Name:	Class:	Class Register Number:

中正中学

CHUNG CHENG HIGH SCHOOL (MAIN)

Parent's Signature

_____

PRELIMINARY EXAMINATION 2019
SECONDARY 4

CHEMISTRY 6092/01

Paper 1 Multiple Choice

Thursday 19 September 2019

1 hour

Additional Materials: Multiple Choice Answer Sheet

READ THESE INSTRUCTIONS FIRST

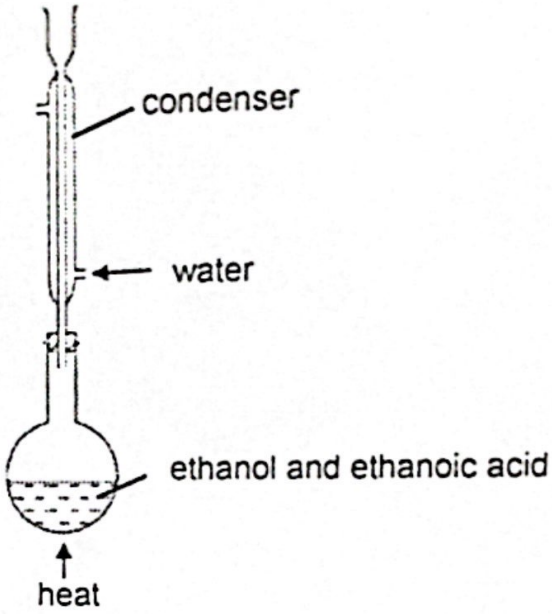
Write in soft pencil.
Do not use staples, paper clips, glue or correction fluid.
Write your name, class and register number clearly in the spaces provided at the top of this page.

There are **forty** questions on this paper. Answer **all** questions. For each question there are four possible answers A, B, C and D.
Choose the **one** you consider correct and record your choice in **soft pencil** on the separate Answer Sheet.

Read the instructions on the Answer Sheet very carefully.

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
Any rough working should be done in this booklet.
A copy of the Periodic Table is printed on page 19.
The use of an approved scientific calculator is expected, where appropriate.

1 Ethanol and ethanoic acid can react to give ethyl ethanoate using the set-up below.



What is the function of the condenser in this set-up?

A To separate ethyl ethanoate from the ethanol and ethanoic acid.

B To lower the temperature to prevent decomposition of ethyl ethanoate.

C To prevent the ethanol from reacting with the oxygen in the air.

D To prevent the ethanol from escaping from the reaction mixture.

2 Which mixture can be separated into its components by adding water, stirring and filtering?

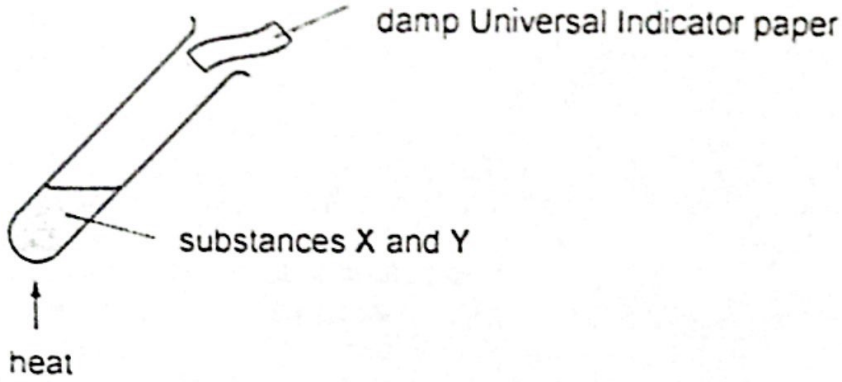
A ammonium carbonate and sodium chloride

B calcium nitrate and barium chloride

C iron(II) carbonate and lithium sulfate

D copper and silver iodide

3 Two substances, X and Y are mixed and heated.



The damp Universal Indicator paper turns blue during the experiment.

What are substances X and Y?

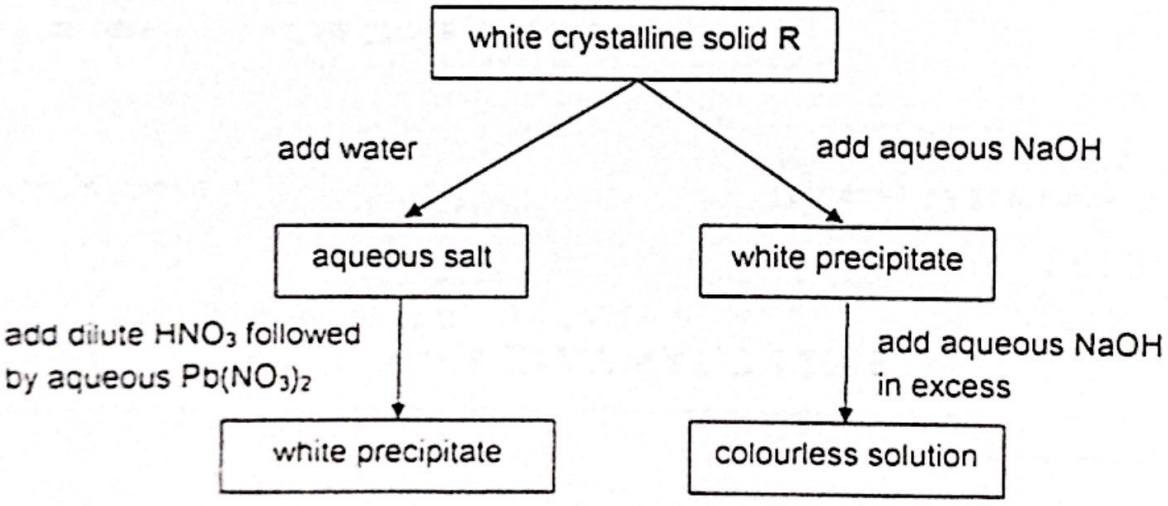
A barium hydroxide and ammonium chloride

B barium hydroxide and hydrochloric acid

C hydrochloric acid and barium nitrate

D hydrochloric acid and ammonium carbonate

4 The diagram below shows the reaction of an unknown substance.



What is solid R?

A zinc chloride

B sodium carbonate

C aluminium nitrate

D calcium sulfate

5 Two particles X and Y have the composition shown in the table.

particle	number of electrons	number of neutrons	number of protons
X	10	8	8
Y	18	18	17

Which statement is correct about X and Y?

A X is a metal while Y is a non-metal.

B X and Y are anions.

C X and Y are isotopes.

D X and Y are in the same period.

6 Which statement about an atom is correct?

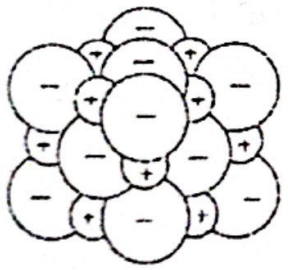
A Each element always has the same number of protons and neutrons.

B Each element always has the same number of electrons and neutrons.

C The nucleon number can be equal to the proton number.

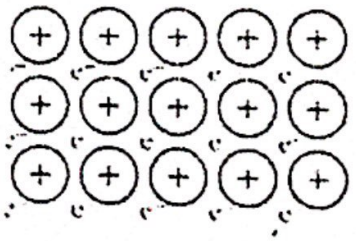
D The nucleon number can be lesser than the number of electrons.

7 The structures of three substances P, Q and R are shown below.



P

Q



R

Which statements are correct?

1 P and R can conduct electricity in the molten state.

2 Q is an element while P and R are compounds.

3 P and R have giant structures while Q has a simple structure.

A 1 and 2

B 1 and 3

C 2 and 3

D 1, 2 and 3

8 In the molecules CH_3OH, NH_3 and HF, which atoms use all of their outer shell electrons in bonding?

A C and H

B C and F

C N and H

D H and O

9 The equation shows the reaction of an oxide of metal **M** in water.

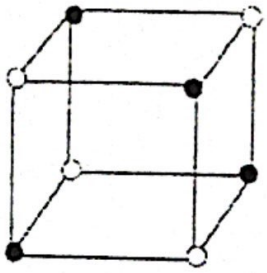
$$M_2O(s) + H_2O(l) \rightarrow 2MOH(aq)$$

What types of bonding are present in M_2O and MOH?

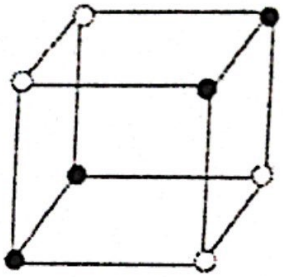
	type of bonding in	
	M_2O	MOH
A	ionic	ionic
B	covalent	ionic and covalent
C	ionic	ionic and covalent
D	covalent	ionic

10 Which diagram best represents the structure of calcium oxide?

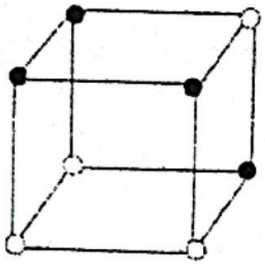
A



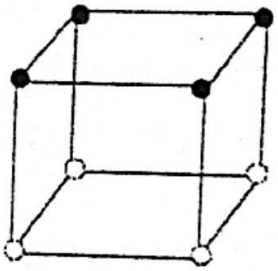
B



C



D



11 Elements X and Y have proton numbers of 11 and 19 respectively.

Which statement about X and Y is not correct?

A X is less reactive with water than Y.

B X and Y are in the same group of the Periodic Table.

C The chlorides of X and Y are molecular.

D X and Y both form basic oxides.

12 Which sulfide shows the greatest mass of sulfur in a 6 g sample?

A SeS_2

B FeS_2

C Ag_2S

D PbS

13 On heating, ammonium nitrate, NH_4NO_3, decomposes to form dinitrogen oxide and water.

$$NH_4NO_3 \rightarrow N_2O + 2H_2O$$

When 90 g of an impure sample of ammonium nitrate is heated, 28 g of water is formed.

What is the percentage purity of ammonium nitrate in the impure sample?

A $\frac{28}{18} \times \frac{80}{90} \times 100$

B $\frac{28}{36} \times \frac{80}{90} \times 100$

C $\frac{28}{18} \times \frac{90}{80} \times 100$

D $\frac{28}{36} \times \frac{90}{80} \times 100$

14 A mixture of 8.0 g of hydrogen with 8.0 g of oxygen is ignited.

$$2H_2 + O_2 \rightarrow 2H_2O$$

What is the mass of water formed?

A 9.0 g B 18.0 g C 36.0 g D 72.0 g

15 50 cm^3 of a gaseous hydrocarbon reacts with 250 cm^3 of oxygen to give only carbon dioxide and water as the only products.

What is the identity of the gaseous hydrocarbon?

A C_2H_6

B C_2H_4

C C_3H_8

D C_3H_6

16 10 cm^3 of an aqueous 2.0 mol/dm^3 solution of the hydroxide of metal M exactly neutralises 50 cm^3 of 0.20 mol/dm^3 aqueous sulfuric acid.

What is the formula for the sulfate of M?

A M_2SO_4 B MSO_4 C $M_2(SO_4)_3$ D $M(SO_4)_2$

17 Compound Z has the molecular formula Cu_2O.

The following statements were made about Z.

1 Copper is present in Z as the Cu^{2+} ion.

2 One mole of Z contains 128 g of copper and 16 g of oxygen.

3 The empirical formula of Z is Cu_2O.

4 One mole of oxygen molecules is needed to make one mole of Z.

Which statements about Z is correct?

A 1 and 2

B 1 and 4

C 2 and 3

D 3 and 4

18 Which pair of reagents can be used to prepare pure insoluble salt?

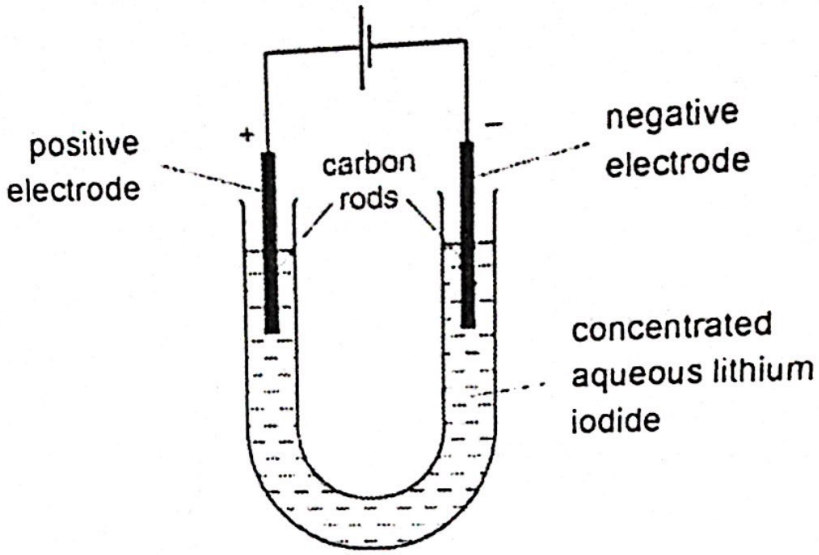
A silver oxide and dilute hydrochloric acid

B iron(III) carbonate and dilute sulfuric acid

C lithium carbonate and sodium sulfate

D calcium nitrate and sodium sulfate

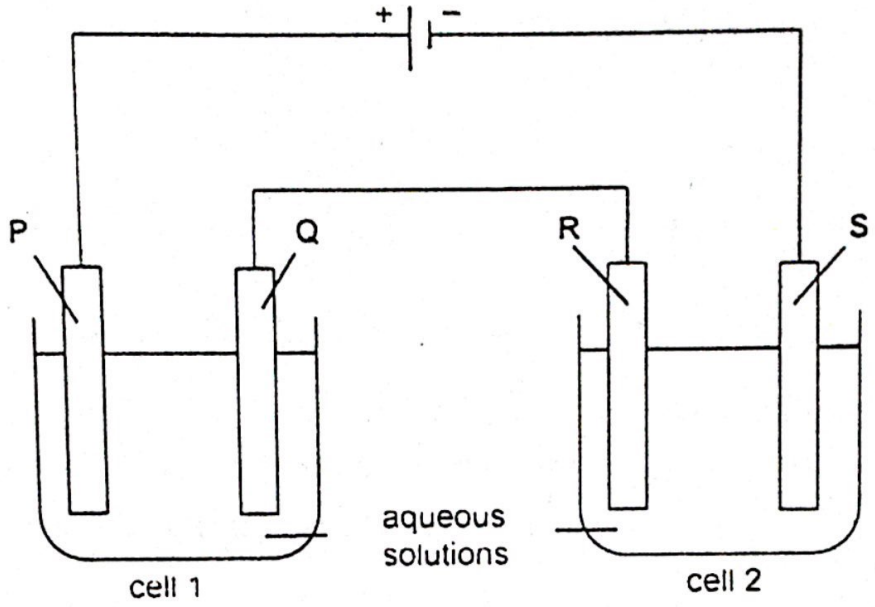
19 The diagram shows the electrolysis of concentrated aqueous lithium iodide.



What is produced at each of the electrodes?

	product at cathode	product at anode
A	hydrogen	iodine
B	hydrogen	oxygen
C	lithium	iodine
D	lithium	oxygen

20 In the diagram below, each cell contains an aqueous solution of a single salt and all the four electrodes are platinum. Electrode **Q** and **S** increase in mass during the electrolysis and no gas is given off at **Q** or **S**.



If the increase in mass of **Q** is greater than the increase in mass of **S** in the same time, which one of the following statements is necessarily true?

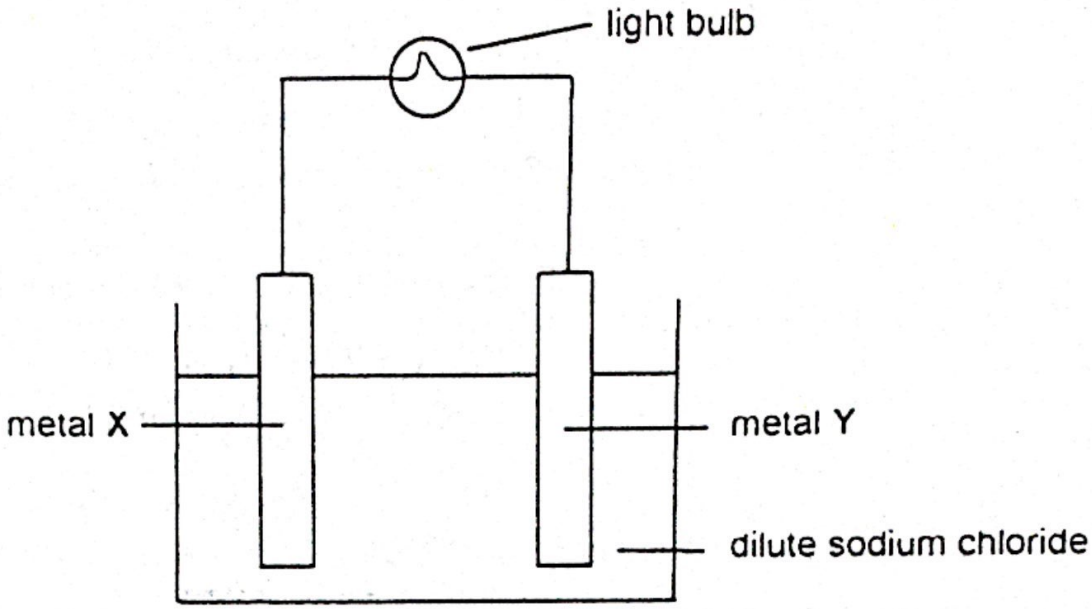
A The cation of the solution in cell 1 is different from the cation of the solution in cell 2.

B The anion of the solution in cell 1 is different from the anion of the solution in cell 2.

C The current flowing in cell 1 is greater than the current flowing in cell 2.

D The loss in mass of electrode **P** is less than the loss in mass of electrode **R**.

21 The apparatus was set up as shown.



For which pair of metals would effervescence be seen at metal Y?

	metal X	metal Y
A	copper	zinc
B	iron	zinc
C	lead	iron
D	iron	copper

22 Which one of the following is an endothermic process?

A Mixing of dilute sulfuric acid with aqueous sodium hydroxide.

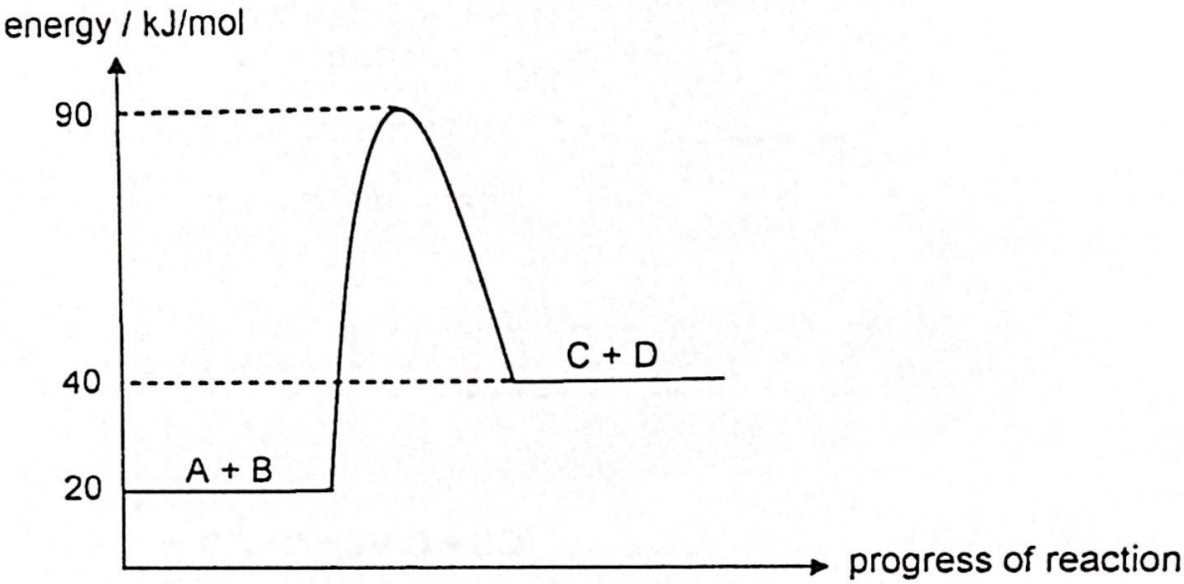
B Addition of lithium to cold water.

C Heating of zinc carbonate to get zinc oxide.

D Rusting of an iron nail.

23 The energy profile diagram of a reversible reaction is shown below.

$$A + B \rightleftharpoons C + D$$



Which of the following statements is correct about the energy profile diagram?

A Activation energy of the backward reaction is given by –50 kJ/mol.

B Enthalpy change of the backward reaction is given by +20 kJ/mol.

C Activation energy of the forward reaction is given by +70 kJ/mol.

D Enthalpy change of the forward reaction is given by +50 kJ/mol.

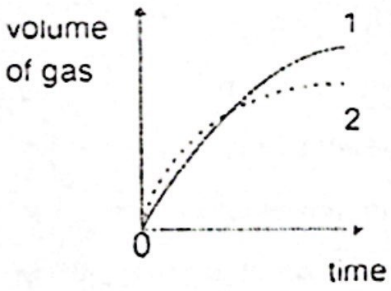
24 Two experiments are carried out to measure the volume of carbon dioxide produced when different concentrations of hydrochloric acid are added to excess calcium carbonate.

experiment	acid
1	50 cm^3 of 0.20 mol/dm^3 hydrochloric acid
2	20 cm^3 of 0.50 mol/dm^3 hydrochloric acid

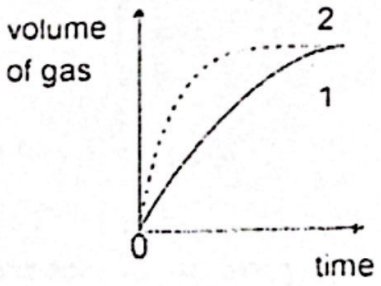
A graph of volume of carbon dioxide against time is plotted for both experiments.

Which graph best shows the results for these experiments?

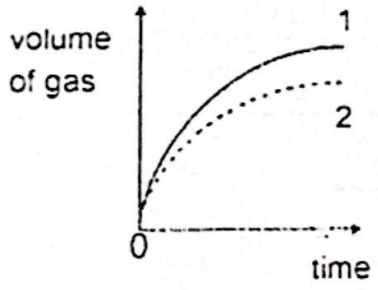
A



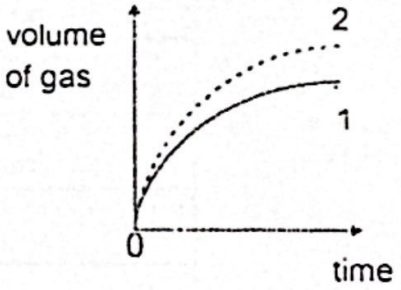
B



C



D



25 In which reaction is the pressure **least** likely to affect the rate of reaction?

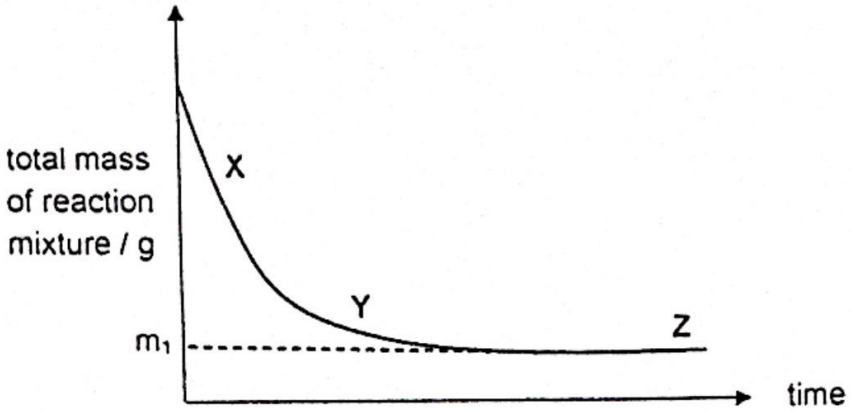
A $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$

B $2SO_2(g) + O_2(g) \rightarrow 2SO_3(g)$

C $Fe_2O_3(s) + 3CO(g) \rightarrow 2Fe(s) + 3CO_2(g)$

D $Mg(s) + H_2SO_4(aq) \rightarrow MgSO_4(aq) + H_2(g)$

26 When an excess copper(II) carbonate is added to dilute sulfuric acid, the total mass of the reaction mixture is measured over a period of time as shown in the graph below.



Which statement about the curve is correct?

A The mass of carbon dioxide produced is m_1 g.

B The concentration of the acid at Y is lower than at X.

C All copper(II) carbonate has reacted at Z.

D The change from X to Y is due to the insoluble layer of salt formed.

27 Disproportionation is a reaction in which the same element is both oxidised and reduced.

Which of the following reactions is an example of disproportionation?

A $2H_2O_2 \rightarrow 2H_2O + O_2$

B $Cu + 4HNO_3 \rightarrow Cu(NO_3)_2 + 2H_2O + 2NO_2$

C $H_2SO_3 + H_2O_2 \rightarrow H_2SO_4 + H_2O$

D $Cu + 2H_2SO_4 \rightarrow CuSO_4 + 2H_2O + SO_2$

28 Which of the following statements about an acid is correct?

A pH is a measure of acid concentration in a solution.

B When an acid reacts with a reactive metal, hydrogen ions lose electrons.

C A weak acid can have the same pH as a strong acid.

D Universal indicator turns blue when placed in an acid.

29 Methylamine, CH_3NH_2 has similar chemical properties to ammonia.

Which property does not represent methylamine?

A It ionises completely in water to give hydroxide ions

B It is a compound that has a simple molecular structure

C It reacts with hydrogen chloride to form a compound with the formula CH_3NH_3Cl

D It turns moist red litmus paper blue

30 Across the period, there is a trend from metallic to non-metallic elements.

This is caused by _____.

A the increase in the number of electron shells

B the increase in the number of electrons

C the increase in the number of valency electrons

D the increase in the number of neutrons

31 Which statement about the alkali metals is correct?

A Their reactivity decreases down the group.

B They form basic oxides on reacting with water.

C They form covalent bonds with the halogens.

D Their melting point decreases down the group.

32 A coil of iron wire is suspended in a beaker of aqueous silver nitrate. Crystals of silver are deposited on the iron wire.

Which statement is correct?

A The solution remains colourless.

B The oxidation states of iron and silver decreases and increases respectively.

C The total number of positive ions decreases.

D The total mass of the crystals of silver decreases.

33 The table below shows the reactivity of four metals and their compounds.

metal	addition of dilute sulfuric acid to the metal	heating hydrogen with the metal oxide	adding metal to the aqueous sulfate of metal J
G	effervescence	metal G formed	no reaction
H	no reaction	metal H formed	no reaction
I	effervescence	no reaction	metal J formed
J	effervescence	no reaction	no reaction

What is the order of thermal stability of the metal carbonates from most to least thermal stable?

A H, G, J, I

B H, J, G, I

C I, J, G, H

D I, G, H, J

34 Which atmospheric pollutants, emitted by internal combustion engines, are reacted together to convert them into less harmful products?

A nitrogen dioxide and sulfur dioxide

B nitrogen dioxide and carbon monoxide

C unburned hydrocarbons and carbon monoxide

D unburned hydrocarbons and carbon dioxide

35 When crude oil is fractionally distilled, which compounds leave from the bottom of the fractionating column?

A The compounds that are least flammable.

B The compound that are the least viscous.

C The compounds with the lowest relative molecular mass.

D The compounds with the lowest boiling points.

36 When dodecane, $C_{12}H_{26}$, is cracked, only three hydrocarbons are formed.

The hydrocarbons are ethene, propane and propene.

What is the ratio of the hydrocarbons formed?

	ethene	propane	propene
A	1	1	1
B	1	1	3
C	1	3	1
D	3	1	1

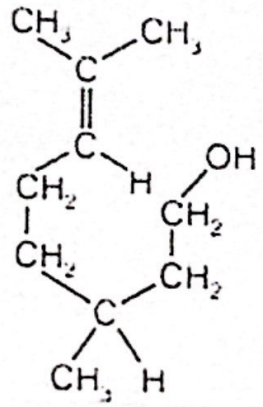
37 The reaction between a carboxylic acid, $C_xH_yCO_2H$ and an alcohol, $C_nH_{2n+1}OH$, produces an ester.

How many hydrogen atoms does one molecule of ester contain?

A $y + 2n + 3$ B $y + 2n + 2$ C $y + 2n + 1$ D $y + 2n$

38 Citronellol is found in rose oil.

The structure of citronellol is shown.



Which statement about citronellol is not correct?

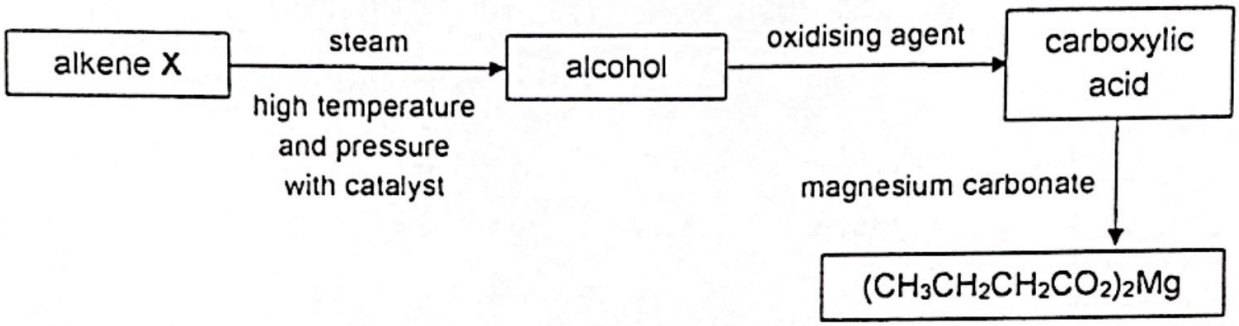
A Citronellol can react with sodium hydroxide to give a salt and water.

B Citronellol can turn purple acidified potassium manganate(VII) colourless.

C Citronellol can react with hydrogen in the presence of a catalyst.

D Citronellol can form a polymer with the same empirical formula.

39 A reaction scheme for an alkene **X** is given. The alkene underwent a series of reactions to obtain the salt, $(CH_3CH_2CH_2CO_2)_2Mg$.



What was alkene **X**?

A $CH_3CH=CH_2$

B $CH_3CH_2CH=CH_2$

C $CH_3CH=CHCH_3$

D $CH_3CH_2CH_2CH=CH_2$

40 Which two monomers can react together to form a polymer with only amide linkages?

A $H_2NCH_2CH_2CH_2CO_2H$ and $HOC(CH_3)_2CH_2CO_2H$

B $H_2NCH_2CH_2CH_2CO_2H$ and $HO_2CCH(CH_3)CH_2NH_2$

C $HO_2CCH_2CH_2CH_2NH_2$ and $HO_2CCH(CH_3)CH_2CO_2H$

D $HO_2CCH_2CH_2CO_2H$ and $CH_3CH(CH_3)CH_2NH_2$

2019 Chung Cheng High School Chemistry Preliminary Examination

6092/01

Answers

1	D	2	C	3	A	4	A	5	B
6	C	7	B	8	A	9	C	10	A
11	C	12	B	13	B	14	A	15	C
16	A	17	C	18	D	19	A	20	A
21	D	22	C	23	C	24	B	25	D
26	B	27	A	28	C	29	A	30	C
31	D	32	C	33	C	34	B	35	A
36	D	37	C	38	A	39	B	40	B