame
- C Natrium nitrit/ Sodium nitrite
- D Monogliserida/ Monoglyceride

Commented [AA1139]:

**[Terengganu2021-40]**

40. Jadual 4 menunjukkan maklumat yang terdapat pada tiga jenis label makanan, P, Q dan R bahan tambah dalam makanan.

The table 4 shows the information available on the three types of food labels, P, Q and R are food additives

Jenis makanan Type of food	Nanas di dalam sirap Pineapple in syrup	Sos tomato Tomato sos	Aiskrim vanila Vanilla ice cream
Kandungan Ingredients	Kepingan nanas segar, bahan tambah makanan P. Fresh pineapple slices, food additive P.	Tomato, gula, garam, tepung jagung, pewarna tiruan, bahan tambah makanan Q. Tomatoes, sugar, salt, corn flour, artificial colouring, food additives Q.	Susu, vanila, gula, pewarna tiruan, bahan tambah makanan R. Milk, vanilla, sugar, artificial colours, food additives R.
Ciri-ciri bahan tambah makanan Properties of food additives	Manis dan dihasilkan secara tradisional daripada sumber asli Sweet and traditionally produced from natural sources	Sedap dan tahan lama Tasty and durable	Berperisa dan lembut Flavoured and soft

Nyatakan nama bahan tambah makanan P, Q dan R

State the names of food additives P, Q and R.

	P	Q	R
A	Aspartam Aspartame	Natrium benzoat Sodium benzoate	Kanji Starch
B	Sorbitol Sorbitol	Natrium nitrit Sodium nitrite	Gelatin Gelatin
C	Gula Sugar	Asid benzoik Benzoic acid	Gam akasia Gam acacia
D	Stevia Stevia	Asid askorbik Ascorbic acid	Gam xantan Gam xantan

#### 5.4 Ubat-Ubatan Dan Bahan Kosmetik

##### [Negeri Sembilan2021-30]

30. Berikut menunjukkan maklumat tentang ubat J.  
The following shows the information about medicine J.

- Mengurangkan kesakitan  
Relieves pain
- Menurunkan demam  
Reduces fever
- Sesuai untuk kebanyakan orang  
Suitable for most people

Antara yang berikut, yang manakah mungkin ubat J?  
Which of the following could be medicine J?

- A Aspirin/ Aspirin
- B Penisilin/ Penicillin
- C Parasetamol/ Paracetamol
- D Prednisolone/ Prednisolone

Commented [AAI140]:

##### [Perlis2021-30]

30. Rajah 6 menunjukkan sejenis tumbuhan yang boleh dijumpai di kawasan kediaman.  
Diagram 6 shows a type of plant that can be found around the housing area.



Apakah fungsi tumbuhan itu sebagai ubat tradisional?  
What is the function of the plant as a traditional medicine?

- A Mencerahkan kulit/ Brighten the skin
- B Merawat penyakit kulit/ Treat skin disease
- C Menyingkirkan angin dalam badan/ Remove wind from the body
- D Merendahkan tekanan darah dan paras kolestrol  
Lower blood pressure and cholesterol level

Commented [AAI141]:

##### [Selangor2021-Set01-01]

25. Maklumat berikut adalah mengenai sejenis ubat.  
The following information is about a type of drug.

- Melegakan sakit dalam keadaan sedar  
Relieves pain in conscious state
- Bersifat asid  
Acidic
- Menyebabkan ulser perut pada kanak-kanak  
Causes stomach ulcer on children

Antara berikut yang manakah ubat yang dinyatakan?  
Which of the following drug is mentioned above?

- A Kodeina                      B Antibiotik                      C Klozapin                      **D Aspirin**  
Codeine                          Antibiotics                          Clozapine                          Aspirin

Commented [AAI142]:

**[Melaka2021-13]**

13. Jadual 2 menunjukkan jenis-jenis ubat moden dan contohnya.  
Table 2 shows types of modern medicines and their example.

Jenis Type	Analgesik Analgesics	P	Ubat psikotik Psychotic drugs
Contoh Example	Q	Antihistamin Antihistamines	R

Antara yang berikut yang manakah mewakili P, Q dan R?  
Which of the following represent P, Q and R?

	P	Q	R
<b>A</b>	Antialergi Anti allergies	Parasetamol Paracetamol	Haloperidol Haloperidol
B	Antimikrob Antimicrobials	Aspirin Aspirin	Klozapin Clozapine
C	Kortikosteroid Corticosteroids	Penisilin Penicillin	Kodeina Codeine

Commented [AAI143]:

**[Melaka2021-01]**

28. Amsyar memakan sejenis ubat yang diberikan oleh doktor apabila dia mengalami gastrik. Antara bahan berikut, yang manakah terkandung dalam ubat tersebut?

Amsyar is taking a medicine given by a doctor when he has gastric pain. Which of the following substance is contained in the medicine?

- A HCl                      **B Mg(OH)<sub>2</sub>**                      C CH<sub>3</sub>COOH                      D (NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub>

Commented [AAI144]:

**[Terengganu2021-23]**

23. Rajah 6 menunjukkan sejenis ubat yang dimakan untuk mengurangkan rasa sakit.  
Figure 6 shows a type of medicine taken to reduce pain.



Antara berikut yang manakah merupakan kesan sampingan ubat ini? Which of the following is a side effect of this medicine?

I Gangguan penglihatan dan sembelit jika diambil pada dos yang tinggi  
Visual disturbances and constipation if taken in high doses

II Menyebabkan kerosakan hati jika diambil melebihi dos  
Causes liver damage if taken in excess of the dose

III Mengakibatkan kekejangan dan menggeletar  
Causes cramps and trembling

IV Menyebabkan ulser perut jika dimakan oleh kanak-kanak  
Causes stomach ulcers if eaten by children

A I dan II  
I and II

B I dan III  
I and III

**C** II dan IV  
II and IV

D III dan IV  
III and IV

Commented [AA1145]:

**[Selangor2021-Set02-25]**

25. Pernyataan manakah yang menerangkan dengan tepat mengapakah pesakit mesti menghabiskan semua antibiotik yang telah dipreskripsi oleh doktor?  
Which statement exactly explain why the patient must finish all the antibiotic prescribed by the doctor?

A Untuk menghalang pertumbuhan bakteria  
To inhibit the growth of bacteria

B Untuk mengelakkan pembaziran antibiotik  
To avoid wastage of antibiotics

C Untuk melegakan kesakitan  
To relieve the pain

**D** Untuk mengelakkan bakteria menjadi imun terhadap antibiotik  
To prevent the bacteria from becoming immune to the antibiotics

Commented [AA1146]:

**[Kelantan2021-35]**

35. Selain daripada membunuh bakteria di permukaan kulit, penggunaan cecair antiseptik disinfektan juga dapat memusnahkan patogen yang terdapat pada lantai dan sistem perparitan.

Di antara berikut, yang manakah disinfektan?

In addition to killing bacteria on the surface of the skin, the use of disinfectant antiseptic liquids can also destroy pathogens found on floors and drainage systems.

Which of the following is a disinfectant?

A Antihistamin  
Antihistamines

B Klozapin  
Klozapin

**C** Etanol  
Ethanol

D Betametason  
Betamethasone

Commented [AA1147]:

**[SBP2021-25]**

25. Puan Linda menggunakan kosmetik X pada wajahnya yang mengalami ruam dan iritasi. Dia juga mengalami kerosakan buah pinggang setelah lama menggunakan kosmetik X.

Apakah bahan kimia dalam kosmetik X yang menyebabkan kesan yang di alami oleh Pn Linda?

Puan Linda applied cosmetic X on her face that has rashes and irritation. She also suffered kidney damage after using cosmetic X for a long time. Which of following chemicals in cosmetic X cause the effect experienced by Puan Linda

- A Betamethasone valerate/ Betamethasone valerate
- B Hidrokuinon/ Hydroquinone
- C Tretinoin/ Tretinoin
- D Merkuri/ Mercury

Commented [AAI148]:

**[Johor2021-11]**

11. Antara yang berikut, yang manakah kesan sampingan merkuri dalam produk rawatan kulit?

Which of the following is the side effect of mercury in the treatment of skin product?

- A Kerosakan buah pinggang/ Damage to the kidney
- B Menyebabkan alahan kulit/ Cause skin allergy
- C Pori-pori kulit tersumbat / Clogging of skin pores
- D Kulit menjadi kering / Skin becomes dry

**[Kedah2021-Set01-07]**

7. Antara berikut yang manakah menunjukkan pengelasan bahan-bahan kosmetik perawatan yang betul?

Which of the following shows the correct classification of treatment cosmetics?

- |                      |                  |                           |   |
|----------------------|------------------|---------------------------|---|
| I Maskara<br>Mascara | II Krim<br>Cream | III Deodoran<br>Deodorant | IV Pelembap<br>kulit<br>Skin<br>moisturiser |
|----------------------|------------------|---------------------------|---|

- |                        |                          |  |                            |
|------------------------|--------------------------|--|----------------------------|
| A I dan II<br>I and II | B I dan III<br>I and III | <input checked="" type="checkbox"/> C II dan IV<br>II and IV | D III dan IV<br>III and IV |
|------------------------|--------------------------|--|----------------------------|

Commented [AAI149]:

**5.5 Aplikasi Nanoteknologi dalam industri**

**[Kedah2021-Set02-07]**

7. Yang manakah bukan satu ciri grafen?

Which is not a feature of graphene?

- A Lut sinar/ Transparent
- B Telap/ Permeable
- C Konduktor elektrik yang baik/ Very good conductor of electricity
- D Sangat kuat dan keras/ Very strong and hard

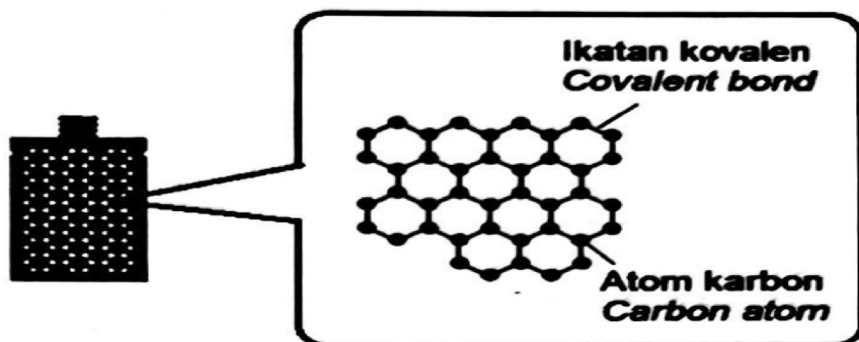
Commented [AAI150]:

**[Johor2021-23]**

23. Rajah 12 menunjukkan bateri telefon pintar yang diperbuat daripada bahan Q.

Q.

Diagram 12 shows a smartphone battery which is made from material Q.



Antara yang berikut, apakah bahan Q? / Which of the following is material Q?

- A Grafit/ Graphite
- B Grafen/ Graphene

- C Berlian/ Diamond
- D Fulerena/ Fullerene

**[Terengganu2021-11]**

11. Antara yang berikut, manakah bukan sifat fizik bagi grafen?

Which of the following is a non physical properties for grafen?

- A Kenyal/ Elastic
- B Lut sinar/ Transparent

- C Kuat dan keras / Strong and hard
- D Penebat haba / Heat insulator

Commented [AAI151]:

**[SBP2021-11]**

11. Penemuan grafen membuka lembaran baru dalam bidang nanoteknologi.

Pelbagai aplikasi sedia ada dapat ditambah baik atau diganti dengan grafen yang mempunyai ciri-ciri unggul dan istimewa.

Antara berikut, yang manakah betul tentang sifat fizik grafen?

The discovery of graphene has opened a new chapter in the field of nanotechnology.

Various existing applications can be improved or replaced with graphene that has superior and distinctive characteristics.

Which of the following is correct about the physical property of graphene?

- A Bersifat tidak telap/ Impermeable
- B Keras tetapi rapuh / Hard but brittle
- C Penebat elektrik / Electrical insulator
- D Penebat haba / Heat insulator

Commented [AAI152]:

### 5.6 Aplikasi Teknologi Hijau Dalam Pengurusan Sisa Industri

#### [Terengganu2021-36]

36. Rajah 11 di atas menunjukkan satu situasi yang berlaku di Johor pada tahun 2019. Sebagai ahli biokimia yang terlibat di dalam pengurusan sisa dan air sisa, apakah kaedah Teknologi Hijau yang paling sesuai digunakan untuk mengatasi kejadian yang sama berulang lagi?



Diagram 11 above shows a situation that was happened in Johor in year 2019. As a biochemist that involved in waste and wastewater

management, what is the most suitable Green Technology method to use to overcome the situation from happen again?

- A Penggunaan alatan dan teknologi cekap tenaga.  
Use of energy efficient tools and technology.
- B Menggunakan bahan api alternatif untuk operasi industri.  
Use alternative fuels in industrial operation.
- C Penggunaan bakteria untuk menguraikan bahan berbahaya.  
Uses of bacteria to compose dangerous chemicals.
- D Memperketatkan tindakan undang-undang terhadap pesalah.  
Restricted of laws on offender.

Commented [AAI153]:

#### [Perlis2021-11]

11. Pasangan manakah yang dipadankan dengan betul?  
Which pair is correctly matched?

	Kosmetik/ Cosmetic	Contoh/ Example
A	Pewarna/ Dyes	Minyak pati/ Essential oil
B	Pengawet/ Preservatives	Ferum(III) oksida/ Iron(III) oxide
<input checked="" type="radio"/> C	Pemekat/ Thickener	Gliserin/ Glycerin
D	Pewangi/ Fragrances	Paraben/ Paraben

Commented [AAI154]: