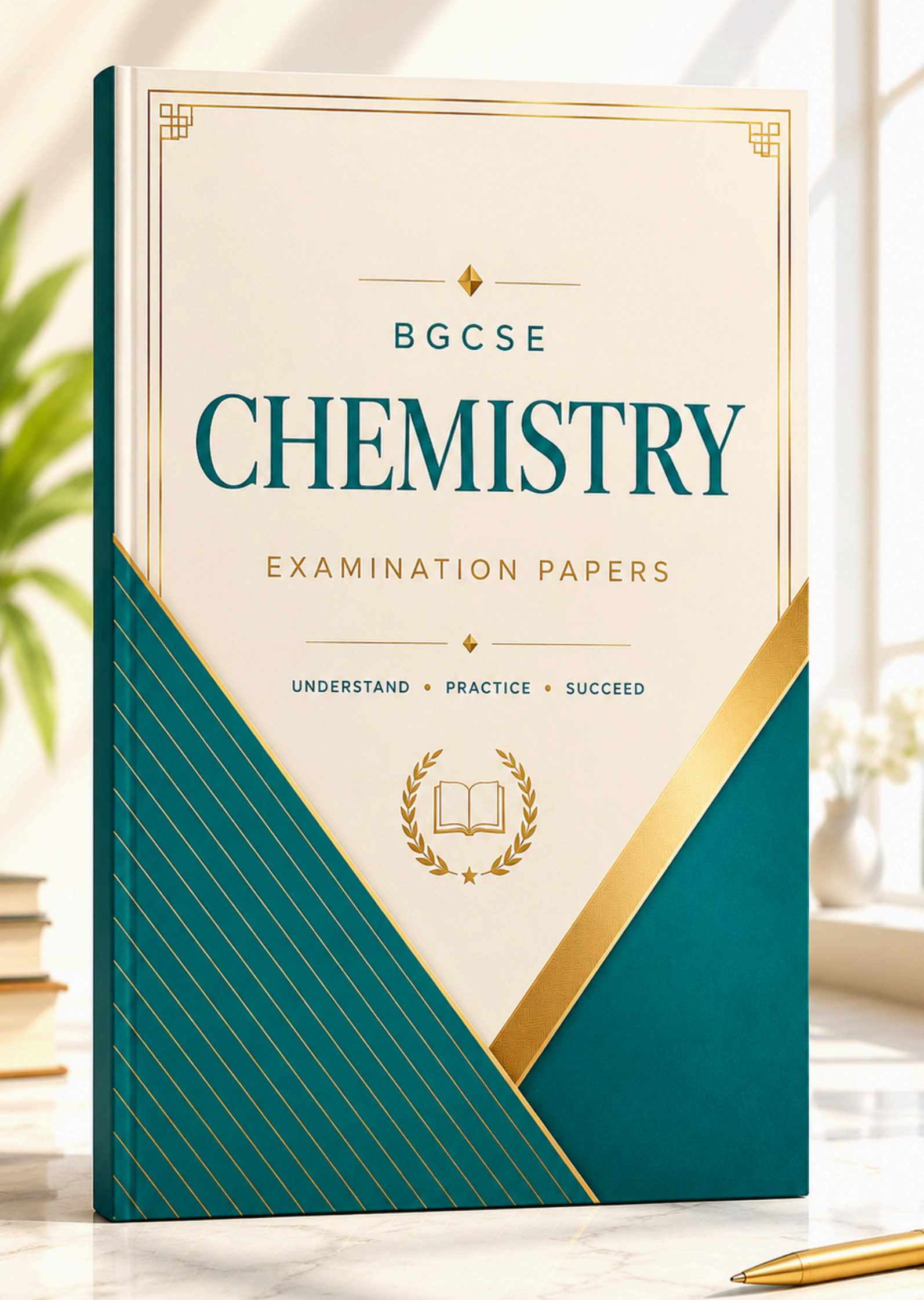
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The Periodic Table of the Elements

Group I	Group II											Group III	Group IV	Group V	Group VI	Group VII	Group 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 †															

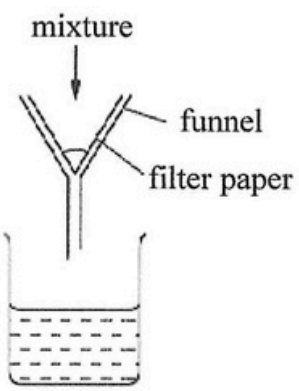
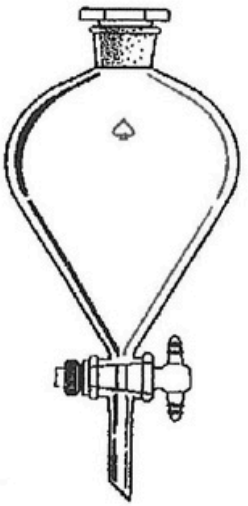
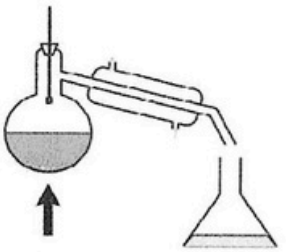
140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	Pm Promethium 61	150 Sm Samarium 62	152 Eu Europium 63	157 Gd Gadolinium 64	159 Tb Terbium 65	162 Dy Dysprosium 66	165 Ho Holmium 67	167 Er Erbium 68	169 Tm Thulium 69	173 Yb Ytterbium 70	175 Lu Lutetium 71
232 Th Thorium 90	Pa Protactinium 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. The diagrams show four methods of separation.

Which separation technique is used to separate oil and water?

			
A	B	C	D

2. The diagrams show four uses of iron.

In which of these is the iron most likely to rust?

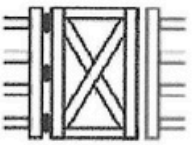
A

iron bucket electroplated with zinc

B

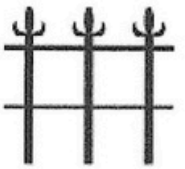
aluminium wire around iron core

C



iron hinges on a gate

D



painted iron fence

3. What is the most appropriate unit to determine the amount of a substance?

A kilograms
B litres
C metres
D moles

4. A student carries out an experiment to find out how fast 4 cm long pieces of magnesium ribbon dissolve in 5 cm^3 samples of sulphuric acid at different temperatures.

Which piece of apparatus is **not** needed?

A balance
B measuring cylinder
C stop clock
D thermometer

5. What is the effect on particles when the temperature of a substance is increased?

A Particles gain energy and move faster.
B Particles gain energy and move slower.
C Particles lose energy and move faster.
D Particles lose energy and move slower.

6. Which statements accurately describe what happens when a solid becomes a liquid and a liquid becomes a gas?

	solid becomes a liquid	**liquid becomes a gas**
A	heat energy increased	heat energy increased
B	heat energy increased	heat energy decreased
C	heat energy decreased	heat energy increased
D	heat energy decreased	heat energy decreased

7. Which pair of processes is explained by kinetic theory?

A corrosion and rusting
B diffusion and elastic collisions
C oxidation and reduction
D photosynthesis and respiration

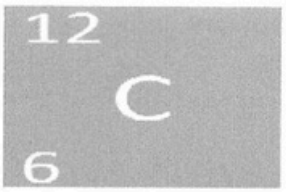
8. How does magnesium become a stable particle?

A It gains two electrons to become negative.
B It gains two protons to become positive.
C It loses two electrons to become positive.
D It loses two protons to become negative.

9. Which part of the atom contributes to its mass **and** charge?

A electron
B neutron
C orbital
D proton

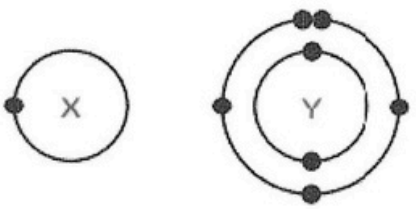
10. Carbon may be written using the symbol.



Which statement correctly describes these two numbers?

A 12 is the atomic mass; 6 is the atomic number.
B 12 is the atomic number; 6 is the atomic mass.
C 12 is the electron number; 6 is the neutron number.
D 12 is the neutron number; 6 is the electron number.

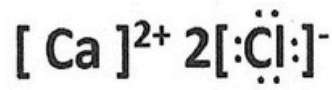
11. The electronic structure of atoms X and Y are shown.



Give the chemical formula of the compound formed when X and Y react.

A XY
B XY_3
C XY_5
D X_3Y

The diagram should be used to answer question 12 and question 13.



12. How did calcium and chlorine become charged particles?

A Calcium gained two protons from two chlorine atoms.
B Calcium lost two electrons from two chlorine atoms.
C Two chlorine atoms gained one electron each from a calcium atom.
D Two chlorine atoms lost one electron each to a calcium atom.

13. Which type of bonding is shown in the diagram?

A covalent bonding
B hydrogen bonding
C ionic bonding
D metallic bonding

14. The reaction between magnesium and carbon dioxide is represented by the equation shown.

$$2\,Mg + CO_2 \rightarrow 2MgO + C$$

Which statement describes what happens in this reaction?

A Carbon is oxidised.
B Magnesium is reduced.
C Neither oxidation or reduction occurs.
D The carbon in carbon dioxide is reduced.

15. Bones are made up of calcium phosphate, $Ca_3(PO_4)_2$.

What is the correct relative molecular mass, Mr, of calcium phosphate?

A 135
B 215
C 279
D 310

16. What is the valency number of tin in SnO_2?

A +1
B +2
C +3
D +4

17. Substance Y has the following properties:

- slippery when touched
- tastes bitter
- turns red litmus paper blue.

How should substance Y be classified?

A acidic
B alkaline
C amphoteric
D neutral

18. Which ion is present in all alkaline solutions?

A H^+
B NH_4^+
C OH^-
D SO_4^{2-}

19. A solution contains barium and silver ions.

Which of the following ions could also be present?

A chloride or nitrate or sulfate
B chloride only
C nitrate only
D sulphate only

20. Which method may be used to determine the concentration of nitric acid?

A distillation
B filtration
C precipitation
D titration

21. A tourist spilled vinegar dressing on a limestone table and noticed tiny bubbles were produced.

Which word equation correctly shows the reaction?

A vinegar + limestone ⟶ salt + carbon dioxide + water
B vinegar + limestone ⟶ salt + hydrogen + water
C vinegar + limestone ⟶ salt + nitrogen + water
D vinegar + limestone ⟶ salt + oxygen + water

22. Streetlights have a golden yellow glow.

Which ion is responsible for this colour?

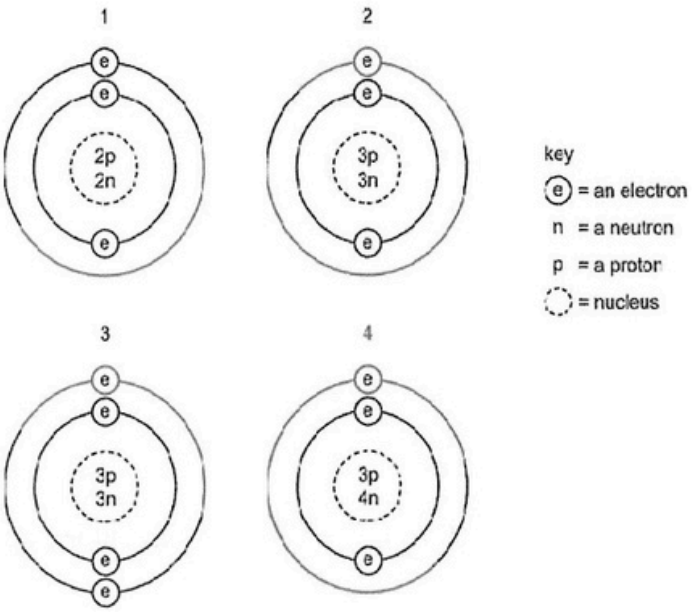
A Ca^{2+}
B K^{+}
C Mg^{2+}
D Na^{+}

23. Diamond and graphite are macromolecules.

Which statement about diamond and graphite is **true**?

A They are insoluble in water.
B They have the same crystal structure.
C They have the same degree of hardness.
D They have the same electrical conductivity.

24. The diagram shows four particles.



Which two diagrams show atoms that are isotopes of each other?

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

25. Gas C bleaches litmus paper.

What is gas C?

A carbon dioxide
B chlorine
C hydrogen
D oxygen

26. Aragonite, a form of calcium carbonate, is mined in The Bahamas.

Name the ore from which metal can be extracted using aragonite.

A asbestos
B bauxite
C haematite
D rock salt

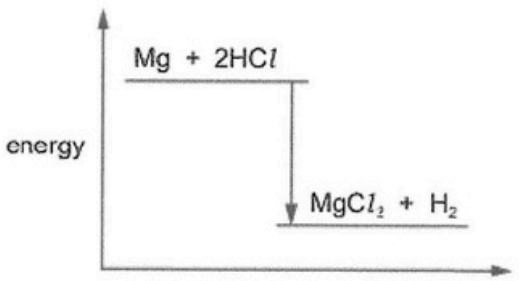
27. Some properties of four elements, W, X, Y and Z, are listed.

1. W melts at 1410 °C and forms an acidic oxide.
2. X has a high density and has a loud sound when hit.
3. Y acts as a catalyst and its oxides react with acids.
4. Z is a lemon-yellow solid which is insoluble in water.

Which of the elements are metals?

A 1 and 3 only
B 2 and 3 only
C 2 and 4 only
D 2, 3 and 4

28. The energy level diagram for the reaction between magnesium and hydrochloric acid is shown.



Which statement about the reaction is **not** correct?

A Energy is given out during the reaction.
B The products are at a lower energy level than the reactants.
C The reaction is endothermic.
D The temperature rises during the reaction.

29. Which metal could **not** be used for electroplating by using an aqueous solution?

A copper
B lithium
C silver
D zinc

30. Which of the following is an electrolyte?

A distilled water
B ethanol
C sugar solution
D tap water

31. Which of the following is the correct order of reactivity of metals, from most reactive to least reactive, based on their reaction with water?

A calcium – magnesium – potassium – sodium
B magnesium – potassium – sodium – calcium
C potassium – sodium – calcium – magnesium
D sodium – calcium – magnesium – potassium

32. Which of the following is an acid salt?

A $AgCl$
B $CaCl_2$
C $MgSO_4$
D $NaHSO_4$

33. Which element would gain **one** electron when forming a compound?

A fluorine
B helium
C oxygen
D sodium

34. Which statement about Group I metals is **not** correct?

A Their reactivity decreases down the group.
B They have relatively low melting and boiling points.
C They react with water to produce hydrogen gas.
D They should not be reacted with an acid in a high school lab.

35. Which group in the Periodic Table has elements that exist as monoatomic gases?

A Group 0
B Group V
C Group VI
D Group VII

36. Platinum is an expensive metal.

Which statement explains why platinum microscopic wires (nanowires) are used as catalysts in fuel cells?

A It gives the reactants more energy.
B It increases the concentration of the reactants.
C It increases the surface area of the reactants.
D It makes reactants move faster.

37. During the extraction process of aluminium, the carbon anodes have to be replaced periodically.

Which statement explains why?

A They are oxidised.
B They react to produce aluminium oxide.
C They react to form an aqueous solution.
D They react to produce aluminium oxide in the reaction.

38. Information about an element is displayed in the table.

Which element is a metal?

	Charge on element ion	Electrical conductivity
A	negative	good
B	negative	poor
C	positive	good
D	positive	poor

39. Which atom has two more electrons than an atom of a noble gas?

A aluminium
B bromine
C magnesium
D rubidium

40. Which statement best explains why iron window frames on a house close to the sea rust more quickly than ones further inland?

A Sea spray contains salts dissolved in water.
B Sea spray causes all metals to rust.
C The cooler nights near the sea increase the rate of rusting.
D The sea air is less moist than air further inland.

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

A chlorine
B hydrogen
C oxygen
D sulphur

42. Which of the non-metals shown is a colourless, odourless gas that relights a glowing splint?

A chlorine
B hydrogen
C nitrogen
D oxygen

43. Which of the following properties characteristically represents a non-metal?

A forms positive ions
B high electronegativity
C high melting point
D reducing agent

44. What is the general formula of an alkene?

A C_nH_{2n-1}
B C_nH_{2n}
C C_nH_{2n+1}
D C_nH_{2n+2}

45. What is the main constituent of natural gas?

A carbon dioxide
B ethane
C hydrogen
D methane

46. Carbon monoxide is an air pollutant produced when gasoline is burned in a car engine.

Why is carbon monoxide considered to be an air pollutant?

A It causes climate change.
B It causes the corrosion of buildings.
C It is a significant greenhouse gas.
D It is poisonous.

47. Which substance is **not** essential for the formation of ethanol by fermentation?

A light
B sugar
C water
D yeast

48. Global temperatures have been steadily rising.

Which has been the greatest contributor of these increasing temperatures?

A burning of forests
B burning of fossil fuels
C exhaust from motor vehicles
D melting of the polar ice caps

49. Sulphur dioxide, carbon monoxide and oxides of nitrogen are common gaseous pollutants found in the air.

Which pollutants contribute most to acid rain?

A carbon monoxide and oxides of nitrogen
B carbon monoxide and sulphur dioxide
C oxides of nitrogen and sulphur dioxide
D oxides of nitrogen only

50. Which element do plants need for healthy growth?

A boron
B fluorine
C nitrogen
D sodium

End]

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