Name: ..... Register/Index Number: ..... Class: .....

PRESBYTERIAN HIGH SCHOOL

SCIENCE (CHEMISTRY) **5076/1, 5078/1**

Paper 1

24 August 2022 **Wednesday** **1 hour**

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2022 SECONDARY FOUR EXPRESS / FIVE NORMAL (ACADEMIC)
PRELIMINARY EXAMINATION

INSTRUCTIONS TO CANDIDATES

Write in soft pencil.
Do not use staples, paper clips, highlighters, glue or correction fluid.
Write your name, class and register number on the Answer Sheet in the spaces provided.

There are **twenty** questions in 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.

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

A copy of the Periodic Table is printed on page 8.

Setter: Mr Muhammad Faeez
Vetted by: Ms Chan Poh Hoon

This question paper consists of **8** printed pages.

1 Which of the following substances may be condensed using a water-cooled condenser?

	melting point/ ˚C	boiling point/ ˚C
A	-135	-0.5
B	-130	+36
C	-115	-85
D	-78	-33

2 A student takes 1 g sample of calcium carbonate and adds them to 10 cm^3 sample of dilute hydrochloric acid at different temperatures. She measures how long it takes for the effervescence to stop.

Which apparatus does she use?

	balance	clock	filter funnel	measuring cylinder	thermometer
A	✓	✓	✓	✓	✗
B	✓	✓	✗	✓	✓
C	✓	✗	✓	✓	✓
D	✗	✓	✓	✗	✓

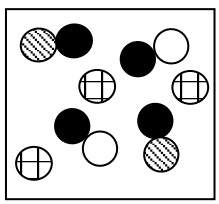
3 The electronic configuration of an ion is 2.8.8.

What could this ion be?

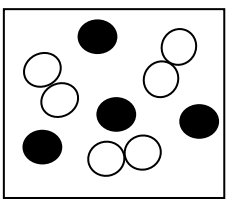
	P^{3-}	K^+
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

4 Which diagram shows a mixture of compounds?

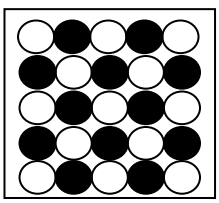
A



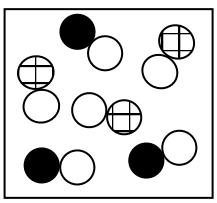
B



C



D



5 Nitrogen is heated in a balloon, which expands slightly.

Which statements about the molecules of nitrogen are correct?

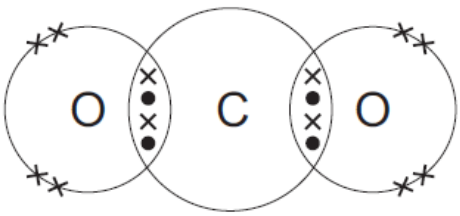
1 They move further apart.
2 They move more quickly.
3 They remain the same distance apart.
4 Their speed remains unchanged.

A 1 and 2 **B** 1 and 4 **C** 2 and 3 **D** 3 and 4

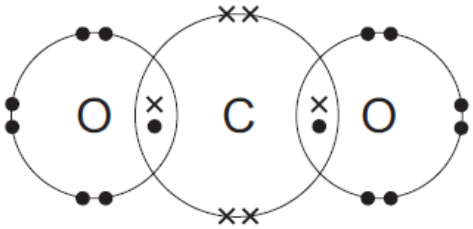
6 The bonding in a molecule of carbon dioxide can be represented by a dot-and-cross diagram.

Which diagram is correct?

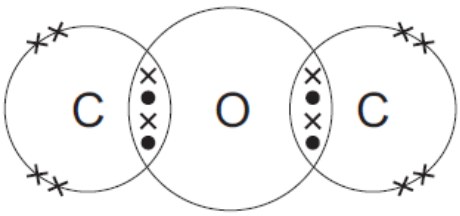
A



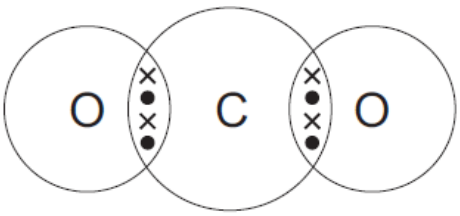
B



C



D



7 Which relative molecular mass, M_r, is not correct for the molecule given?

	molecule	M_r
A	ammonia, NH_3	17
B	carbon dioxide, CO_2	44
C	methane, CH_4	16
D	oxygen, O_2	16

8 The water in a lake is acidic and the fish are dying. The water in the lake needs to be neutralised.

Which compound can be added in excess to neutralise the water in the lake?

A calcium carbonate

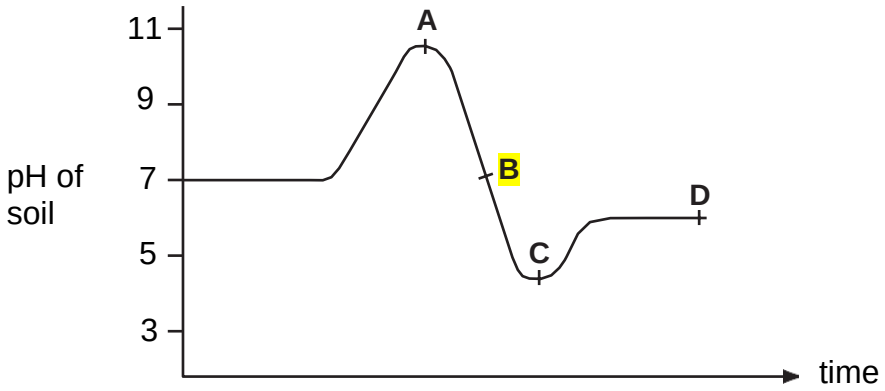
B phosphoric acid

C sodium hydroxide

D magnesium nitrate

9 The graph shows how the pH of soil in a field changed over time.

At which point was the soil neutral?



10 Two incomplete statements about the preparation of an insoluble salt are given.

…...1…... can be used to prepare insoluble salts, such as …...2…... .

The salt is collected by …... 3…... and it is then …...4…... .

Which words correctly complete the missing words in 1–4?

	1	2	3	4
A	precipitation	barium nitrate	filtration	evaporated
B	precipitation	lead(II) sulfate	evaporation	washed and dried
C	precipitation	lead(II) sulfate	filtration	washed and dried
D	titration	barium nitrate	evaporation	washed and dried

11 A compound **X**, when heated with an aqueous solution of compound **Y**, produces a gas that turns red litmus blue.

1 **Y** could be sodium hydroxide.

2 **Y** could be potassium nitrate.

3 **X** could be an ammonium salt.

4 **X** is an acid.

Which statements are correct?

A 1 and 3

B 1 and 4

C 2 and 3

D 2 and 4

12 Dissolving potassium chloride in water is an endothermic change.

Which row shows the energy change and temperature change of the mixture during the dissolving of potassium chloride?

	energy change	temperature change
A	energy is absorbed	decrease
B	energy is absorbed	increase
C	energy is released	decrease
D	energy is released	increase

13 Iron is extracted from its ore in a blast furnace.

Hematite, coke, limestone and hot air are added to the furnace.

Which explanation is **not** correct?

A Coke burns and produces a high temperature.

B Hematite is the ore containing the iron as iron(III) oxide.

C Hot air provides the oxygen for the burning.

D Limestone reduces the iron(III) oxide to iron.

14 Hydrogen will form water when passed over heated oxides of **P** and **Q**, but not when passed over the oxide of **R**. Furthermore, **Q** reduces the oxide of **P**.

From the given information, which of the following can be deduced as the order of the reactivity of the elements, putting the most reactive metal first.

A **P,Q,R** **B** **R,Q,P** **C** **Q,P,R** **D** **R,P,Q**

15 Which process does **not** involve either oxidation or reduction?

A burning propane in the air

B heating copper(II) oxide with carbon

C reacting magnesium with copper(ll) sulfate

D reacting potassium hydroxide with dilute hydrochloric acid

16 Four sources of air pollution are listed.

1 burning fossil fuels containing sulfur
2 nitrogen reacting with oxygen in car engines
3 incomplete combustion of carbon fuels
4 adding lead compounds to petrol

Which sources produce acid rain?

A 1 and 2 **B** 1 and 3 **C** 2 and 3 **D** 3 and 4

17 Which statement about alkenes is correct?

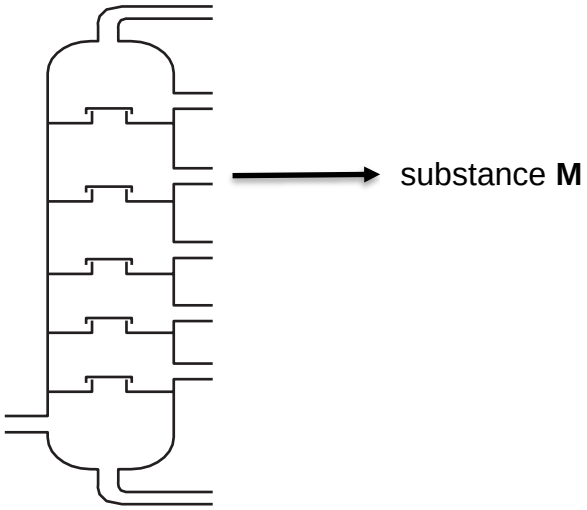
A Alkenes are saturated hydrocarbons.

B Alkenes can be made by cracking other hydrocarbon compounds.

C Alkenes change aqueous bromine from colourless to brown.

D Alkene molecules contain double bonds between carbon atoms and hydrogen atoms.

18 The diagram shows an industrial process. Substance **M** is one of the substances produced by this process and is used as aircraft fuel.



What is this process and what is substance M?

	process	substance **M**
A	fractional distillation	paraffin
B	fractional distillation	petrol
C	thermal decomposition	paraffin
D	thermal decomposition	petrol

19 Ethanol is produced by the fermentation of glucose from sugar cane. In some countries ethanol is used as a fuel.

Which statements are correct?

1 Sugar cane is a renewable resource.

2 When sugar cane is growing it removes carbon dioxide from the atmosphere.

A 1 only

B 2 only

C both 1 and 2

D neither 1 nor 2

20 Which bond is **not** found in a molecule of ethanoic acid?

A C-O **B** C=O **C** C=C **D** O-H

END OF PAPER

DATA SHEET

The Periodic Table of Elements

Group																	
I	II											III	IV	V	VI	VII	0
							1 H hydrogen 1										2 He helium 4
3 Li lithium 7	4 Be beryllium 9		**Key** proton (atomic) number atomic symbol name relative atomic mass									5 B boron 11	6 C carbon 12	7 N nitrogen 14	8 O oxygen 16	9 F fluorine 19	10 Ne neon 20
11 Na sodium 23	12 Mg magnesium 24											13 Al aluminium 27	14 Si silicon 28	15 P phosphorus 31	16 S sulfur 32	17 Cl chlorine 35.5	18 Ar argon 40
19 K potassium 39	20 Ca calcium 40	21 Sc scandium 45	22 Ti titanium 48	23 V vanadium 51	24 Cr chromium 52	25 Mn manganese 55	26 Fe iron 56	27 Co cobalt 59	28 Ni nickel 59	29 Cu copper 64	30 Zn zinc 65	31 Ga gallium 70	32 Ge germanium 73	33 As arsenic 75	34 Se selenium 79	35 Br bromine 80	36 Kr krypton 84
37 Rb rubidium 85	38 Sr strontium 88	39 Y yttrium 89	40 Zr zirconium 91	41 Nb niobium 93	42 Mo molybdenum 96	43 Tc technetium -	44 Ru ruthenium 101	45 Rh rhodium 103	46 Pd palladium 106	47 Ag silver 108	48 Cd cadmium 112	49 In indium 115	50 Sn tin 119	51 Sb antimony 122	52 Te tellurium 128	53 I iodine 127	54 Xe xenon 131
55 Cs caesium 133	56 Ba barium 137	57 – 71 lanthanoids	72 Hf hafnium 178	73 Ta tantalum 181	74 W tungsten 184	75 Re rhenium 186	76 Os osmium 190	77 Ir iridium 192	78 Pt platinum 195	79 Au gold 197	80 Hg mercury 201	81 Tl thallium 204	82 Pb lead 207	83 Bi bismuth 209	84 Po polonium –	85 At astatine –	86 Rn radon –
87 Fr francium –	88 Ra radium –	89 – 103 actinoids	104 Rf Rutherfordium –	105 Db dubnium –	106 Sg seaborgium –	107 Bh bohrium –	108 Hs hassium –	109 Mt meitnerium –	110 Ds darmstadtium –	111 Rg roentgenium –	112 Cn copernicium –		114 Fl flerovium –		116 Lv livermorium –		

lanthanoids	57 La lanthanum 139	58 Ce cerium 140	59 Pr praseodymium 141	60 Nd neodymium 144	61 Pm promethium –	62 Sm samarium 150	63 Eu europium 152	64 Gd gadolinium 157	65 Tb terbium 159	66 Dy dysprosium 163	67 Ho holmium 165	68 Er erbium 167	69 Tm thulium 169	70 Yb ytterbium 173	71 Lu lutetium 175
actinoids	89 Ac actinium –	90 Th thorium 232	91 Pa protactinium 231	92 U uranium 238	93 Np neptunium –	94 Pu plutonium –	95 Am americium –	96 Cm curium –	97 Bk berkelium –	98 Cf californium –	99 Es einsteinium –	100 Fm fermium –	101 Md mendelevium –	102 No nobelium –	103 Lr lawrencium –

The volume of one mole of any gas is 24 dm^3 at room temperature and pressure (r.t.p.).

PRESBYTERIAN HIGH SCHOOL
SCIENCE DEPARTMENT
SUGGESTED ANSWERS

Subject: SCIENCE (CHEMISTRY) Exam: **Prelim Exam**
Setter: Muhd Faeez Year: 2022
Level: **SEC 4 EXP/5N**

Paper 1					
Question	1	2	3	4	5
Answer	B	B	A	D	A

Question	6	7	8	9	10
Answer	A	D	A	B	C

Question	11	12	13	14	15
Answer	A	A	D	B	D

Question	16	17	18	19	20
Answer	A	B	A	C	C