

SULIT
4541/1
Chemistry
Kertas 1
September
1 1/4 jam



4541/1

PERSIDANGAN KEBANGSAAN PENGETUA-PENGETUA
SEKOLAH MENENGAH MALAYSIA (PKPSM)
CAWANGAN MELAKA

PEPERIKSAAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA 2007

CHEMISTRY

Kertas 1

Satu jam lima belas minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

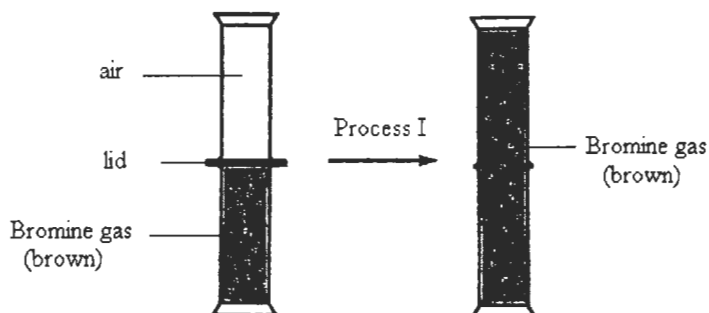
1. *Kertas soalan ini mengandungi 50 soalan*
2. *Jawab **semua** soalan*
3. *Jawab dengan menghitamkan ruangan yang betul pada kertas jawapan*
4. *Hitamkan **satu** ruangan sahaja bagi setiap soalan*
5. *Rajah tidak dilukis mengikut skala **kecuali** dinyatakan*
6. *Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogramkan.*

Kertas soalan ini mengandungi 39 halaman bercetak.

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[Lihat sebelah
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- 1 The figure below shows the set-up of the apparatus to study Process I

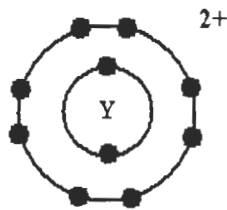


What is Process I ?

- A Condensation
 - B Evaporation
 - C Diffusion
 - D Sublimation
- 2 What is the definition of a mole ?
- A The volume occupied by 6.02×10^{23} particles
 - B The atomic mass of a substance which consists of 6.02×10^{23} atoms
 - C The molecular mass of a substance which consists of 6.02×10^{23} molecules
 - D The quantity of substance which has the same number of particles as the number of atoms in 12 g of Carbon-12

- 5 When steam condenses, the particles
- A become smaller size
 - B lose energy to their surroundings
 - C move further apart
 - D vibrate about fixed positions

- 6 The figure below shows an electron arrangement of Y^{2+}



How many protons and electrons does an **atom** of Y contain ?

- | | Proton | Electron |
|---|--------|----------|
| A | 8 | 8 |
| B | 12 | 10 |
| C | 12 | 12 |
| D | 8 | 10 |
- 7 What can we deduce from the symbol ${}^4_2\text{He}$?
- A An atom of helium contains two electrons
 - B An atom of helium has two protons and four neutrons in its nucleus
 - C Helium has a proton number of 4
 - D Helium occurs as a diatomic molecule

- 8 The relative formula mass of ammonium phosphate, $(\text{NH}_4)_3\text{PO}_4$ is
[Relative atomic mass of H=1, N=14, O=16 and P=31]
- A 133
B 141
C 149
D 159
- 9 Rouge is a pigment which contains 2.8 g of iron combined with 1.2 g of oxygen.
What is the chemical formula of this pigment ?
[Relative atomic mass of Fe=56 and O=16]
- A FeO
B Fe_2O_3
C Fe_3O_2
D Fe_3O_4
- 10 A metal X can exist as X^{2+} and X^{3+} ions. The possible formulae for its sulphates would be
- I XSO_4
II X_2SO_4
III $\text{X}_2(\text{SO}_4)_3$
IV $\text{X}_3(\text{SO}_4)_2$
- A I and II only
B I and III only
C II and III only
D II, III and IV only

11 Which of the following electron arrangements is found in a noble gas atom?

- A 1
- B 2.1
- C 2.8
- D 2.8.2

12 The following table shows the proton number and nucleon number of atom X

Proton number	9
Nucleon number	19

Which of the following shows the position of X in the Periodic Table of elements?

	<i>Group</i>	<i>Period</i>
A	1	4
B	17	2
C	1	1
D	17	4

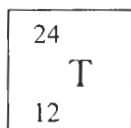
13 The table below shows the position of 2 elements, P and Q, in the Periodic Table of Elements.

Elements	Group	Period
P	1	3
Q	17	3

Which of the following is true about elements P and Q ?

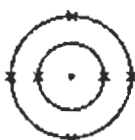
- A The atoms of P are smaller than the atoms of Q
- B Atoms of P have stronger attraction for other electrons
- C The number of positive charges in the nucleus of P is less than Q
- D Atoms of Q have a higher tendency than P to release electrons

14 The chemical symbol of an element T is as shown :

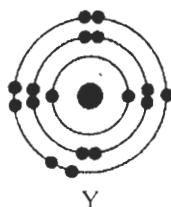


What would be the electron arrangement of the ion formed by an atom of T ?

- A 2.8
 B 2.8.2
 C 2.8.8
 D 2.8.8.8
- 15 The electron arrangement of atom X = 2.8.7. What is the formula of the ions formed from X ?
- A X^-
 B X^+
 C X^{7-}
 D X^{7+}
- 16 The electron arrangements of 2 atoms X and Y are as shown :



X



Y

Which of the following is true when X react with Y?

- A X receives electrons
 B Y receives electrons
 C The compound formed has a formula of XY_2
 D The compound formed is made up of molecules

- 17 The proton numbers of a few elements are as shown :

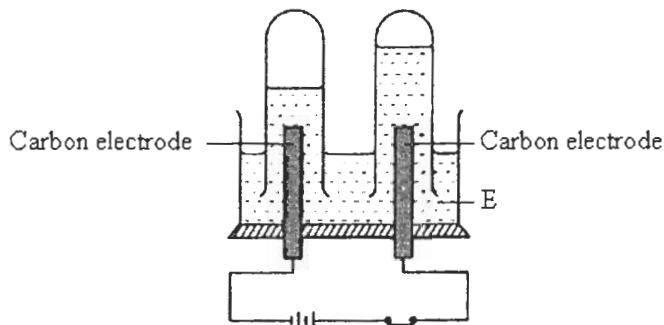
Element	Proton Number
H	1
Na	11
Mg	12
S	16

With the atoms of which element would chlorine atoms combine by sharing electrons?

- I H
II Na
III Mg
IV S
- A I only
B II only
C II and III only
D I and IV only

- 18 It is discovered that a compound with formula WZ dissolves in water. What inference can you make about the compound ?
- A It is not a covalent compound
B The compound ionizes in water
C The compound will not dissolve in an organic solvent
D The intermolecular forces between the particles are very weak

19 The following diagram shows the apparatus set up for an electrolysis.



Which of the following **cannot** be E ?

- A Ammonium hydroxide
 - B Sodium Chloride
 - C Ethanoic acid
 - D Ether
- 20 An experiment has been carried out to determine the relative position of three metals X, Y and Z in the electrochemical series by using the displacement reaction. The results are as shown :

Mixture	Results
X + solution of Y	Y deposited
X + solution of Z	No reaction
Y + solution of Z	No reaction
Z + solution of Y	Y deposited

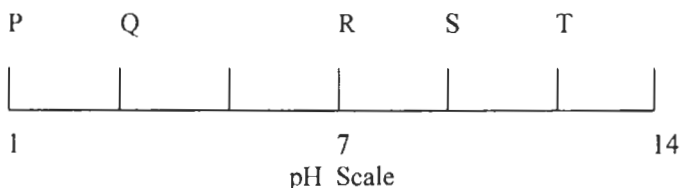
Which of the following shows the correct relative position of X, Y and Z in the electrochemical series?

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

21 Which of the following compounds is a soluble base?

- A Aluminium oxide
- B Copper(II) oxide
- C Iron(III) oxide
- D Sodium oxide

22 The pH scale below shows the position of five aqueous solutions P, Q, R, S and T, of equal concentration.



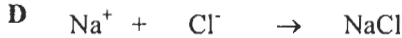
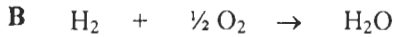
What could the aqueous solutions be ?

	Ethanoic acid	sulphuric acid	ammonia aqueous	sodium chloride	sodium hydroxide
A	P	Q	R	S	T
B	Q	P	S	R	T
C	Q	P	T	S	R
D	S	T	Q	R	P

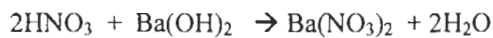
23 What is the concentration of hydrogen ions in 0.05 mol dm^{-3} sulphuric acid?

- A $0.025 \text{ mol dm}^{-3}$
- B $0.050 \text{ mol dm}^{-3}$
- C $0.100 \text{ mol dm}^{-3}$
- D $0.250 \text{ mol dm}^{-3}$

- 24 Which of the following equations best represents the actual reaction between hydrochloric acid and sodium hydroxide solution?

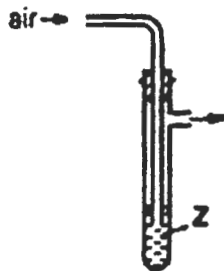


- 25 The neutralization reaction between nitric acid and barium hydroxide solution is shown in the equation below



10.0 cm³ of 0.1 mol dm⁻³ barium hydroxide solution was titrated with 0.1 mol dm⁻³ of nitric acid. What is the volume of the nitric acid?

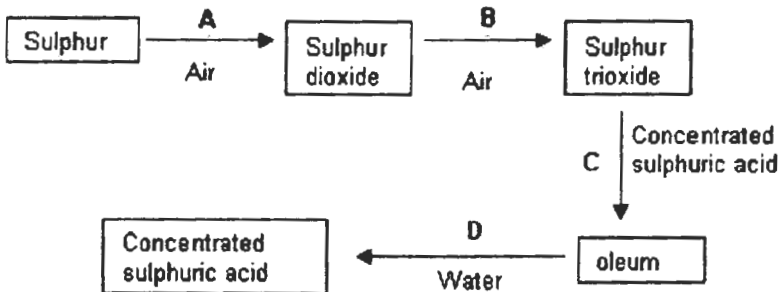
- A 40 cm³
 B 30 cm³
 C 20 cm³
 D 10 cm³
- 26 Air polluted by sulphur dioxide was passed through the apparatus shown in the diagram below.



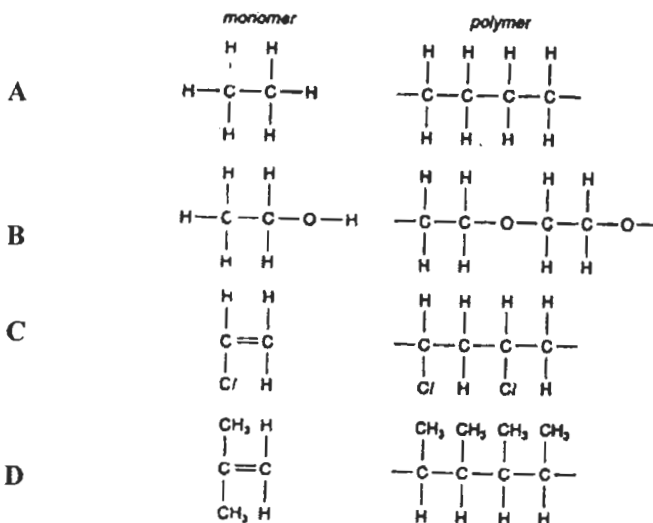
Which of the following solutions could be used as Z to show the presence of sulphur dioxide?

- A acidified potassium manganate(VII)
 B aqueous iron(II) sulphate
 C aqueous potassium iodide
 D limewater

- 27 The following scheme shows four stages A, B, C and D in the conversion of sulphur to sulphuric acid. In which stage is the catalyst used?



- 28 Which of the following mixtures of elements forms the most suitable alloy for manufacturing of racing bicycle which is light and firm?
- A copper and nickel
 B iron and carbon
 C stanum and copper
 D aluminium and copper
- 29 Which of the following pairs shows the correct monomer for making the polymer?

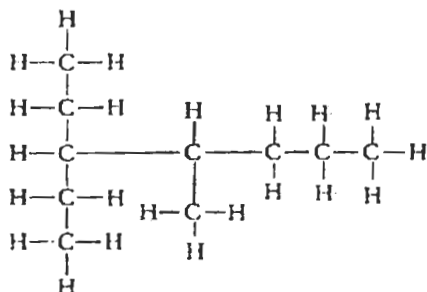


- 30 The followings are the properties of glass. Which of the followings are true?
- I low melting point.
 - II they are good insulators of heat.
 - III resistant to chemicals
 - IV hard but brittle
- A I and II only
 - B III and IV only
 - C I, III and IV only
 - D II, III and IV only
- 31 Compound A is an organic compound. When heated strongly, which of the following gases is released?
- A Oxygen
 - B Hydrogen
 - C Carbon dioxide
 - D Ethane
- 32 The chemical equation shows a chemical reaction that took place.

X	$\text{CH}_2\text{CHCH}_2\text{CH}_3 + \text{H}_2 \rightarrow \text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$
Y	$\text{CH}_2\text{CHCH}_2\text{CH}_3 + \text{H}_2\text{O} \rightarrow \text{CH}_3\text{CH}(\text{OH})\text{CH}_2\text{CH}_3$

- | | X | Y |
|---|---------------|---------------|
| A | Hydration | Hydrogenation |
| B | Hydrogenation | Hydration |
| C | Substitution | Dehydration |
| D | Oxidation | Reduction |

- 33 Which of the following is the IUPAC name for the structural formula shown?



- A 3-ethyl-4-methylheptane
 B 4-methyl-2-ethylhexane
 C 5-ethyl-3-methylheptane
 D 2-ethyl-4-methylhexane
- 34 Which of the following is correct regarding the physical properties of pentene, C_5H_{10} ?
- A Pentene is denser than hexene.
 B Pentene exists in the form of gas at room temperature
 C Complete combustion of pentene will produce 4 moles of carbon dioxide gas.
 D Pentene is insoluble in water but is soluble in organic solvent.
- 35 Which of the following best explains the statement below?

Combustion of hexene is sootier than that of hexane

- A Hexane molecule has more hydrogen atoms than hexene molecule.
 B The van der Waals' forces between hexene molecules are stronger.
 C Percentage by mass of carbon in hexene molecule is higher than that in hexane molecule.
 D The size of hexene molecule is larger.

36 In a reaction temperature will increase the rate of reaction because it will

- A lower the activation energy of the reaction
- B increase the energy of particles involved in the reaction
- C decrease the effective collision of particles involved
- D increase the rate of collision among the particles

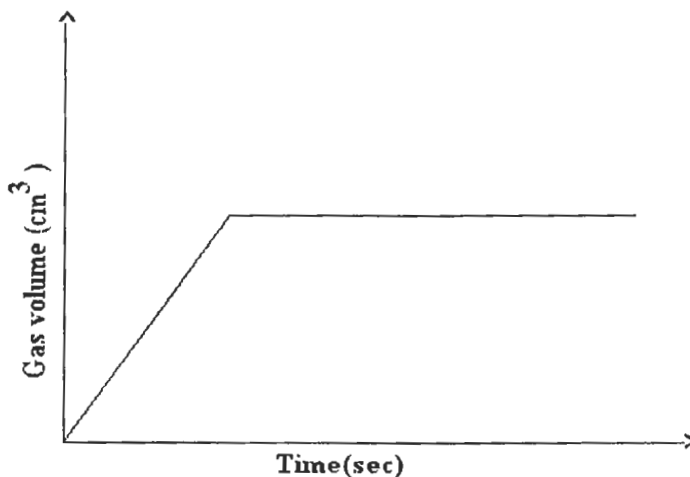
37 The table shows the volume of oxygen gas obtained at regular intervals for the decomposition of hydrogen peroxide, H_2O_2

Time(min)	Volume of oxygen gas (cm^3)
0	0
1.0	5.5
2.0	10.0
3.0	14.0
4.0	17.5
5.0	20.0

The average rate of decomposition of hydrogen peroxide from the second minute to the fourth minute is

- A $17.5 \text{ cm}^3 \text{ min}^{-1}$
- B $12.5 \text{ cm}^3 \text{ min}^{-1}$
- C $3.75 \text{ cm}^3 \text{ min}^{-1}$
- D $4.17 \text{ cm}^3 \text{ min}^{-1}$

- 38 The graph below shows the volume of gas produced against time for the reaction of potassium carbonate and hydrochloric acid



The gradient of the graph decreases with time because

- A catalyst is not used
 - B temperature of reaction decreases
 - C volume of mixture decreases
 - D concentration of hydrochloric acid decreases
- 39 Which of the following will increase the frequency of collision?
- I Use reactant with larger size
 - II Increase the concentration of reactant
 - III Increase the temperature of reaction
 - IV Remove the product of reaction
- A IV only
 - B II and IV only
 - C II and III only
 - D I, III and IV only

- 40 The equation below shows one of the reaction to produce hydrogen gas



Which of the following would increase the rate of production of hydrogen gas?

- A Increase the time of reaction
 - B Increase the volume of acid
 - C Increase the size of granulated zinc
 - D Increase the temperature of the mixture
- 41 Which of the following chemicals can oxidise chloride ions to chlorine?
- A Potassium manganate (VII)
 - B Iron(III) sulphate
 - C Aqueous bromine
 - D Potassium
- 42 Which of the following is an oxidising agent?
- A Hydrogen gas
 - B Potassium manganate(VII)
 - C Potassium Iodide
 - D Ammonia

43

A patient claims that other people are reading his mind and controlling his thoughts

Which of the following types of medicine is most appropriate in treating the above symptoms

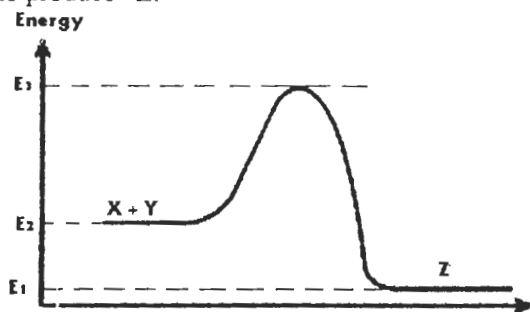
- A Psychotherapeutic medicine
- B Hormones
- C Analgesic
- D Antibiotics

- 44 A series of experiment was carried out to investigate the reactivity of metals K Y and Z. The following results were obtained.

Mixture	Result
X+ oxide of Y	No reaction.
Y+ oxide of Z	Reaction occurred.
X + oxide of Z	Reaction occurred.

Which of the following is the correct sequence for the reactivity of the metals in ascending order?

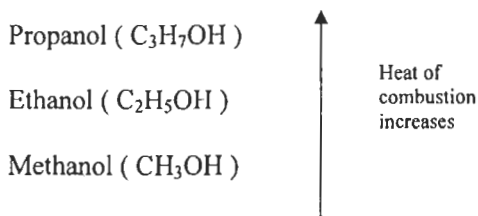
- A X, Y, Z
 B Z, K, Y
 C Y, Z, X
 D Y, X, Z
- 45 The figure bellows shows the energy profile diagram for a reaction between X and Y to produce Z.



What is the heat of reaction?

- A $E_2 - E_1$
 B $E_1 - E_2$
 C $E_3 - E_1$
 D $E_3 - E_2$

- 46 Which of the following is an exothermic reaction?
- A The heating of hydrated copper(II) sulphate
 - B The heating of sodium thiosulphate
 - C Dissolving ammonium chloride in water
 - D Rusting process
- 47 The figure below shows the change in the heat of combustion of a few alcohols.

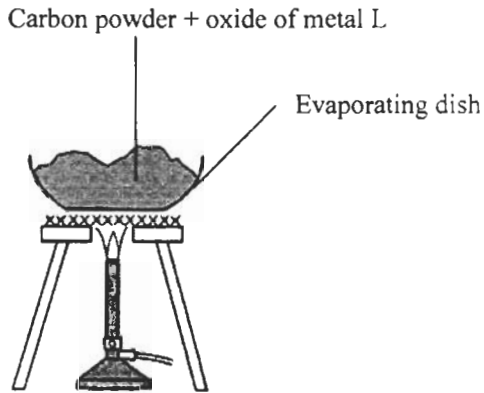


The increase in the heat of combustion of alcohols as shown is due to

- A an increase in the sootiness of the alcohols when burnt
 - B an increase in the reactivity of alcohols
 - C an increase in the relative molecular mass
 - D an increase in the carbon and hydrogen atoms per molecule of alcohol
- 48 Which of the following pairs regarding traditional medicines and their uses is correct?

	Traditional medicine	Use
A	Long jack (<i>Eurycoma longifolia</i>)	To relief asthmatic attack
B	Aloe vera	To treat skin wounds
C	Garlic	To treat stomach wind
D	Ginseng	To treat malaria

- 49 A mixture carbon powder is heated strongly as shown.



Which of the following shows the arrangement of the metals in the reactivity series in ascending order?

- A M, N, L
B L, M, N
C L, N, M
D N, L, M
- 50 Which of the following is one of the possible products formed when palm oil is boiled in concentrated sodium hydroxide solution ?
- I Sodium chloride
II Glycerol
III Sodium palmitate
IV Sodium stearate
- A II and III only
B I, II and III only
C II, III and IV only
D I, II, III and IV