G12 ECZ CHEMISTRY 2018 PAPER 1 SOLUTIONS

Grade 12 ECZ Chemistry 2018 Paper 1 (5070/1)

Worked solutions — 40 multiple-choice questions

The full question paper appears first — worked answers are at the end.

EXAMINATIONS COUNCIL OF ZAMBIA

Examination for School Certificate Ordinary Level

Chemistry 5070/1

Paper 1 Multiple Choice

Thursday **8 NOVEMBER 2018**

Additional Materials:
Electronic calculator (non programmable)
Multiple Choice Answer Sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

Time: 1 hour

Instructions to Candidates

Do not open this question paper until you are told to do so.
Look at the left hand side of your answer sheet. Ensure that your **name**, the **school/centre name** and **subject paper** are **printed**. Also ensure that the **subject code**, **paper number**, **centre code**, your **examination number** and the year are printed and shaded. Do not change the already printed information.
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 one you consider correct and record your choice in **soft pencil** on the separate answer sheet provided.
Read very carefully the instructions on the Answer Sheet.

Information for Candidates
Each correct answer will score one mark.
Any rough working should be done in this question paper.
The **Periodic Table** is printed on page 12.
Cell phones are not allowed in the examination room.

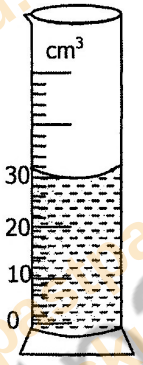
1 Which of the following gaseous molecules would diffuse fastest in a vacuum?

A Cl_2 70
B CO_2 44
C NH_3 17
D O_2 32

2 Water was stored in a deep freezer until it turned into ice.
What basic unit of matter are found in ice?

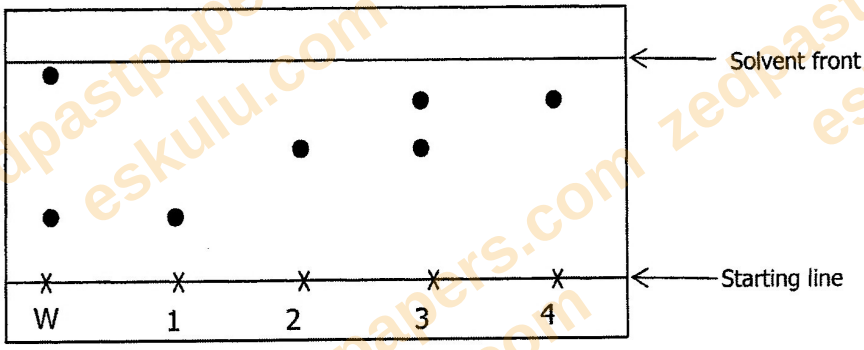
A Atoms
B Ions
C Molecules
D Solids

3 The apparatus below was used to measure the volume of a liquid. Identify the apparatus and the volume of the liquid.



	Name of apparatus	Volume/cm^3
A	Beaker	34
B	Beaker	30
C	Measuring cylinder	32
D	Measuring cylinder	30

4 A learner does a chromatography experiment to identify the components of **W**, a sample of ink containing a mixture of coloured dyes. The chromatogram below contains a sample of **W** as well as individual dyes, which are labelled **1**, **2**, **3** and **4**.



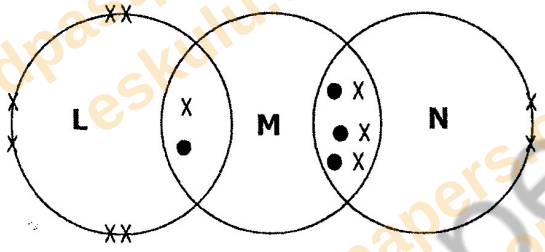
Substance **W** contains …

A dye 1 and an unknown dye.
B dyes 1 and 2 only.
C dyes 1 and 3 only.
D dyes 1 and 4 only.

5 Which of the following sets contain the same number of electrons?

A Ar, He, Ne, Kr.
B Na^+, Mg^{2+}, F^-, O^{2-}
C Na^+, K^+, Li^+, Rb^+
D Na^+, K^+, Cl^-, F^-

6 The following dot and cross structure represents a molecule made of three different elements **L, M** and **N**, showing the outermost shell electrons only.



Which set represents the correct identities of **L, M** and **N**?

	L	M	N
A	Chlorine	Silicon	Boron
B	Hydrogen	Carbon	Nitrogen
C	Fluorine	Carbon	Nitrogen
D	Hydrogen	Silicon	Boron

7 An element has an atom with the following nuclide symbol $^{28}_{14}X$. The number of neutrons in one atom of this element is …

A 7.
B 14.
C 28.
D 42.

8 When 127g of copper combine with oxygen, 143g of oxide is formed.
What is the empirical formula of this oxide?

A Cu_2O
B CuO
C Cu_2O_2
D CuO_2

9 The formula of copper (II) sulphate is $CuSO_4$.
What is the percentage of sulphur in the compound?

A 100
B 60
C 40
D 20

10 2.5g of impure copper (II) oxide reacted with $200cm^3$ of 0.125M sulphuric acid.
What is the percentage purity of copper (II) oxide?

A 80%
B 60%
C 40%
D 20%

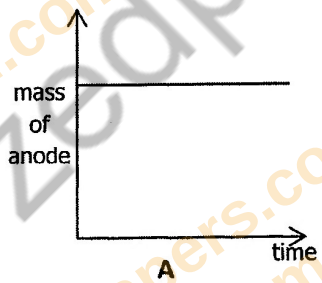
11 Tetraborate is a polyatomic radical and the formula for sodium tetraborate is $Na_2B_4O_7$.
What is the total number of atoms in the formula of aluminium tetraborate?

A 12
B 13
C 25
D 35

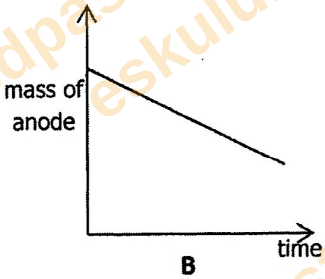
12 Graphite is often used as an electrode in the electrolysis of solutions.
Which particles are involved in the conduction of electricity by graphite?

A Electrons only
B Negative ions only
C Positive ions and electrons
D Positive ions and negative ions

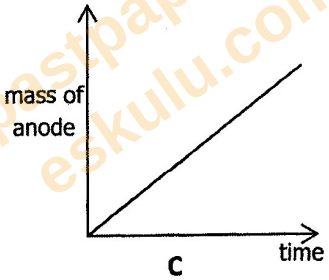
13 Aqueous copper (II) sulphate is electrolysed using copper electrodes. The current is constant and the anode (positive electrode) is weighed at regular intervals.
Which graph is obtained when the mass of the anode is plotted against time?



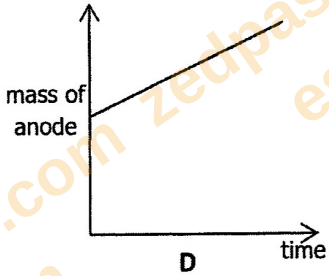
A



B



C



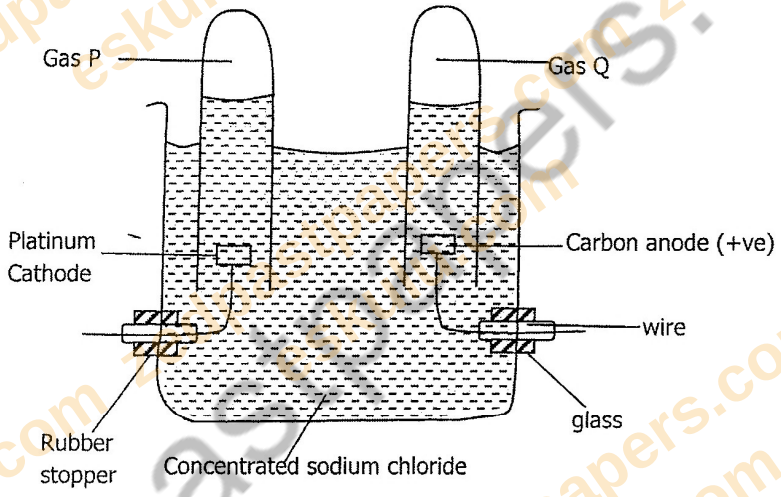
D

14 The relative atomic mass of element **Q** is 208. When a current of 0.5A was passed through a fused bromide of **Q** for 16 minutes 5 seconds, 0.26g of **Q** was deposited at the cathode.

Deduce the formula for the **Q** ion and for the sulphate of **Q**.

	Formula for Q ion	Formula for sulphate of Q
A	Q^{2+}	QSO_4
B	Q^{+}	Q_2SO_4
C	Q^{4+}	$Q(SO_4)_2$
D	Q^{3+}	$Q_2(SO_4)_3$

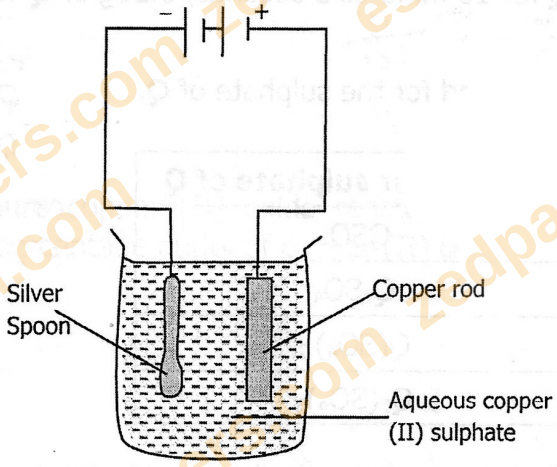
15 Concentrated sodium chloride solution (Brine) was electrolysed using the apparatus below.



Which of the following correctly represents **P**, **Q** and the pH of the solution?

	Gas P	Gas Q	pH of solution
A	Chlorine gas	Hydrogen gas	Increases
B	Hydrogen gas	Chlorine gas	Increases
C	Chlorine gas	Hydrogen gas	Constant
D	Chlorine gas	Hydrogen gas	Decreases

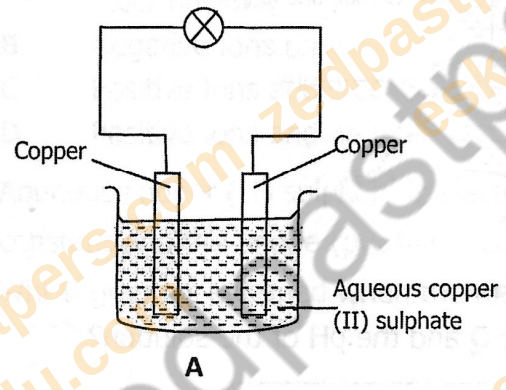
16 The diagram shows an application of electrolysis in industry.



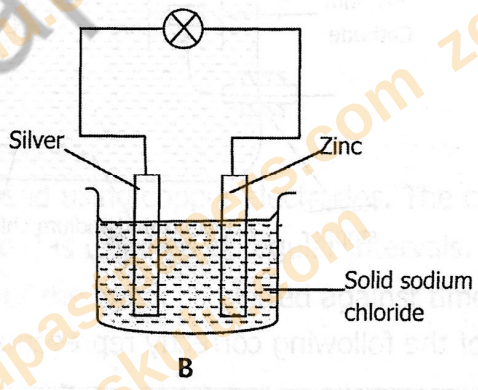
The above application is best known as ...

A anodization.
B deposition.
C electroplating.
D galvanizing.

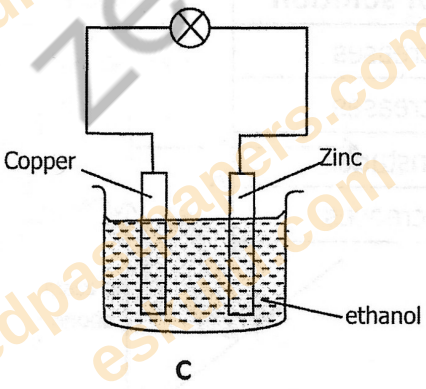
17 In which circuit does the bulb light?



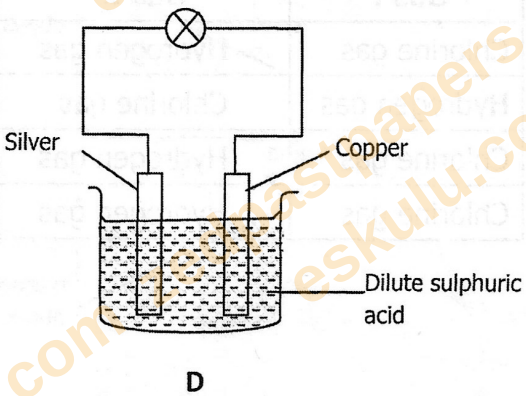
A



B

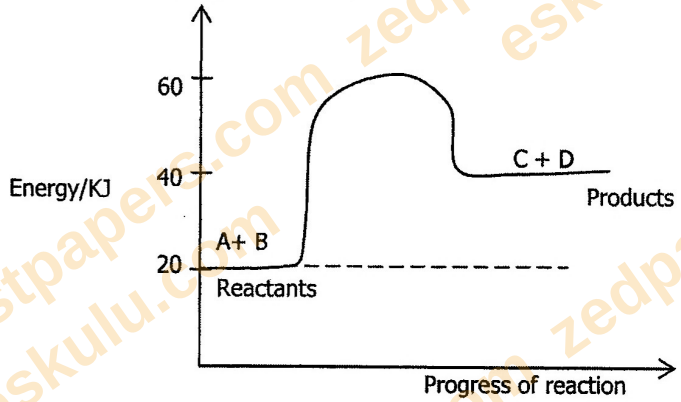


C



D

18 Study the energy profile diagram below.



What is the value of the enthalpy change for the reaction?

A –20KJ
B +20KJ
C +40KJ
D –40KJ

19 Which statement is correct for all exothermic reactions?

A A catalyst is needed for the reaction to take place.
B Light is absorbed during the reaction.
C The products of the reaction have less energy than the reactants.
D They are reactions which require heat to start.

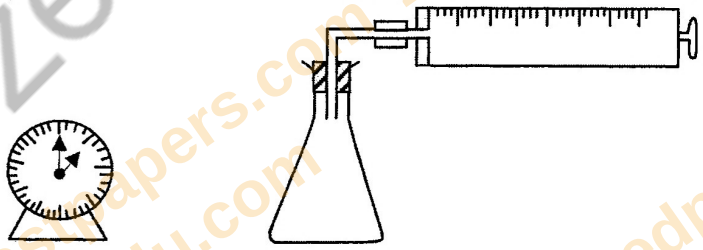
20 The equation below illustrates a reversible reaction that has attained chemical equilibrium.

$2PQ_{2(g)} + Q_2(g) \rightleftharpoons 2PQ_{3(g)}$ ΔH = –ve

Which change would favour the production of PQ_3?

A A decrease in temperature
B A decrease in pressure
C An increase in temperature
D A decrease in the concentration of the reactants.

21 The apparatus shown can be used to find the rate of some chemical reactions.



The above set up, can be used to measure the rate of reaction between ...

A aqueous silver nitrate and aqueous potassium iodide.
B magnesium ribbon and dilute hydrochloric acid.
C sodium hydroxide solution and copper (II) sulphate solution.
D sodium hydroxide solution and dilute hydrochloric acid.

22 Which one of the following pairs can behave as both reducing and oxidising agents?

A Calcium and Sulphur dioxide
B Calcium and Hydrogen peroxide
C Sodium and Hydrogen
D Sulphur dioxide and Hydrogen

23 What is observed during the electrolysis of aqueous copper (II) sulphate using carbon electrodes?

A A pink solid is deposited on the anode.
B Bubbles of a colourless gas are produced at the negative electrode.
C The colour of the solution fades.
D The negative electrode becomes smaller.

24 Which of the following oxides is soluble in water?

A Calcium oxide
B Copper (II) oxide
C Lead (II) oxide
D Zinc oxide

25 Which equation correctly represents the reaction between dilute hydrochloric acid and solid sodium carbonate?

A $HCl_{(aq)} + NaCO_{3(s)} \longrightarrow NaCl_{(aq)} + CO_{2(g)} + H_2O_{(l)}$
B $2HCl_{(aq)} + Na_2CO_{3(s)} \longrightarrow 2NaCl_{(aq)} + CO_{2(g)} + H_2O_{(l)}$
C $2HCl_{(aq)} + Na_2CO_{3(s)} \longrightarrow 2NaCl_{(aq)} + CO_{2(g)} + H_{2(g)}$
D $HCl_{(aq)} + Na_2CO_{3(s)} \longrightarrow Na_2Cl_{(aq)} + CO_{2(g)} + H_2O_{(l)}$

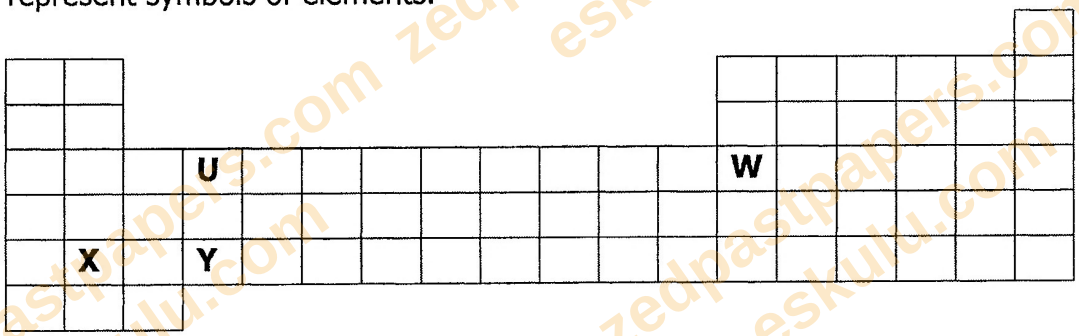
26 In which equation is the underlined substance acting as an oxidising agent?

A $Fe^{3+}_{(aq)} + \underline{Al}_{(s)} \longrightarrow Fe_{(s)} + Al^{3+}_{(aq)}$
B $2I^-_{(aq)} + \underline{Cl_2}_{(g)} \longrightarrow I_{2(s)} + 2Cl^-_{(aq)}$
C $\underline{3CO}_{(g)} + Fe_2O_{3(s)} \longrightarrow 2Fe_{(l)} + 3CO_{2(g)}$
D $N_{2(g)} + \underline{3H_2}_{(g)} \longrightarrow 2NH_{3(g)}$

27 ... is an insoluble salt formed by precipitation.

A Barium chloride
B Lead (II) chloride
C Silver sulphate
D Zinc sulphate

28 The diagram below shows part of the Periodic Table. The letters **U**, **W**, **X** and **Y** represent symbols of elements.



Which letter represents the most metallic element?

A U
B W
C X
D Y

29 Sulphur and selenium are all in the same group of the Periodic Table.

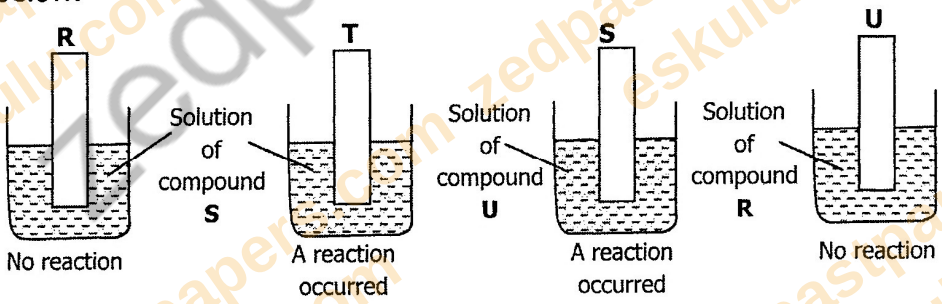
From this we would expect selenium to form compounds having the formula ...

A SeO_2, Na_2Se and Na_2SeO_3
B Se_2O, Na_2Se and $NaSeO_4$
C SeO_2, Na_2Se and $NaSeO_4$
D SeO_3, $NaSe$ and $NaSeO_3$

30 All of the following are physical properties of metals **except** ...

A ductility.
B malleability.
C reducing ability.
D sonority.

31 The metals **R**, **S**, **T** and **U** were dipped in ionic solutions as illustrated in the diagram below.



Arrange the metals **R**, **S**, **T** and **U** in order of increasing reactivity.

A R, U, S, T
B U, R, S, T
C S, U, R, T
D T, S, R, U

32 Which set of conditions is suitable for the production of ammonia by the Haber process?

	Temperature/°C	Pressure/atm	Catalyst
A	450	200	Iron
B	450	1	Iron
C	450	1	Vanadium (V) oxide
D	450	200	Vanadium (V) oxide

33 The ozone layer is important because it …

A is used as a substitute for oxygen for our survival.
B protects us from global warming which leads to adverse effects.
C protects us from the greenhouse effects.
D traps the ultra-violet radiation which may lead to skin cancer.

34 The Ostwald process is a commercial process used to prepare nitric acid. The name of the catalyst used in this process is …

A copper – zinc alloy.
B iron – alumina mixture.
C nickel – alumina mixture.
D platinum – rhodium alloy.

35 … is a separation technique used to identify the products of protein hydrolysis.

A Crystallisation
B Chromatography
C Distillation
D Decantation

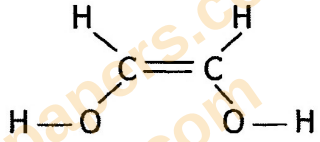
36 Which of the following artificial macromolecules has a structure that resembles that of a protein?

A Polyamide
B Poly(ethene)
C Polyester
D Poly(vinyl chloride)

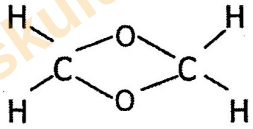
37 An aqueous solution of a compound of molecular formula $C_2H_4O_2$, reacts with sodium carbonate liberating carbon dioxide.

What is the structural formula of the compound?

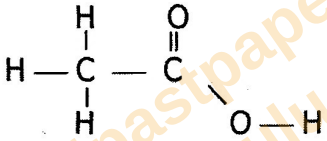
A



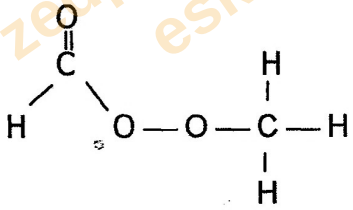
B



C



D



38 Which chemical elements are contained in carbohydrates, fats and proteins?

A Carbon, Nitrogen and Oxygen
B Carbon, Hydrogen and Sulphur
C Carbon, Hydrogen and Nitrogen
D Carbon, Hydrogen and Oxygen

39 Which of the following would produce two isomeric alcohols when hydrated?

A But-2-ene
B Ethene
C Ethene and Propene
D Propene only

40 A learner names an alkene and ends with -4-ene. If the name is correct, what must be the minimum number of carbon atoms in this alkene?

A 4
B 5
C 8
D 9

DATA SHEET
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	104 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

The volume of one mole of any gas is 24 dm^3 at room temperature and pressure (r.t.p.).
NA = 6.0 × 10^{23}/mol; 1F = 96500C.

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Question 1. Which gaseous molecules diffuse fastest in a vacuum?

The lightest molecules diffuse fastest. NH■ (Mr 17) is lighter than O■ (32), CO■ (44) and Cl■ (71).

Answer: C — NH■.

Question 2. What basic unit of matter is found in ice?

Ice is solid water; it is still made of water molecules.

Answer: C — molecules.

Question 3. Identify the apparatus used to measure the liquid and the volume read.

The graduated, narrow vessel is a measuring cylinder, and the meniscus sits on the 30 cm³ mark.

Answer: D — measuring cylinder; 30 cm³.

Question 4. From the chromatogram, what does substance W contain?

W gives two spots: a low one level with dye 1, and a high one that does not line up with any of dyes 1–4. So W contains dye 1 and an unknown dye.

Answer: A — dye 1 and an unknown dye.

Question 5. Which set of particles all contain the same number of electrons?

Na■ (10), Mg²■ (10), F■ (10) and O²■ (10) all have 10 electrons.

Answer: B — Na■, Mg²■, F■, O²■.

Question 6. From the dot-and-cross diagram of L–M≡N, identify L, M and N.

L forms 1 bond and has lone pairs (a halogen, Group VII = fluorine); M forms 4 bonds (carbon); N forms a triple bond plus a lone pair (nitrogen). The molecule is F–C≡N.

Answer: C — fluorine, carbon, nitrogen.

Question 7. An atom has the nuclide symbol ²■■■X. How many neutrons does it have?

Neutrons = mass number − proton number = 28 − 14 = 14.

Answer: B — 14.

Question 8. 127 g of copper combines with oxygen to form 143 g of oxide. Find the empirical formula.

Mass of O = 143 – 127 = 16 g. Moles Cu = 127 ÷ 64 = 2; moles O = 16 ÷ 16 = 1. Ratio 2 : 1 → Cu■O.

Answer: A — Cu■O.

Question 9. What is the percentage of sulphur in copper(II) sulphate, CuSO■?

M(CuSO■) = 64 + 32 + 64 = 160. % S = 32 ÷ 160 × 100 = 20 %.

Answer: D — 20.

Question 10. 2.5 g of copper(II) oxide reacts with 200 cm³ of 0.125 mol/dm³ sulphuric acid. Find the percentage purity.

Moles acid = 0.2 × 0.125 = 0.025 = moles CuO reacting = 0.025 × 80 = 2.0 g. Purity = 2.0 ÷ 2.5 × 100 = 80 %.

Answer: A — 80 %.

Question 11. Sodium tetraborate is Na■B■O■. How many atoms are in the formula of aluminium tetraborate?

The tetraborate ion is B■O■²■, so aluminium tetraborate is Al■(B■O■)■: 2 Al + 3 × (4 + 7) = 2 + 33 = 35 atoms.

Answer: D — 35.

Question 12. Which particles carry the current through a graphite electrode?

Graphite conducts by the movement of its free (delocalised) electrons only.

Answer: A — electrons only.

Question 13. Copper(II) sulphate is electrolysed with copper electrodes. Which graph shows the mass of the anode against time?

The copper anode dissolves (Cu – 2e■ → Cu²■), so its mass falls steadily — a straight line decreasing with time.

Answer: B.

Question 14. Q (Ar 208): 0.5 A for 16 min 5 s deposits 0.26 g. Deduce the Q ion and the formula of its sulphate.

Q = 0.5 × 965 = 482.5 C = 0.005 mol electrons. Moles Q = 0.26 ÷ 208 = 0.00125, so 4 electrons per ion → Q■■, giving Q(SO■)■.

Answer: C — Q■■ and Q(SO■)■.

Question 15. Electrolysis of brine: identify gas P (cathode), gas Q (anode) and the pH change.

At the cathode hydrogen is given off (P), at the anode chlorine (Q), and the solution becomes alkaline (sodium hydroxide forms), so the pH increases.

Answer: B — P: hydrogen; Q: chlorine; pH increases.

Question 16. A silver spoon is coated with copper from copper(II) sulphate. This application is known as …

Coating an object with a layer of metal by electrolysis is electroplating.

Answer: C — electroplating.

Question 17. In which simple cell does the bulb light?

A simple cell needs two DIFFERENT metals in a conducting electrolyte. Only the silver/copper pair in dilute sulphuric acid satisfies both (same metals in A; non-conducting solid NaCl and ethanol in B and C).

Answer: D — silver and copper in dilute sulphuric acid.

Question 18. Energy profile: reactants at 20, products at 60. What is the enthalpy change?

ΔH = energy of products – reactants = 60 – 20 = +40 kJ (endothermic).

Answer: C — +40 kJ.

Question 19. Which statement is true for all exothermic reactions?

In an exothermic reaction the products are at a lower energy than the reactants (energy is given out).

Answer: C — the products have less energy than the reactants.

Question 20. 2P(g) + Q■(g) ■ 2PQ(g), ΔH negative. Which change favours more PQ?

The forward reaction is exothermic, so lowering the temperature shifts the equilibrium forward and makes more PQ.

Answer: A — a decrease in temperature.

Question 21. The gas-syringe apparatus measures the rate of a reaction. Which reaction can it follow?

A gas syringe measures a gas, so the reaction must give off a gas. Magnesium with dilute hydrochloric acid produces hydrogen.

Answer: B — magnesium ribbon and dilute hydrochloric acid.

Question 22. Which pair can behave as both reducing and oxidising agents?

In SO■ sulphur is +4 and in H■O■ oxygen is –1 — both intermediate states — so each can be oxidised or reduced.

Answer: D — sulphur dioxide and hydrogen peroxide.

Question 23. Aqueous copper(II) sulphate is electrolysed with carbon electrodes. Which statement is correct?

Copper ions are removed from solution (deposited at the cathode), so the blue colour of the solution fades.

Answer: C — the colour of the solution fades.

Question 24. Which oxide is soluble in water?

Calcium oxide reacts with water to form calcium hydroxide; the copper, lead and zinc oxides are insoluble.

Answer: A — calcium oxide.

Question 25. Which equation is correct for dilute hydrochloric acid reacting with solid sodium carbonate?

2HCl + Na■CO■ → 2NaCl + CO■ + H■O is correctly balanced and gives carbon dioxide.

Answer: B — 2HCl + Na■CO■ → 2NaCl + CO■ + H■O.

Question 26. In which equation is the underlined substance acting as an oxidising agent?

In 2I■ + Cl■ → I■ + 2Cl■ the underlined Cl■ is reduced (0 → –1), so it is the oxidising agent.

Answer: B — 2I■ + Cl■ → I■ + 2Cl■ (Cl■ underlined).

Question 27. Which is an insoluble salt formed by precipitation?

Lead(II) chloride is insoluble in cold water and is made by precipitation; the others are soluble.

Answer: B — lead(II) chloride.

Question 28. On the Periodic-Table outline, which letter is the most metallic element?

Metallic character is greatest towards the bottom-left. X is furthest to the bottom-left, so it is the most metallic.

Answer: C — X.

Question 29. Selenium is in the same group as sulphur. What formulae do its compounds have?

As sulphur gives SO■, Na■S and Na■SO■, selenium gives SeO■, Na■Se and Na■SeO■.

Answer: C — SeO■, Na■Se and Na■SeO■.

Question 30. Which is NOT a physical property of metals?

Ductility, malleability and sonority are physical properties; reducing ability (losing electrons in reactions) is a chemical property.

Answer: C — reducing ability.

Question 31. From the displacement results, arrange R, S, T, U in order of increasing reactivity.

T displaces S, S displaces R and R displaces U, while the reverse reactions do not happen: T > S > R > U. So increasing order is U, R, S, T.

Answer: B — U, R, S, T.

Question 32. Which conditions suit the Haber process for making ammonia?

The Haber process uses about 450 °C, about 200 atm pressure and an iron catalyst.

Answer: A — 450 °C, 200 atm, iron.

Question 33. Why is the ozone layer important?

The ozone layer absorbs harmful ultraviolet radiation, which would otherwise cause skin cancer.

Answer: D — it traps ultraviolet radiation that may cause skin cancer.

Question 34. What catalyst is used in the Ostwald process for nitric acid?

The Ostwald process oxidises ammonia over a platinum–rhodium catalyst.

Answer: D — platinum–rhodium alloy.

Question 35. Which technique identifies the products of protein hydrolysis (amino acids)?

The amino acids from a hydrolysed protein are separated and identified by chromatography.

Answer: B — chromatography.

Question 36. Which artificial macromolecule has a structure resembling a protein?

Proteins contain amide (peptide) links, so the man-made polyamide (nylon) most resembles them.

Answer: A — polyamide.

Question 37. A compound C■H■O■ reacts with sodium carbonate, giving off CO■. What is its structure?

Reacting with a carbonate shows it is a carboxylic acid (–COOH). The structure with the –COOH group is ethanoic acid, CH■COOH.

Answer: C — ethanoic acid (CH■COOH).

Question 38. Which elements are present in carbohydrates, fats AND proteins?

Carbohydrates, fats and proteins all contain carbon, hydrogen and oxygen (proteins also contain nitrogen, but the common three are C, H, O).

Answer: D — carbon, hydrogen and oxygen.

Question 39. Which compound gives two isomeric alcohols when hydrated?

Adding water across the double bond of propene (CH■CH=CH■) can place the –OH on either carbon, giving propan-1-ol and propan-2-ol — two isomeric alcohols.

Answer: D — propene.

Question 40. An alkene is named '...-4-ene'. What is the minimum number of carbon atoms?

For the double bond to take the locant 4 (the lowest from either end), it must be at position 4 from both ends — that needs 8 carbons (oct-4-ene).

Answer: C — 8.

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