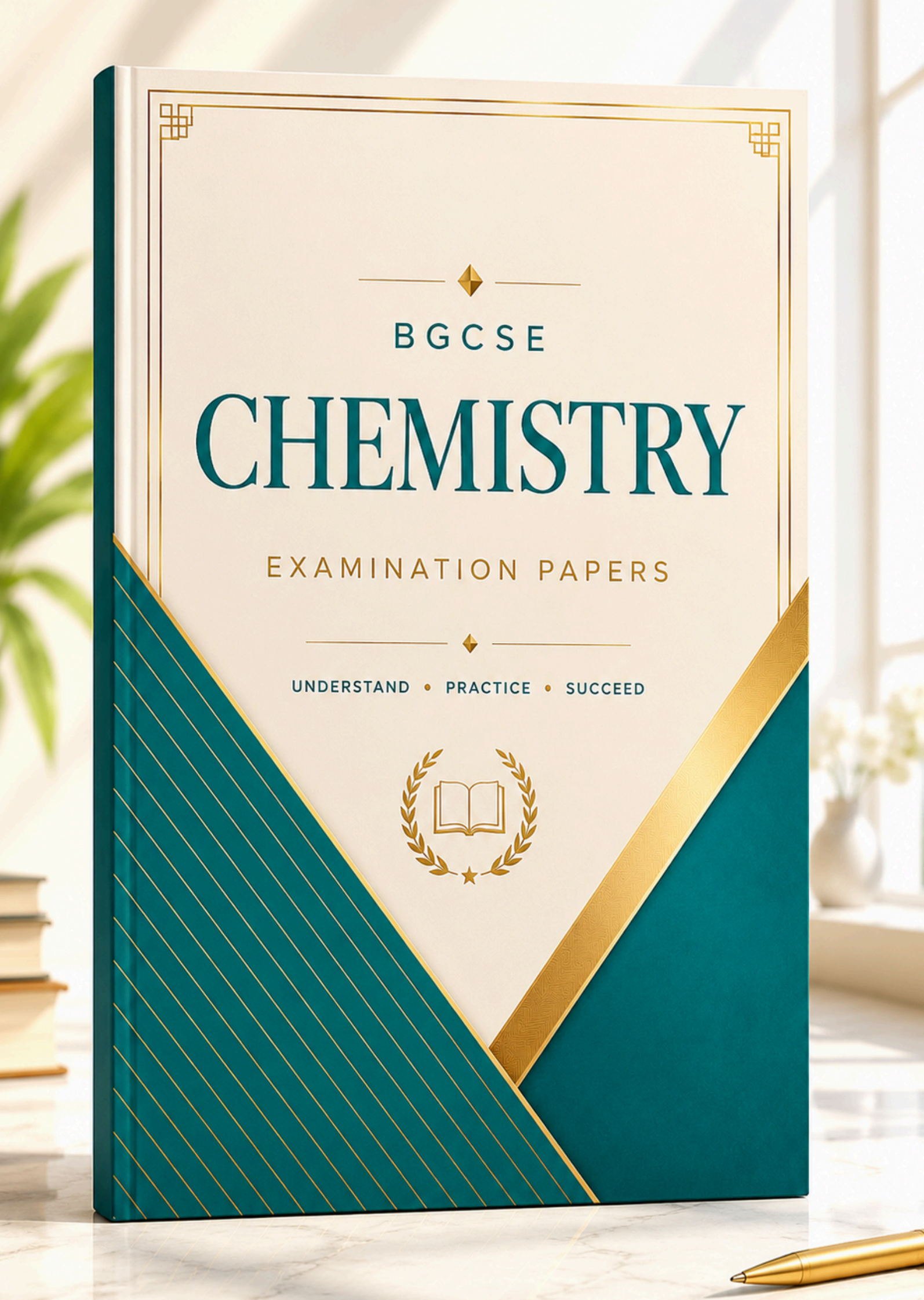
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School Number	Candidate Number
Surname and Initials	

CHEMISTRY

PAPER 1
(50 marks)

Wednesday **21 MAY 2025** **12:00 NOON–1:15 P.M.**
(1 hr. 15 mins)

Additional materials:
Calculator

MINISTRY OF EDUCATION
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BAHAMAS GENERAL CERTIFICATE OF SECONDARY EDUCATION

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Write your school number, candidate number, surname and initials in the spaces provided above.

Answer **ALL** the questions on this paper.

For each question in this paper, **four** suggested answers, A, B, C and D are given.

Circle the letter of the response which you consider to be correct.

Attempt **ALL** the questions. Marks will **NOT** be deducted for wrong answers. Your total score on this test will be the number of correct answers given.

Relative atomic masses are given in the Periodic Table provided on page 2.

The volume of one mole of gas at room temperature and pressure (r.t.p.) is 24,000 cm^3 and at standard temperature and pressure (s.t.p.) is 22,400 cm^3.

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TOTAL MARKS	

This question paper consists of 15 printed pages and 1 blank page.

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The Periodic Table of the Elements

Group																	
I	II										III	IV	V	VI	VII	0
							1 H Hydrogen 1									4 He Helium 2
7 Li Lithium 3	9 Be Beryllium 4										11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10
23 Na Sodium 11	24 Mg Magnesium 12										27 Al Aluminium 13	28 Si Silicon 14	31 P Phosphorus 15	32 S Sulphur 16	35.5 Cl Chlorine 17	40 Ar Argon 18
39 K Potassium 19	40 Ca Calcium 20	45 Sc Scandium 21	48 Ti Titanium 22	51 V Vanadium 23	52 Cr Chromium 24	55 Mn Manganese 25	56 Fe Iron 26	59 Co Cobalt 27	59 Ni Nickel 28	64 Cu Copper 29	65 Zn Zinc 30	70 Ga Gallium 31	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	84 Kr Krypton 36
85 Rb Rubidium 37	88 Sr Strontium 38	89 Y Yttrium 39	91 Zr Zirconium 40	93 Nb Niobium 41	96 Mo Molybdenum 42	Tc Technetium 43	101 Ru Ruthenium 44	103 Rh Rhodium 45	106 Pd Palladium 46	108 Ag Silver 47	112 Cd Cadmium 48	115 In Indium 49	119 Sn Tin 50	122 Sb Antimony 51	128 Te Tellurium 52	127 I Iodine 53	131 Xe Xenon 54
133 Cs Caesium 55	137 Ba Barium 56	139 La Lanthanum 57 *	178 Hf Hafnium 72	181 Ta Tantalum 73	184 W Tungsten 74	186 Re Rhenium 75	190 Os Osmium 76	192 Ir Iridium 77	195 Pt Platinum 78	197 Au Gold 79	201 Hg Mercury 80	204 Tl Thallium 81	207 Pb Lead 82	209 Bi Bismuth 83	Po Polonium 84	At Astatine 85	Rn Radon 86
Fr Francium 87	226 Ra Radium 88	227 Ac Actinium 89 †															

140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	Pm Promethium 61	150 Sm Samarium 62	152 Eu Europium 63	157 Gd Gadolinium 64	159 Tb Terbium 65	162 Dy Dysprosium 66	165 Ho Holmium 67	167 Er Erbium 68	169 Tm Thulium 69	173 Yb Ytterbium 70	175 Lu Lutetium 71
232 Th Thorium 90	Pa Protactinium 91	238 U Uranium 92	Np Neptunium 93	Pu Plutonium 94	Am Americium 95	Cm Curium 96	Bk Berkelium 97	Cf Californium 98	Es Einsteinium 99	Fm Fermium 100	Md Mendelevium 101	No Nobelium 102	Lr Lawrencium 103

*58-71 Lanthanoid series
†90-103 Actinoid series

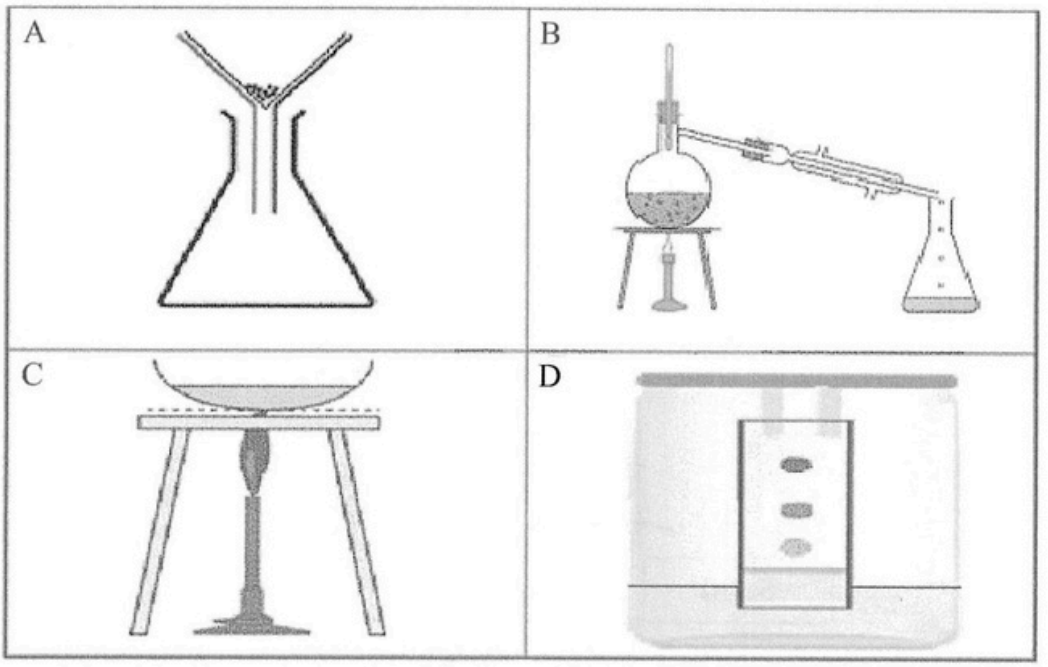
Key: a X b — a = relative atomic mass; X = atomic symbol; b = proton (atomic) number

1. A student conducts an investigation to see if the green color in grass is a mixture.

Which method can the student use to carry out their investigation?

A. centrifugation
B. chromatography
C. distillation
D. evaporation

2. Which method shown should be used to obtain pure water from a mixture containing salt, sand and water?



3. The number of particles in one mole of oxygen gas, O_2 is

A. 6.02×10^{23} atoms.
B. 6.02×10^{23} molecules.
C. 6.02×10^{23} ions.
D. 2 atoms.

4. The table shows the melting and boiling point of four substances **A, B, C** and **D**.

Which of the substances is a gas at 20 °C?

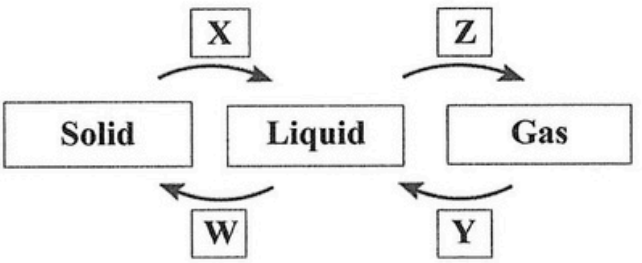
Substance	Melting Point (°C)	Boiling Point (°C)
A	-104	-29
B	1063	2970
C	801	1413
D	3550	4830

5. When bromine liquid is placed at the bottom of a gas jar, the bromine gas soon fills the vessel.

Why does this occur?

A. Gaseous bromine has condensed and evaporated.
B. Gaseous bromine has evaporated.
C. Liquid bromine has diffused.
D. Liquid bromine has evaporated and then diffused.

The diagram represents the changes in states of matter. Use the diagram below to answer questions 6 and 7.



6. In which changes do particles move further apart?

A. **W** and **X**
B. **W** and **Z**
C. **X** and **Z**
D. **Y** and **Z**

7. Which change of state represents condensation?

A. **W**
B. **X**
C. **Y**
D. **Z**

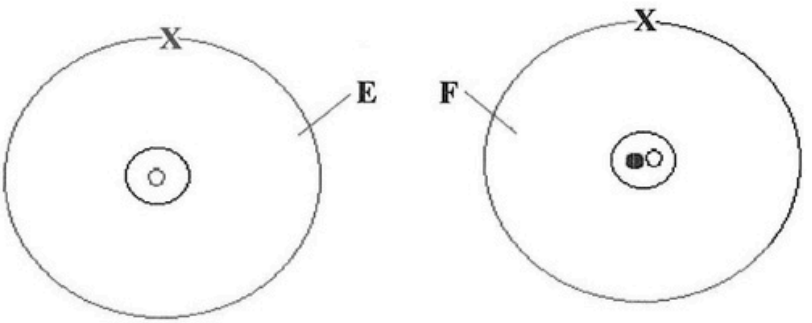
8. An atom has a symbol ${}^{A}_{B}T$. Which value determines the position of atom T on the Periodic Table?

A. A
B. B
C. A − B
D. A + B

9. Which pair contains the same number of neutrons?

A. ${}^{59}_{27}Co$ and ${}^{59}_{28}Ni$
B. ${}^{65}_{29}Cu$ and ${}^{64}_{29}Cu$
C. ${}^{64}_{29}Cu$ and ${}^{65}_{30}Zn$
D. ${}^{65}_{29}Cu$ and ${}^{65}_{30}Zn$

Diagrams **E** and **F** show two different atoms of hydrogen.
Use the diagrams to answer questions 10 and 11.



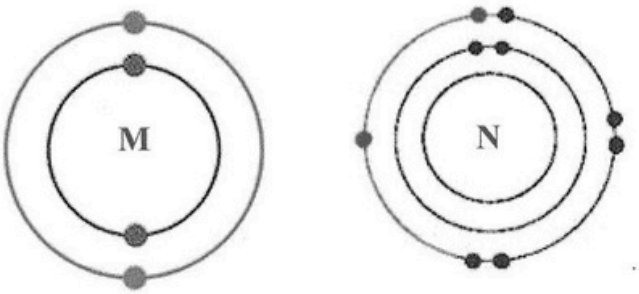
10. Why are both atoms described as neutral?

A. They have the same number of electrons and neutrons.
B. They have the same number of electrons and protons.
C. They have the same number of electrons, neutrons and protons.
D. They have the same number of neutrons and protons.

11. Which statement about **X** and **Y** is correct?

A. Atoms **X** and **Y** have different atomic numbers.
B. Atoms **X** and **Y** have different number of neutrons.
C. Atoms **X** and **Y** have the same atomic number.
D. Atoms **X** and **Y** have the same mass numbers.

12. The atomic structures of two atoms **M** and **N** are shown.
M and **N** react and form a compound.



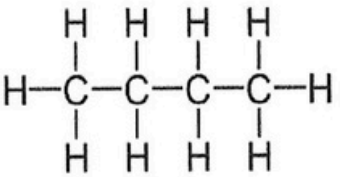
Which row shows the type of bonding and chemical formula found in this compound?

	Type of bonding	**Chemical formula of compound**
A.	Covalent	NM_2
B.	Covalent	N_2M
C.	Ionic	MN_2
D.	Ionic	M_2N

13. Which change occurs when an atom forms a positive ion?

A. It gains electrons.
B. It gains protons.
C. It loses electrons.
D. It loses protons.

14. The structural formula of the organic compound butane is shown.



What is the empirical formula of butane?

A. C_2H_5
B. C_2H_6
C. C_4H_5
D. C_4H_{10}

15. Which of the following is a property of sulfur?

A. It is a metal
B. It has a yellow color
C. It is a gas at room temperature
D. It is a good conductor of electricity

16. Which one of the elements shown is **not** a diatomic molecule?

A. chlorine
B. hydrogen
C. nitrogen
D. sulfur

17. The reaction between chlorine and sodium bromide is shown.

$$Cl_2(g) + 2NaBr(aq) \longrightarrow 2NaCl(aq) + Br_2(g)$$

This reaction can occur because chlorine is more reactive than bromine.

Which of the statements does **not** give an accurate reason why chlorine is more reactive than bromine?

A. Chlorine atoms gain electrons more easily.
B. Chlorine atoms have fewer electron shells than bromine.
C. Chlorine atoms have 7 valence electrons.
D. Chlorine has smaller atoms than bromine.

18. Which non-metal is the least reactive?

A. chlorine
B. fluorine
C. nitrogen
D. oxygen

19. Which statement about alkane molecules is true?

A. They burn in oxygen.
B. They contain carbon, hydrogen and oxygen atoms.
C. They contain double bonds.
D. They contain ionic bonds.

20. Coal is a fossil fuel.

Which type of organism is responsible for the formation of coal?

A. animals only
B. both animals and vegetation
C. neither animals or vegetation
D. vegetation only

21. What is the most abundant gas in natural gas?

A. carbon dioxide
B. hydrogen
C. methane
D. propane

22. Which statement is true of organic compounds?

A. They always contain carbon and hydrogen.
B. They are only found in living organisms.
C. They do not react with other elements.
D. They are always inorganic in nature.

23. Which row correctly identifies the general formula of an alkene and the molecular formula of the shortest alkene?

	General Formula	Molecular Formula
A	C_nH_{2n}	CH_2
B	C_nH_{2n}	C_2H_4
C	$C_nH_{(2n+2)}$	C_2H_4
D	$C_nH_{(2n+2)}$	C_3H_6

24. Which compound contains two of the three essential elements needed for a fertilizer useful to farmers in Andros?

A. ammonium chloride
B. ammonium nitrate
C. ammonium phosphate
D. ammonium sulfate

25. Which pollutant does **not** affect respiration?

A. carbon monoxide
B. lead compounds
C. oxides of nitrogen
D. sulfur dioxide

26. Which gas is a greenhouse gas?

A. ethane
B. carbon monoxide
C. methane
D. nitrogen

27. Which one of the substances is acidic?

A. baking soda
B. iodized salt
C. lemon juice
D. oven-cleaner

28. Which gas is produced when zinc reacts with hydrochloric acid?

A. carbon dioxide
B. chlorine
C. hydrogen
D. oxygen gas

29. Which kind of solution is colourless in phenolphthalein?

A. acid
B. alkali
C. base
D. neutral

30. Indigestion can be caused by excess acid in the stomach.

Which of the following substances could be an active ingredient in an indigestion tablet?

A. glucose
B. magnesium hydroxide
C. sodium chloride
D. vinegar

31. Potassium nitrate is made from aqueous potassium hydroxide and nitric acid.

What is the correct sequence of steps in this preparation?

	Step 1	Step 2	Step 3
A	evaporation	crystallization	neutralization
B	evaporation	neutralization	crystallization
C	neutralization	crystallization	evaporation
D	neutralization	evaporation	crystallization

32. Aqueous sodium hydroxide is added to an unknown solution. A dirty-green precipitate is formed which slowly turns rusty brown.

Which ion is present in the solution?

A. Ba^{2+}
B. Cu^{2+}
C. Fe^{2+}
D. Zn^{2+}

33. Which type of reaction takes place when an iron nail is rusting?

A. neutralization
B. oxidation-reduction
C. polymerization
D. synthesis

34. Which gas burns with a "squeaky pop"?

A. carbon dioxide
B. chlorine
C. hydrogen
D. oxygen

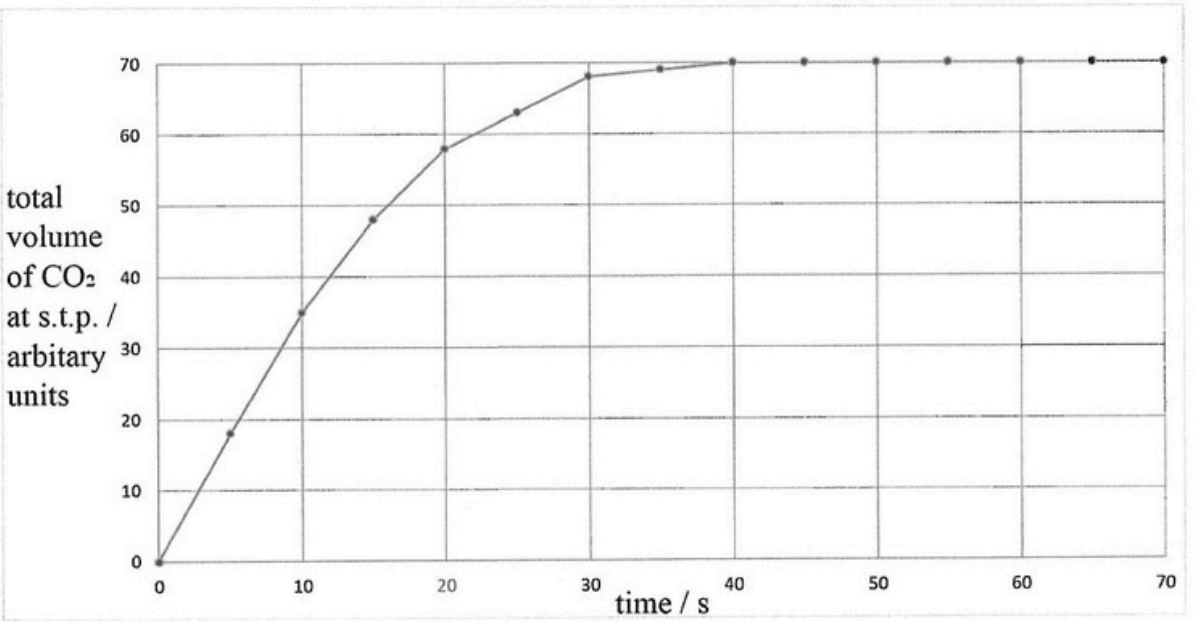
35. The table shows the results of a series of tests on a solution.

test	result
anhydrous copper(II) sulfate	turns blue
universal indicator paper	turns red
silver nitrate solution	forms a white precipitate

Which substances are present in the solution?

A. ethanol, an acid and halide ions
B. ethanol, an alkali and halide ions
C. water, an acid and halide ions
D. water, an alkali and carbonate ions

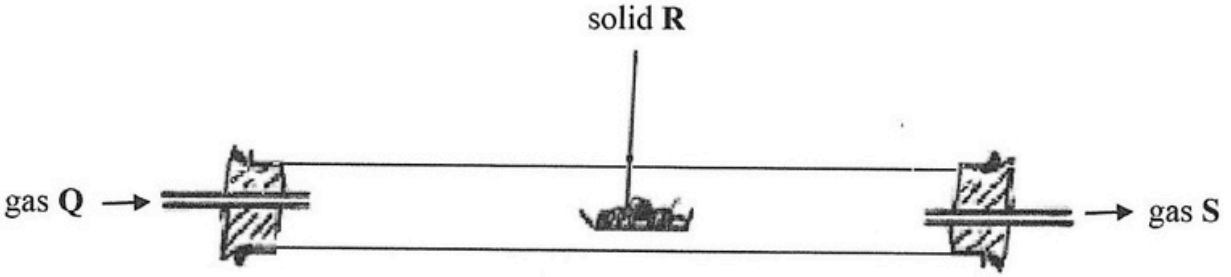
36. The graph represents the progress of a reaction between calcium carbonate and an excess of hydrochloric acid. The curve shows how the total volume of carbon dioxide liberated (at s.t.p.) varied with time.



How long did it take for half the volume of carbon dioxide to be liberated?

A. 10 s
B. 15 s
C. 20 s
D. 40 s

37. The apparatus is used to prepare gas **S** by reacting the gas **Q** with solid **R**.



Gas **S** is used in photosynthesis.

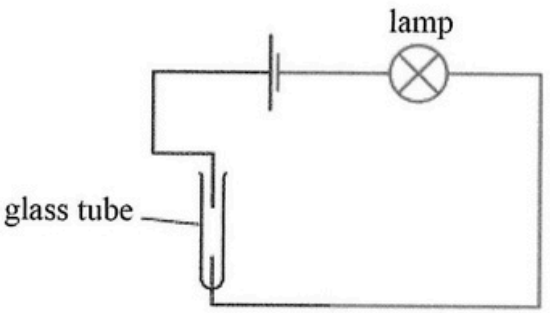
Gas **Q** is a poisonous, diatomic gas.

Solid **R** is black and turns reddish-brown.

Using these facts, what are gases **Q** and **S** and solid **R**?

	gas Q	**solid R**	**gas S**
A	carbon dioxide	sodium oxide	carbon monoxide
B	carbon monoxide	copper(II) oxide	carbon dioxide
C	carbon monoxide	potassium oxide	carbon dioxide
D	steam	copper(II) oxide	hydrogen

38. The diagram shows an incomplete circuit.



Which substance causes the lamp to light when added to the glass tube?

A. aqueous sodium chloride
B. aqueous sugar
C. solid sodium chloride
D. solid sugar

39. Iron nails coated with zinc is said to be galvanized and protects the nails from rusting. This process is sacrificial protection.

What is occurring during this process?

A. Iron is oxidized and loses electrons to zinc.
B. Iron is reduced and loses electrons to zinc.
C. Zinc is oxidized and loses electrons to iron.
D. Zinc is reduced and loses electrons to iron.

40. Which group reacts with hydrogen to form acidic gases?

A. alkali metals
B. alkaline earth metals
C. halogens
D. noble gases

41. Which element exists in different forms, shares electrons and conducts electricity?

A. carbon
B. fluorine
C. nitrogen
D. sulfur

42. Which group has coloured elements?

A. alkali metals
B. alkaline earth metals
C. halogens
D. noble gases

43. Which element is the most electronegative?

A. carbon
B. fluorine
C. nitrogen
D. sulfur

44. Which substance is aluminium commercially extracted from?

A. bauxite
B. haematite
C. magnetite
D. siderite

45. Which property of metals is useful in making ornaments?

A. conductivity
B. high melting and boiling points
C. lustre
D. strength

Study the table to answer questions 46-49.

metal	reactivity in dilute HC*l*	extraction method
A	reacts slowly at first and then vigorously	electrolysis
B	no reaction	purified by electrolysis
C	violent reaction (not done in the lab)	electrolysis
D	reacts with the acid	reduction

46. Which letter represents a metal used to make airplanes? A B C D

47. Which letter represents a Group 1 metal? A B C D

48. Which letter represents a pinky brown metal used to make pots? A B C D

49. Which letter represents a metal that can be extracted by the Blast Furnace? A B C D

50. Which source of energy is finite?

A. fossil fuels
B. hydroelectric power
C. solar energy
D. tidal power

End]

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