



ZIMBABWE SCHOOL EXAMINATIONS COUNCIL
General Certificate of Education Ordinary Level

CHEMISTRY

PAPER 1 Multiple Choice

4024/1

1 hour

JUNE 2024 SESSION

Additional materials:

Multiple Choice answer sheet

Soft clean eraser

Soft pencil (type B or HB is recommended)

Electronic calculator

INSTRUCTIONS TO CANDIDATES

Write your name, centre number and candidate number on the answer sheet in the spaces provided unless this has already been done for you.

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

INFORMATION FOR CANDIDATES

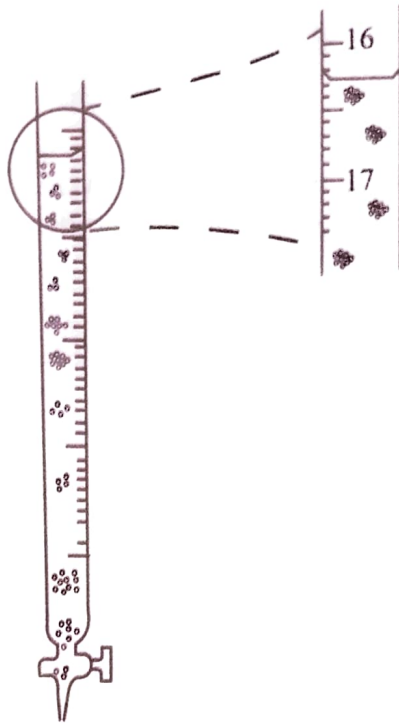
A copy of the Periodic Table is printed on page 19.

This question paper consists of 19 printed pages and 1 blank page.

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[Turn over

1. The diagram shows part of a burette.



What reading is shown on the diagram?

- A 16.25 cm^3
 B 16.20 cm^3
 C 16.29 cm^3
 D 17.75 cm^3
2. An ion of an element X is represented as follows.

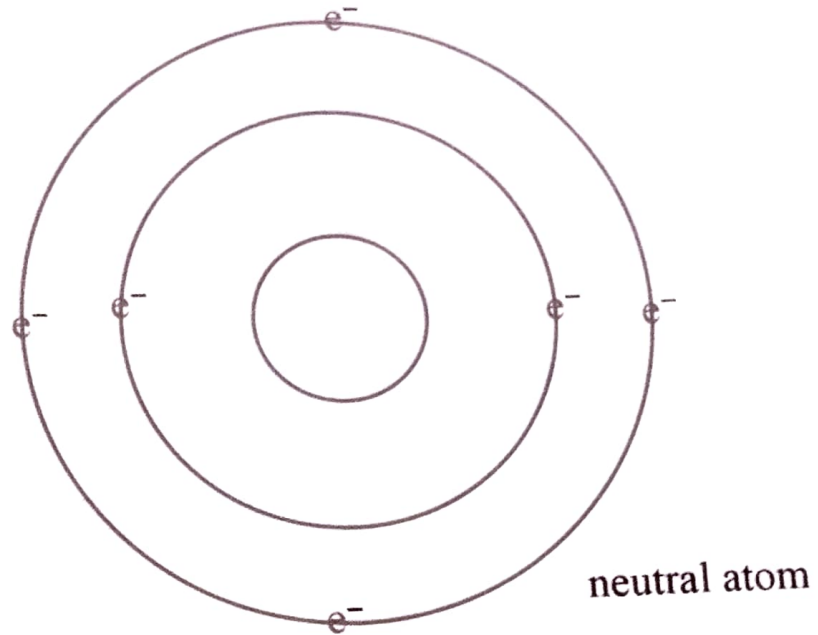


Which statement about X is true?

- A Y is the nucleon number.
 B Z is the atomic number.
 C W is the proton number.
 D W is the charge on the ion.



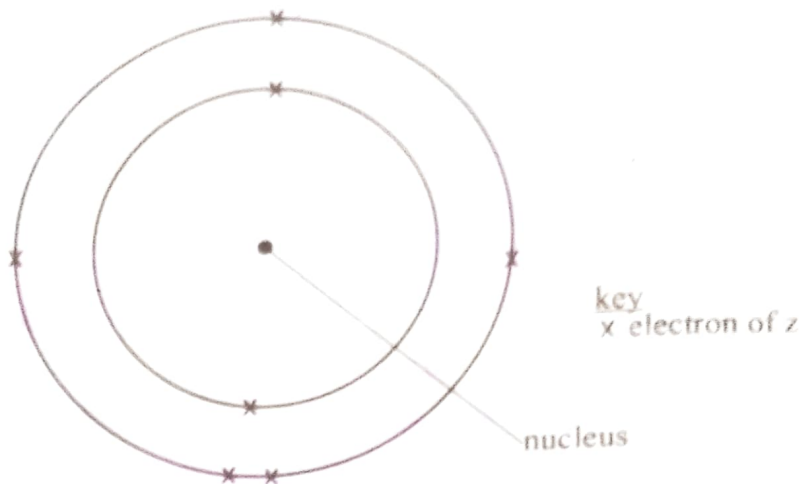
3. The diagram shows the structure of a neutral atom of an element.



How many protons does the atom have?

- A 6
- B 7
- C 13
- D 12

4. The diagram shows the atomic structure of a neutral atom of an element **z**.



To which group of the periodic table does element **z** belong?

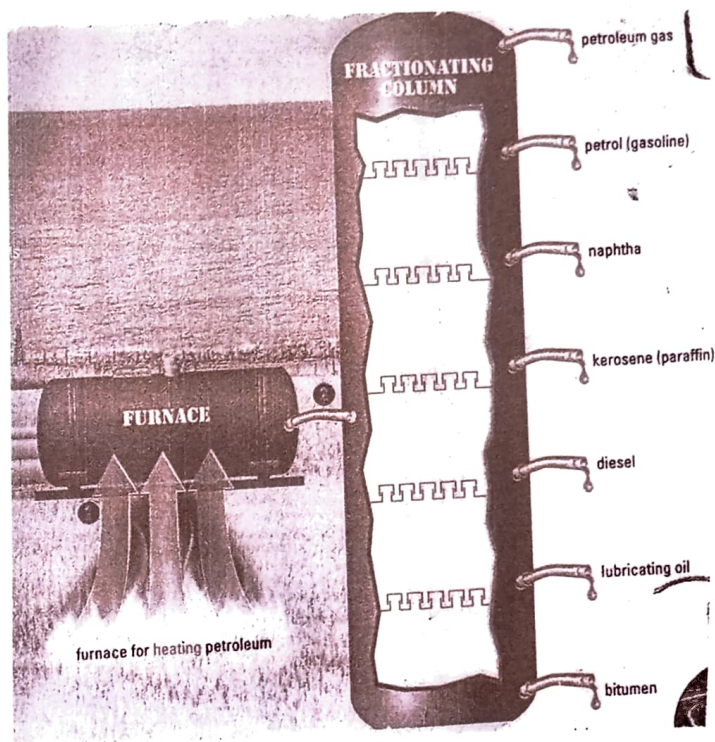
- A 2
B 5
C 7
D 3

5. Which row correctly describes the states of the substances at room temperature and pressure?

	solid	liquid	gas
A	mercury	carbon dioxide	naphthalene
B	Mercury	naphthalene	carbon dioxide
C	naphthalene	mercury	carbon dioxide
D	carbon dioxide	naphthalene	mercury

6. Which property shows that calcium is **not** a transition element?
- A Its compounds are soluble in water.
 - B Its compounds are coloured in solution.
 - C Its compounds are white when solid.
 - D It has a very high density.

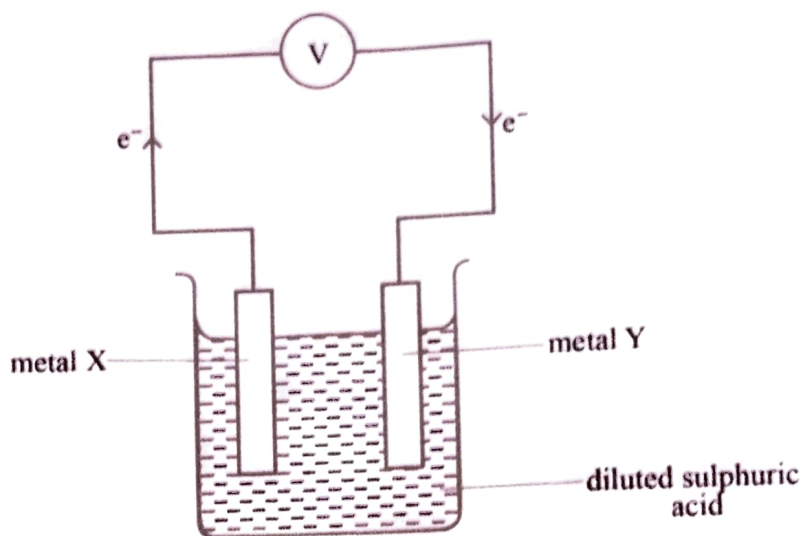
7. The diagram shows a fractional distillation plant for distilling crude oil.



Which fraction has compounds with the highest boiling point range ?

- A petroleum gas
- B kerosene
- C bitumen
- D lubricating oil

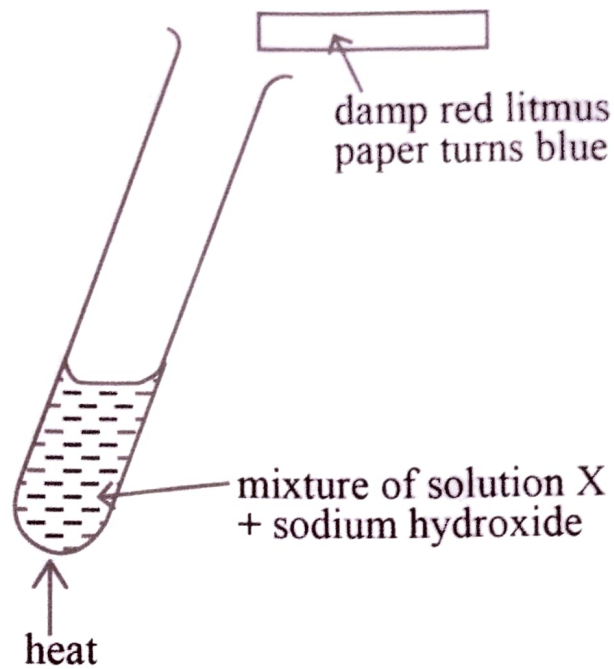
8. The diagram shows a simple cell.



Which combination of metals would allow electrons to flow in the direction shown?

- | | X | Y |
|----------|--------|------|
| A | copper | lead |
| B | iron | zinc |
| C | lead | iron |
| D | zinc | iron |

9. The diagram shows results obtained when aqueous sodium hydroxide was added to solution X and heated.



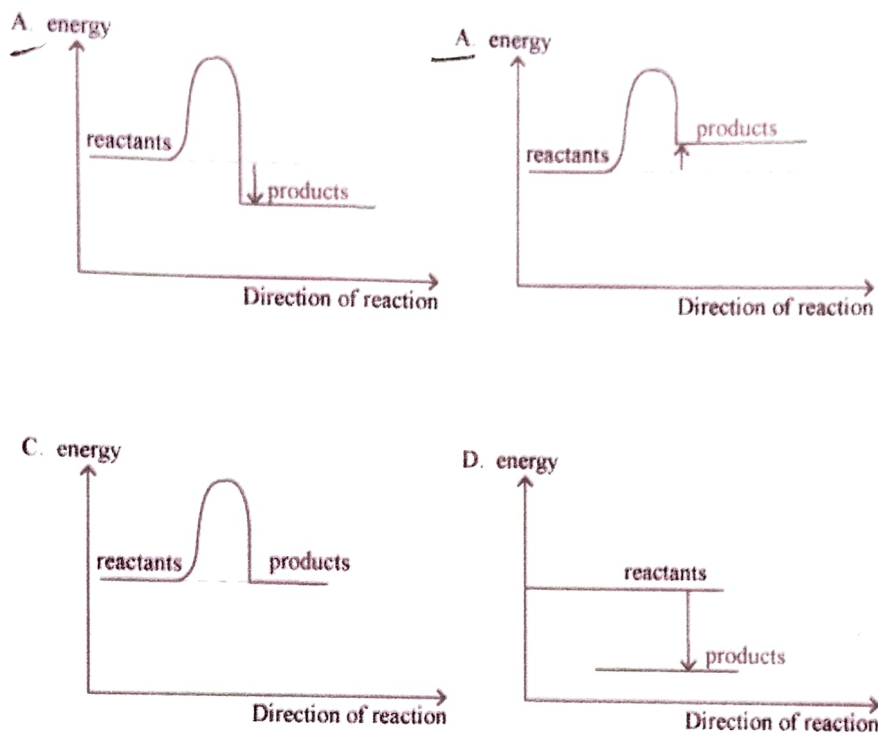
Which ion was present in solution X ?

- A NO_3^-
- B SO_4^{2-}
- C NH_4^+
- D Pb^{2+}

10. The equation shows the dissolution of ammonium chloride.



Which diagram A, B, C or D shows the energy profile for the dissolution?



11. Which pair of ions causes hardness in water ?

- A Ca^{2+} and Zn^{2+}
- B Ca^{2+} and Mg^{2+}
- C Mg^{2+} and Na^{+}
- D Mg^{2+} and Zn^{2+}

12. Which statement is true about the electrolysis of dilute sulphuric acid ?

- A amount of sulphuric acid remains unchanged
- B sulphate ions are discharged at the anode
- C hydroxide ions are discharged at the cathode
- D hydroxide ions remain in the electrolyte



13. Which option gives the correct catalyst for the given process?

	process	catalyst
A	hydrogenation	platinum
B	ostwald	vanadium (v) oxide
C	contact	nickel
D	haber	iron

14. Which is **not** a use of carbon dioxide gas?

- A refridgerant
- B extinguishing fire
- C as a preservative in fizzy drinks
- D as a fuel in welding

15. Which property of lime makes it useful in agriculture?

- A has high melting point
- B is slightly soluble in water
- C is basic in nature
- D conducts electricity in molten state

16. Which one is **not** a product of destructive distillation of coal?

- A coke
- B coal gas
- C ammonia liquor
- D carbon dioxide

17. The table shows some physical properties of elements W, X, Y and Z.

element	electrical conductivity	heat conductivity	lusture
W	none	none	dull
X	good in solid and liquid state	good	shiny
Y	conducts in solid	none	dull
Z	none	none	shiny

Which element W, X, Y or Z is metallic ?

- A Z
- B Y
- C X
- D W
18. Which reaction is a redox reaction ?
- A $CuCO_{3(s)} \rightarrow CuO_{(s)} + CO_{2(g)}$
- B $HCl_{(aq)} + NaOH_{(aq)} \rightarrow NaCl_{(aq)} + H_2O_{(l)}$
- C $AgNO_{3(aq)} + NaCl_{(aq)} \rightarrow AgCl_{(s)} + NaNO_{3(aq)}$
- D $Fe_2O_{3(s)} + 3CO_{(g)} \rightarrow 2Fe_{(l)} + 3CO_{2(g)}$
19. Which are the correct products of the reaction between magnesium and steam ?
- A $MgH_{2(s)} + O_{2(g)}$
- B $Mg(OH)_{2(aq)} + O_{2(g)}$
- C $Mg(OH)_{2(aq)} + H_{2(g)}$
- D $MgO_{(s)} + H_{2(g)}$

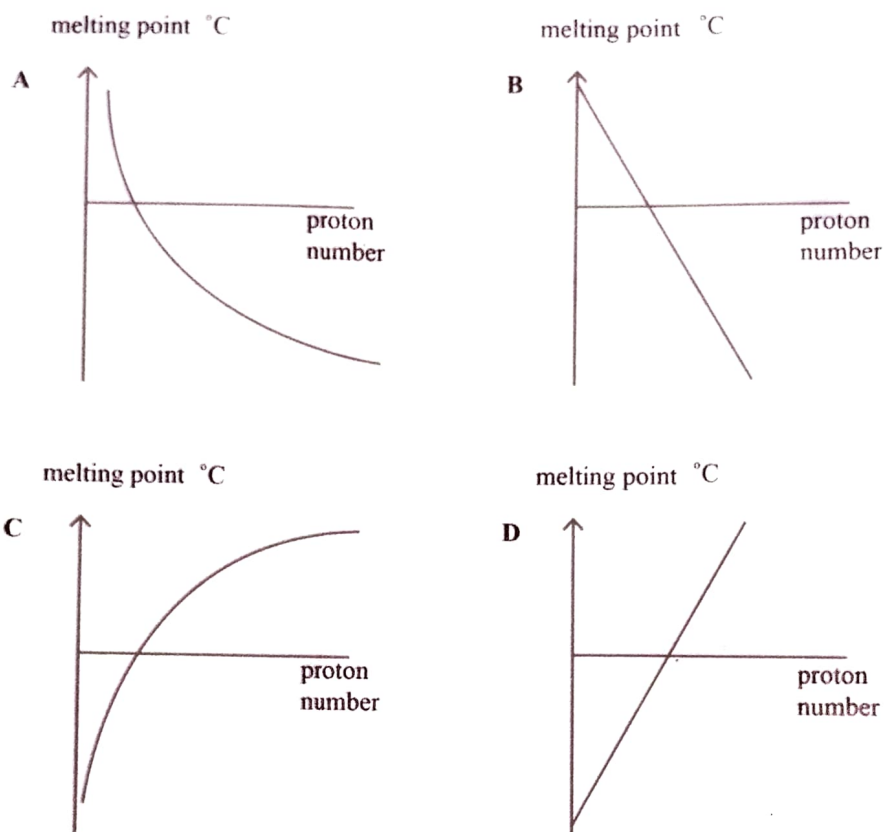
20. Which catalyst is used in the reaction of ethene with steam to produce ethanol?
- A sulphuric acid
 - B phosphoric (v) acid
 - C ethanoic acid
 - D aluminium oxide
21. An ester has the chemical formula:
 $\text{CH}_3\text{COOCH}_2\text{CH}_3$

Which compounds react to produce the ester?

- A CH_3COOH and CH_3OH
- B $\text{CH}_3\text{CH}_2\text{COOH}$ and $\text{CH}_3\text{CH}_2\text{OH}$
- C CH_3COOH and $\text{CH}_3\text{CH}_2\text{OH}$
- D $\text{CH}_3\text{CH}_2\text{COOH}$ and CH_3OH



22. Which graph shows the correct trend in melting points of Group (VII) elements?



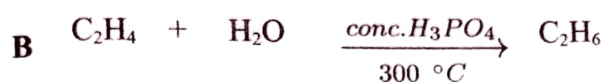
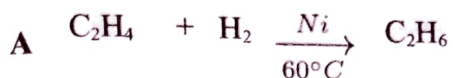
23. A volume of 25 cm^3 of 0.20 mol dm^{-3} hydrochloric acid was neutralised by 50 cm^3 of 0.10 mol dm^{-3} sodium hydroxide. The temperature increased by 14°C . The energy change for the reaction was 4410 J .

The enthalpy change of neutralisation was

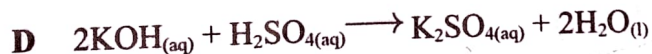
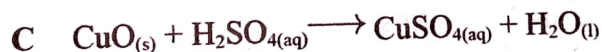
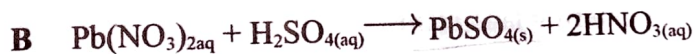
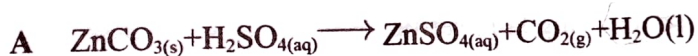
- A $882.000 \text{ kJ mol}^{-1}$.
- B $196.000 \text{ kJ mol}^{-1}$.
- C 14.700 kJ mol .
- D $4.410 \text{ kJ mol}^{-1}$.

24. Ethanol is produced by fermentation of glucose at a temperature of 37°C in the presence of yeast because yeast
- A cells produce too much carbon dioxide at lower temperatures.
 - B cells produce too much ethanol at lower temperatures.
 - C enzymes are denatured at higher temperatures.
 - D enzymes are denatured at lower temperatures.

25. Which reaction can be used as a test for alkenes?



26. Which reaction is **not** an acid-base reaction?



27. The equation shows the decomposition of calcium carbonate.



20 g of $\text{CaCO}_{3(\text{s})}$ was heated until no more change was observed.

The volume of carbon oxide gas produced at r.t.p was

A 5.60 dm^3

B 0.96 dm^3

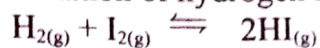
C 4.80 dm^3

D 9.60 dm^3

28. Which type of waste is biodegradable?
- A plastic
 - B rubber
 - C paper
 - D glass
29. Why is chlorine added to water which has been filtered by a sand filter?
- A The sand filter kills some but not all the bacteria.
 - B Sand filter only removes solid particles but bacteria can pass through.
 - C Chlorine increases the pH of the water
 - D Chlorine is a good coagulant.
30. Recycling, composting and source reduction are designed to
- A measure the amount of waste entering land refills.
 - B increase the amount of waste entering land refills.
 - C maintain the amount of waste entering land refills.
 - D minimise the amount of waste entering land refills.
31. Which statement is true about a system in dynamic equilibrium?
- A The concentration of reactants is equal to the concentration of products.
 - B The concentration of products is now more than that of reactants.
 - C The speed of the forward reaction is equal to the speed of the backward reaction.
 - D The speed of the forward reaction is more than that of the backward reaction.

32. Which factor does **not** affect the speed of the reaction between aqueous sodium hydroxide and aqueous hydrochloric acid?
- A pressure
 - B temperature
 - C concentration
 - D stirring

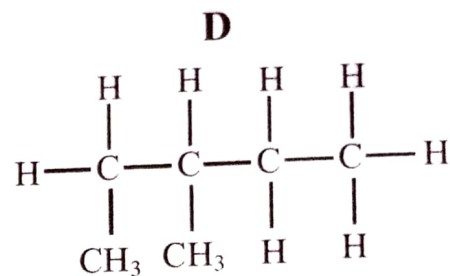
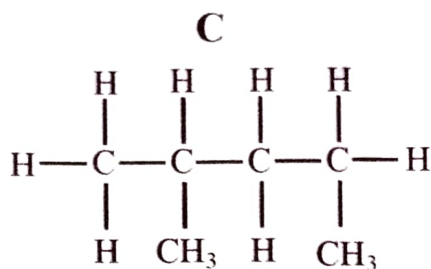
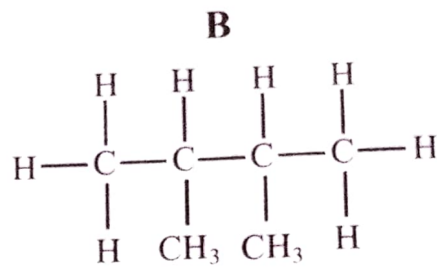
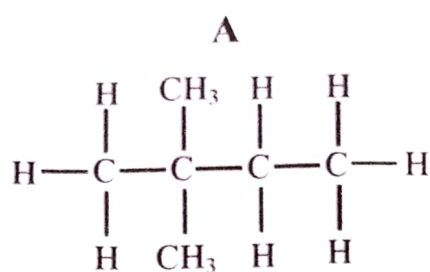
33. The chemical equation shows the formation of hydrogen iodide from hydrogen and iodine.



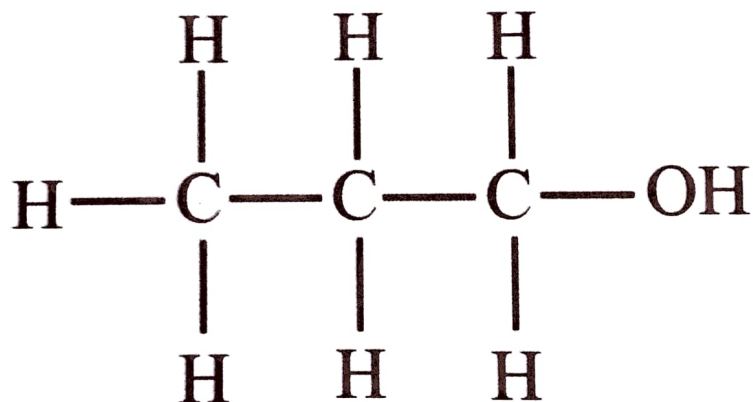
What is the effect of increasing pressure on the yield of hydrogen iodide?

- A more hydrogen iodide is formed
- B less hydrogen iodide is formed
- C no effect on the yield of hydrogen iodide
- D more hydrogen iodide decomposes

34. Which is the correct structure for 2, 2-dimethylbutane?



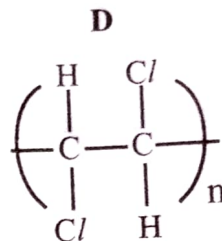
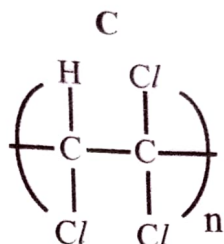
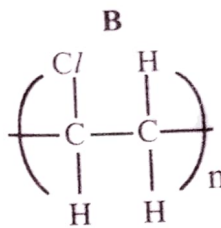
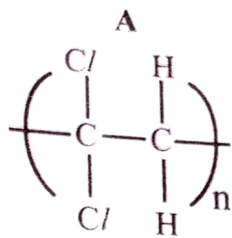
35. The diagram shows the structural formula of an organic compound.



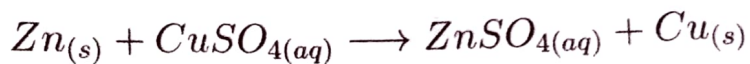
The name of the organic compound shown is

- A** propanal
- B** propanone
- C** propane
- D** propanol

36. Which structure is a polymer of CH_2CHCl ?



37. Zinc metal reacts with a solution of copper (II) sulphate according to the equation



The following are all observations made **except**

- A grey metal disappears.
 - B blue colour fades.
 - C bubbles of gas.
 - D pink solid formed.
38. A 27 g sample of X burns in chlorine to produce 133.5 g of the chloride.

What is the empirical formula of the chloride given that A_r of X is 27?

- A X_2Cl_3
- B XCl_2
- C XCl_3
- D XCl_4

39. Which exhaust gas is **not** converted to another substance by a catalytic converter ?
- A nitrogen dioxide
 - B carbon dioxide
 - C hydrocarbons
 - D carbon monoxide
40. Which one is an advantage of using herbs?
- A lack of dosage instructions
 - B lack of regulation
 - C effective with chronic conditions
 - D inappropriate for many conditions

DATA SHEET

The Periodic Table of the Elements

		Group																																																																																												
				III		IV		V		VI		VII		O																																																																																
I	II																																																																																													
		1 H Hydrogen																																																																																												
3 Li Lithium	4 Be Beryllium	11 B Boron	12 C Carbon	13 Al Aluminum	14 N Nitrogen	15 P Phosphorus	16 S Sulfur	17 Cl Chlorine	18 Ar Argon	19 F Fluorine	20 Ne Neon	21 Na Sodium	22 Mg Magnesium	23 Al Aluminum	24 Si Silicon	25 P Phosphorus	26 S Sulfur	27 Cl Chlorine	28 Ar Argon	29 K Potassium	30 Ca Calcium	31 Ga Gallium	32 Ge Germanium	33 As Arsenic	34 Se Selenium	35 Br Bromine	36 Kr Krypton	37 Rb Rubidium	38 Sr Strontium	39 Y Yttrium	40 Zr Zirconium	41 Nb Niobium	42 Mo Molybdenum	43 Tc Technetium	44 Ru Ruthenium	45 Rh Rhodium	46 Pd Palladium	47 Ag Silver	48 Cd Cadmium	49 In Indium	50 Sn Tin	51 Sb Antimony	52 Te Tellurium	53 I Iodine	54 Xe Xenon	55 Cs Cesium	56 Ba Barium	57 La Lanthanum	58 Ce Cerium	59 Pr Praseodymium	60 Nd Neodymium	61 Pm Promethium	62 Sm Samarium	63 Eu Europium	64 Gd Gadolinium	65 Tb Terbium	66 Dy Dysprosium	67 Ho Holmium	68 Er Erbium	69 Tm Thulium	70 Yb Ytterbium	71 Lu Lutetium	72 Hf Hafnium	73 Ta Tantalum	74 W Tungsten	75 Re Rhenium	76 Os Osmium	77 Ir Iridium	78 Pt Platinum	79 Au Gold	80 Hg Mercury	81 Tl Thallium	82 Pb Lead	83 Bi Bismuth	84 Po Polonium	85 At Astatine	86 Rn Radon	87 Fr Francium	88 Ra Radium	89 Ac Actinium	90 Th Thorium	91 Pa Protactinium	92 U Uranium	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

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

Key
 a = relative atomic mass
 X = atomic symbol
 b = proton (atomic) Number

The volume of one mole of any gas is 28 dm³ at room temperature and pressure (r.t.p.)