EXP

PUNGGOL SECONDARY SCHOOL
SECONDARY 4/5
EXPRESS
2022 PRELIMINARY EXAMINATION

QUESTION BOOKLET

NAME			
CLASS		INDEX NUMBER	

Science (Physics/Chemistry) 5076/01

Paper 1 **30 August 2022**

1 hour

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 on the OTAS in the spaces provided.

There are **forty** questions in this section. 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 OTAS.

Read the instructions on the OTAS very carefully.

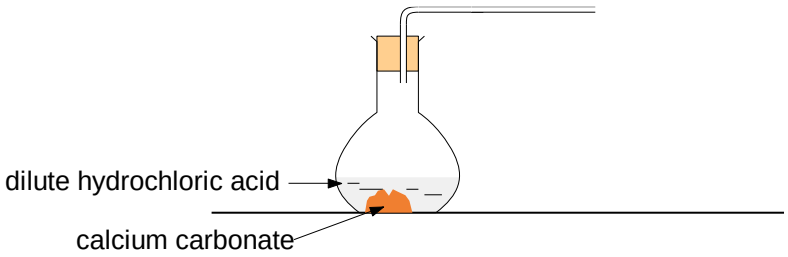
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
Any rough working should be done in this booklet.
A copy of the of the Periodic Table is printed on page 17.
The use of an approved scientific calculator is expected, where appropriate**.**

For Examiner's use	
Physics	-
Chemistry	-
Total	/40

Parent's Signature

Answer **all** questions.

21 What additional apparatus are needed to measure the rate of carbon dioxide produced when calcium carbonate is added to dilute hydrochloric acid in the set-up as shown?



1. stopwatch
2. measuring cylinder
3. gas syringe
4. gas jar

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

22 A colourless solution of **W** is tested separately with aqueous sodium hydroxide and aqueous barium nitrate acidified with dilute nitric acid.

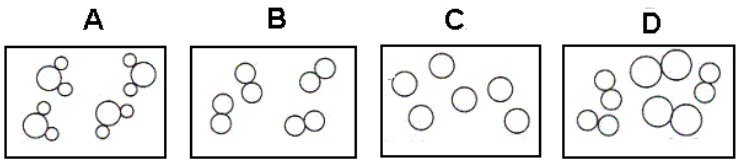
The test results are shown.

test	aqueous sodium hydroxide	aqueous barium nitrate acidified with dilute nitric acid
results	white ppt soluble in excess	white precipitate

Identify the colourless solution of **W**.

A zinc chloride
B zinc sulfate
C calcium nitrate
D calcium sulfate

23 Which diagram shows the arrangement of particles of a mixture of nitrogen and oxygen?

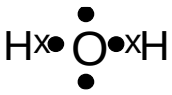


24 Water is a covalently bonded compound made from the elements oxygen and hydrogen.

Which 'dot and cross' diagram shows the arrangement of the outer shell electrons in a molecule of water?

A

B



C

D

25 Which pair of elements form a compound by sharing of electrons?

A carbon and hydrogen
B potassium and chlorine
C helium and nitrogen
D sodium and iodine

26 Why does molten calcium chloride conduct electricity?

A Electron is transferred from calcium to chlorine atoms.
B The calcium and chloride ions are free to move.
C The calcium and chloride electrons are free to move.
D The calcium and chloride ions are attracted to each other strongly.

27 The electronic configuration of some elements are shown in the table.

element	**Q**	**R**
electronic configuration	2,8,8,1	2,7

What is the formula of the compound formed between **Q** and **R**?

A Q_2R_2 **B** R_2Q **C** QR_2 **D** QR

28 An excess of magnesium is added to 200 cm^3 of 1.0 mol/dm^3 hydrochloric acid.

$$Mg\,(s) + 2HCl\,(aq) \rightarrow MgCl_2\,(aq) + H_2\,(g)$$

What is the maximum volume of hydrogen gas produced at room temperature and pressure?

A 0.2 dm^3 **B** 1.2 dm^3 **C** 2.4 dm^3 **D** 4.8 dm^3

29 25 cm^3 of dilute nitric acid is neutralised by 30 cm^3 of 0.5 mol/dm^3 aqueous sodium hydroxide.

$$HNO_3\,(aq) + NaOH\,(aq) \rightarrow NaNO_3\,(aq) + H_2O\,(l)$$

What is the concentration of dilute nitric acid?

A 0.015 mol/dm^3
B 0.03 mol/dm^3
C 0.417 mol/dm^3
D 0.6 mol/dm^3

30 Which statement about the elements in the Periodic Table is correct?

A Elements are arranged in order of their nucleon number.
B The reactivity of Group VII increases down the group.
C Elements in the same Group have similar chemical properties.
D Elements in the same Period have similar physical properties.

31 **R** and **T** are elements in Group VII of the Periodic Table.

R has a melting point of –101°C.
T has a melting point of 114 °C.

Which statement is **not** correct?

A **R** has less electron shells than **T**.
B **R** has more protons than **T**.
C **R** has more electrons than **T**.
D **R** is less reactive than **T**.

32 The reactive series for some metals is shown.

least reactive			→		most reactive
Ag	Cu	Fe	Zn	A*l*	Mg

Which reaction will take place?

A iron + aluminium oxide → aluminium + iron(II) oxide
B aluminium + iron(II)oxide → aluminium oxide + iron
C iron(II) sulfate + copper → iron + copper(II) sulfate
D copper(II) nitrate + silver → copper + silver nitrate

33 Which substance represents a Group I metal?

	malleability	**melting point and boiling point**	**conduction of electricity**
A	malleable	low	good
B	malleable	low	poor
C	non- malleable	high	good
D	malleable	high	poor

34 **Z** is a natural indicator extracted from a vegetable.

It forms a yellow colour in distilled water.
It also forms a yellow colour in acidic solution but changes to red when excess aqueous sodium hydroxide is added to it.

2 ml of **Z** is added to a solution of limewater and vinegar respectively.

What colours are observed?

	limewater	**vinegar**
A	red	red
B	red	yellow
C	yellow	red
D	yellow	yellow

35 Carbon monoxide, oxides of nitrogen and sulfur dioxide are all common pollutants of the air.

Which row describe the effect on the environment and source of the pollutant correctly?

	pollutant	**effect on the environment**	**source**
A	carbon monoxide	acid rain	combustion of fossil fuel
B	sulfur dioxide	global warming	lightning activities
C	oxides of nitrogen	acid rain	lightning activities
D	unburnt hydrocarbons	acid rain	volcanoes eruptions

36 Which row correctly describes the composition of clean and dry air?

	percentage of nitrogen /%	percentage of oxygen /%	percentage of carbon dioxide and noble gases / %	Most abundant noble gas
A	78	21	0.03	helium
B	79	20	1	argon
C	78	21	1	argon
D	78	21	1	helium

37 Dissolving powdered sodium hydroxide in water is an exothermic process.

Which row describes the changes correctly?

	temperature changes	energy change
A	fall	absorbed from surroundings
B	rise	absorbed from surroundings
C	fall	given out to surroundings
D	rise	given out to surroundings

38 The alkanes are a homologous series of organic compounds.

Which row describes the physical properties correctly as the number of carbon atoms increases in the series?

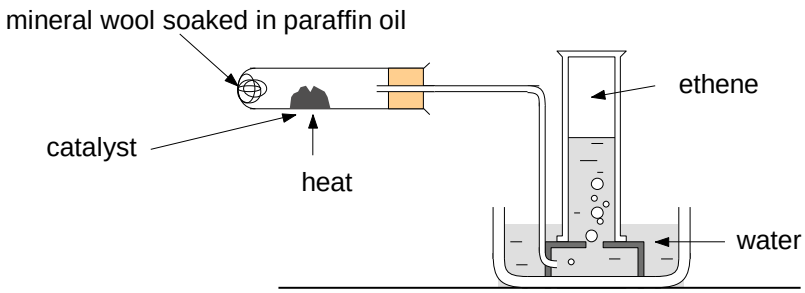
	viscosity	flammability	melting point
A	decreases	decreases	decreases
B	increases	decreases	increases
C	increases	increases	decreases
D	decreases	increases	increases

39 Chlorine gas reacts with methane under certain conditions.

Which row describes the type of reaction and the conditions required?

	type of reaction	**conditions**
A	substitution	presence of ultraviolet light
B	addition	complete darkness
C	addition	presence of ultraviolet light
D	substitution	complete darkness

40 The apparatus is used in the laboratory to produce ethene from paraffin oil.



What type of reaction is taking place?

A oxidation
B addition
C combustion
D cracking

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											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 A*l* aluminium 27	14 Si silicon 28	15 P phosphorus 31	16 S sulfur 32	17 C*l* 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 T*l* 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 F*l* flerovium –		116 Lv livermorium –		

Key

proton (atomic) number
atomic symbol
name
relative atomic mass

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.).