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Student name

CHEMISTRY

Unit 2

Trial Examination

QUESTION AND ANSWER BOOK

Total writing time: 1 hour 30 minutes

Structure of book

Section	Number of questions	Number of marks
A	20	20
B	10	67
	Total	**87**

- Students are permitted to bring into the examination room: pens, pencils, highlighters, erasers, sharpeners, rulers, an approved scientific calculator.
- Students are NOT permitted to bring into the examination room: blank sheets of paper and/or white out liquid/tape.

Materials supplied

- Question and answer book of 18 pages, with a detachable data sheet in the centrefold and a detachable answer sheet for multiple-choice questions inside the front cover.

Instructions

- Detach the data sheet from the centre of this book and the answer sheet for multiple-choice questions during reading time.
- Write your **name** in the space provided above on this page and on the answer sheet for multiple-choice questions.
- All written responses should be in English.

At the end of the examination

- Place the answer sheet for multiple-choice questions inside the front cover of this book.

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SECTION A – Multiple-choice questions

Instructions for Section A

Answer all questions in pencil on the answer sheet provided for multiple choice questions.

Choose the response that is **correct** or that **best answers** the question.

A correct answer scores 1, an incorrect answer scores 0.

Marks will **not** be deducted for incorrect answers.

No mark will be given if more than one answer is completed for any question.

Question 1

Water has a higher latent heat of vapourisation than molecules of similar size and structure. This is due to water molecules having

A. strong covalent bonds within the molecule which need more energy to be broken.

B. strong intermolecular dispersion forces.

C. two non-bonding electron pairs per molecule.

D. hydrogen bonding between the molecules.

Question 2

Which of the following lists only significantly soluble substances in water?

A. ethanol, ethane, ethene, polyethene

B. glucose, sucrose, ethanol, ethanoic acid

C. methanol, methane, ethanol, ethane

D. carbon dioxide, ethanol, ethane, ethanoic acid

Question 3

Which of the following substances is likely to be insoluble?

A. sodium sulfate

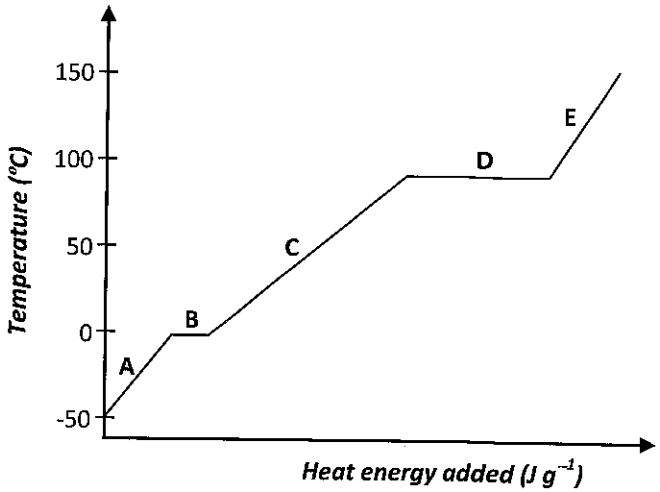
B. magnesium nitrate

C. ammonium carbonate

D. calcium sulfate

Use the following information and graph to answer Questions 4 & 5.

The graph at the right shows how the temperature changes as a block of ice, initially at -50 °C, is heated over a period of time. Five distinct stages (A-E) can be discerned.



Question 4

Which one of these statements can be deduced from the graph?

A. The specific heat of liquid water is given by the slope of part C

B. Less heat energy is required to melt than to evaporate

C. Water expands as it freezes.

D. Steam cannot be heated above 150 °C.

Question 5

The best explanation for the constant temperature during stages B and D is that

A. during changes of state any heat energy added is immediately lost to the surroundings.

B. the heat energy added is used up in loosening/breaking bonds.

C. substances cannot absorb energy while undergoing a state change.

D. the heat source was turned off during the melting and boiling stages.

Question 6

A particular solution contains a mixture of sodium chloride, NaCl, and magnesium chloride, $MgCl_2$. If the chloride ion concentration is 0.600 M and the sodium ion concentration is 0.400 M, the concentration of magnesium ions must be

A. 0.100 M

B. 0.200 M

C. 0.300 M

D. 0.400 M

Question 7

Gaseous hydrogen chloride consists of molecules. The best evidence that an aqueous solution of hydrogen chloride is not composed of the same particles as the gas is

A. the dissolving of HCl in water is accompanied by a substantial temperature rise.

B. HCl (aq) is a good conductor of electricity whereas water is a poor conductor.

C. HCl (aq) turns blue litmus paper red whereas neither dry hydrogen chloride nor water has any effect on blue litmus paper.

D. HCl is evolved when concentrated hydrochloric acid is boiled.

Question 8

Which of the following is a diprotic acid species?

A. HCOOH

B. $H_2PO_4^-$

C. C_2H_2

D. CH_3COOH

Question 9

If HNO_3 reacts with KOH, the reaction that has really occurred in the solution is

A. $H_3O^+ + OH^- \rightarrow 2H_2O$

B. $2H_2O \rightarrow H_3O^+ + OH^-$

C. $K^+ + NO_3^- \rightarrow KNO_3$

D. $HNO_3 + KOH \rightarrow KNO_3 + H_2O$

Question 10

Which of the following solutions will have the lowest pH?

A. 0.1 M HCl

B. 0.1 M CH_3COOH

C. Pure water

D. 1 M HCl

Question 11

The pH of an aqueous solution of Na_2HPO_4 was found to be 9.5. The **best** explanation of this is

A. the Na^+ ion forms NaOH in solution.

B. the Na_2HPO_4 is a base.

C. the HPO_4^{2-} ion is amphiprotic and preferentially donates protons to water molecules.

D. the HPO_4^{2-} ion is amphiprotic and preferentially accepts protons from water molecules.

Question 12

If 2.0 L of HCl(aq) has a pH of 2.0, what volume, in L, must be **added**, to increase the pH to 3.0?

A. 2

B. 10

C. 18

D. 20

Question 13

A solution of barium hydroxide, $Ba(OH)_2$ was found to have a concentration of 0.0050 M. The pH of the solution at 25 °C will be

A. 2.0

B. 2.3

C. 11.7

D. 12.0

Question 14

When 25 mL 0.080 M nitric acid is mixed with 50 mL of 0.020 M nitric acid, the molarity of the resulting solution is

A. 0.030 M

B. 0.040 M

C. 0.050 M

D. 0.060 M

Question 15

A solution has CO_2 bubbled under pressure into water. To raise the pH, which of the following could be added?

A. lemon juice

B. more CO_2

C. water

D. vinegar

Question 16

In which of the following species does arsenic have an oxidation number of -3?

A. AsH_3

B. As_4O_6

C. H_3AsO_4

D. As_2O_5

Question 17

Which of the following is **not** a redox reaction?

A. $Cr_2O_7^{2-}(aq) + 2OH^-(aq) \rightarrow 2CrO_4^{2-}(aq) + H_2O(l)$

B. $2Fe^{3+}(aq) + 2I^-(aq) \rightarrow 2Fe^{2+}(aq) + I_2(g)$

C. $PbS(s) + 4H_2O_2(aq) \rightarrow PbSO_4(s) + 4H_2O(l)$

D. $Fe_2O_3(s) + 3CO(g) \rightarrow 2Fe(s) + 3CO_2(g)$

Question 18

Each of the following represents a redox reaction. In which of the following is the bolded substance acting as a reductant?

A. $ZnO(s) + \mathbf{CO}(g) \rightarrow Zn(s) + CO_2(g)$

B. $Cu(s) + \mathbf{N_2O}(g) \rightarrow CuO(s) + N_2(g)$

C. $3Cu(s) + \mathbf{N_2}(g) \rightarrow 3H_2O(g) + CuO(s) + 2NH_3(g)$

D. $H_2S(g) + \mathbf{Cl_2}(aq) \rightarrow 2H^+(aq) + 2Cl^-(aq) + S(s)$

Question 19

Four incomplete half-equations are given below. In which case is reduction occurring?

A $SO_3 \rightarrow SO_4^{2-}$

B $O_2 \rightarrow H_2O_2$

C $Mn^{2+} \rightarrow MnO_4^-$

D $CrO_4^{2-} \rightarrow Cr_2O_7^{2-}$

Question 20

The chemical amount, in mol, of lithium **ions** in 3.086 g of Li_3PO_4, (M = 115.7 g mol^{-1}) is closest to

A. 0.03000

B. 0.08000

C. 3.000

D. 8.000

END OF SECTION A

SECTION B – Short answer questions

Instructions for Section B

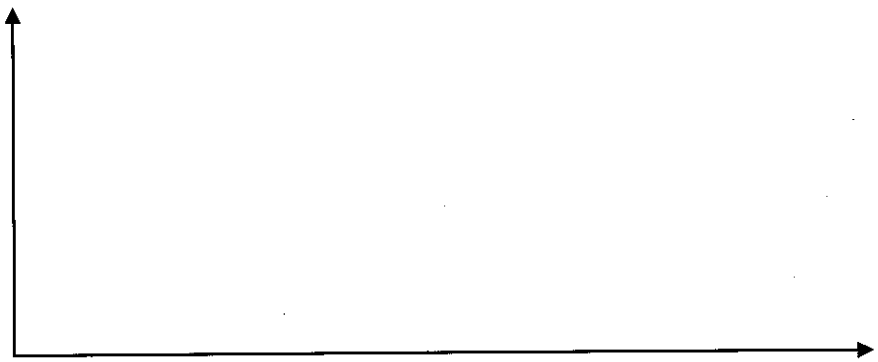
Answer all questions in the spaces provided.
To obtain full marks for your response you should:

- give simplified answers with an appropriate number of significant figures for all numerical questions; unsimplified answers will not be given full marks.
- show all working in your answers to numerical questions. No credit will be given for an incorrect answer unless it is accompanied by details of the working.
- make sure all chemical equations are balanced and that the formulas for individual substances include an indication of state (for example, $H_2(g)$; NaCl(s).

Question 1

An ice cube of mass 10.0 g was taken from a freezer, (temperature –20 °C), and placed in a bowl. It was left overnight in a warm room at a constant temperature of 25 °C. By the morning, the contents of the bowl had completely evaporated.

a. Sketch a graph to show how the temperature of the contents of the bowl changed on standing.



2 marks

b. How much energy must be given to the ice at –20 °C to raise its temperature to 0 °C, assuming no evaporation takes place?

_____

_____

1 mark

c. How much energy must be given to 10 g of liquid water at 0 °C to raise the temperature to 25 °C again assuming that no evaporation had taken place?

_____

_____

1 mark

d. The total energy given to the 10 g of ice at –20 °C to raise its temperature to 25 °C is 4816 J, ignoring evaporation. Account for the difference between this value and the sum of the values you have calculated in parts **b** and **c**.

_____

_____

_____

2 marks

e. The heat of vaporization of water at 100 °C is 40.67 kJ mol^{-1}.

i. What is the mass of one mole of water molecules?

_____

ii. What is the heat of vaporisation of water at 100 °C in kJ g^{-1}?

_____

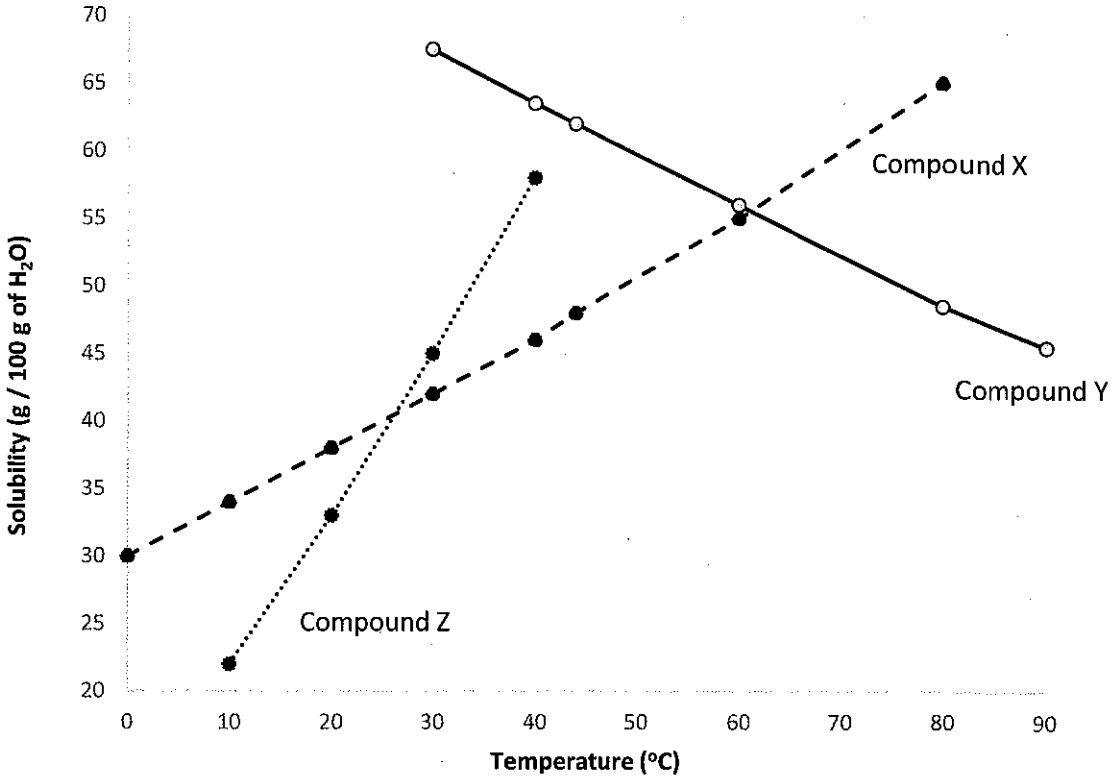
iii. How much energy is required to change 10 g of liquid water to steam at 100 °C?

_____

3 marks

Question 2

The graphs below show how the solubility changes with temperature for three compounds, X, Y and Z.



a. Which one or more of the compounds: X, Y and Z is a gas? Explain your answer.

_____

_____

2 marks

b. What is the solubility of compound Y at 55 °C? _____

1 mark

c. What mass of water (to 2 significant figures) at 60 °C is needed to make a saturated solution from 50 g of compound X?

_____

_____

2 marks

d. If 80 g of Z is added to 60 g of water at 40 °C, what mass of Z would remain undissolved?

_____

_____

_____

3 marks

Question 3

Many ionic compounds are soluble in water.

Write balanced equations to represent the dissolving process for each of the following

a. **i.** AlF_3

ii. Na_2CO_3

2 marks

b. Describe **all** of the types of bonds that are broken and formed when solid sodium carbonate dissolves in water.

3 marks

c. Draw diagrams to show how water molecules are arranged around the **dissolved particles** in a solution of Na_2CO_3.

2 marks

Question 4

a. Gaseous hydrogen bromide, HBr, will ionise when it dissolves in water. Write a chemical equation to represent the dissolving process for this compound in water.

_____

1 mark

b. **i.** Write an overall equation for the precipitate which forms between sodium iodide and lead(II) nitrate.

_____

ii. Write the ionic equation for the reaction in part **i.**

_____

3 marks

c. **i.** Write an overall equation for the precipitate which forms between potassium hydroxide and iron(III) nitrate.

_____

ii. Write the ionic equation for the reaction in part **i.**

_____

3 marks

d. Identify the type of bonding that is always present between water and ions.

_____

1 mark

Question 5

A 20.00 mL sample of vinegar, containing the active ingredient ethanoic acid, was added to a volumetric flask and distilled water was added to a total volume of 250.0 mL. A 20.00 mL sample of the diluted vinegar solution required 21.35 mL of 0.0311 M sodium hydroxide, NaOH, solution, from a burette to reach the endpoint.

Given the equation for the reaction is

$$CH_3COOH(aq) + NaOH(aq) \rightarrow H_2O(l) + CH_3COONa(aq)$$

a. Determine the amount of sodium hydroxide, in mol, used in the experiment.

1 mark

b. Determine the amount of ethanoic acid, in mol, in the aliquot taken from the diluted solution.

1 mark

c. Determine the mass, in g, of ethanoic acid in the 20.00 mL **undiluted** vinegar sample.

3 marks

d. In a report of the experiment a student used the words 'aliquot' and 'titre'. Explain the meanings of these two terms.

2 marks

Question 6

In a series of experiments involving the displacement of one metal ion from solution by another metal, the following results were recorded by a group of students.

Combination	Result
copper(II) nitrate + lead	reaction occurred
copper(II) nitrate + zinc	reaction occurred
iron(II) sulfate + zinc	reaction occurred
lead(II) nitrate + copper	no reaction occurred
lead(II) nitrate + iron	no reaction occurred
lead(II) nitrate + tin	reaction occurred
magnesium sulfate + zinc	no reaction occurred
tin(II) chloride + iron	reaction occurred
tin(II) chloride + magnesium	reaction occurred
zinc sulfate + lead	no reaction occurred
zinc sulfate + tin	no reaction occurred

a. Circle the number corresponding to the order of reactivity of the five metal elements used in this series of experiments (with the most reactive element first). Explain your reasoning.

i. copper, lead, tin, zinc, magnesium
ii. magnesium, tin, zinc, copper, lead
iii. magnesium, zinc, tin, lead, copper
iv. tin, zinc, magnesium, lead, copper
v. zinc, magnesium, lead, copper, tin

2 marks

b. Which experimental result do you think is likely to be in error? Explain your reasoning.

2 marks

c. The instructions for a particular experiment read: Mix together equal volumes of dry aluminium powder and thoroughly dried iron(III) oxide. Place the mixture in a crucible and stand this in a tin filled with sand. Place a spatula measure of a mixture of barium peroxide and magnesium powder on top of the mixture and insert a freshly scraped magnesium ribbon through this pile to act as a fuse. Light the magnesium ribbon with a taper and stand well back. An extremely vigorous reaction takes place and a bead of iron can be emptied out when the reaction subsides.

i. Why is it necessary to use 'freshly scraped magnesium ribbon'?

_____

_____

ii. What do these instructions tell you about the reactivity of aluminium?

_____

_____

iii. Iron(III) oxide is converted in this experiment into iron. What type of reaction is this?

_____

3 marks

Question 7

A student wishes to determine the amount of potassium ion in a sample of liquid soup using atomic absorption spectroscopy.

In the determination, 2.65 g of the soup was weighed and added to a small volume of water. The insoluble material is removed by filtration and washed with more de-ionised water. The filtrate and washings are collected and the volume is made up to 250.0 mL in a volumetric flask.

A 25.00 mL aliquot of this solution is run into a second volumetric flask and again the volume made up to 250.0 mL with de-ionised water. This diluted solution is sprayed into the flame of an atomic absorption spectrophotometer and the absorbance is recorded. The student also measures the absorbance of solutions containing known concentrations of potassium ion. All the results are tabulated below.

$c(K^+)$ (aq) mg L^{-1}	**Absorbance**
10	0.021
20	0.041
30	0.063
40	0.083
50	0.104
diluted soup	0.049

a. Use the data for the standard solutions in the table to plot the calibration line for K^+ (aq) on the axes provided below.

2 marks

b. Use your graph to determine the concentration of potassium ion in the **diluted** soup.

1 mark

c. What is the concentration of potassium ion in mg L^{-1} in the original sample of soup?

3 marks

d. Determine the mass and the percentage by mass of potassium ion in the original sample of soup.

2 marks

Question 8

a. Determine the pH of a 0.00010 M HCl(aq).

1 mark

b. A solution of sulfuric acid has a concentration of 5.0×10^{-3} M. Assuming complete ionization occurs, determine its pH.

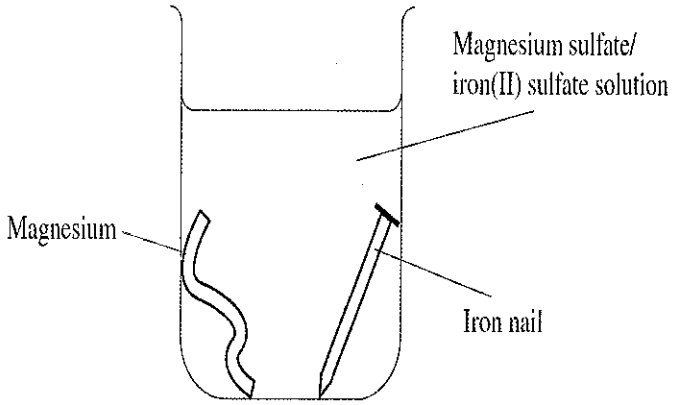
2 marks

c. A solution of nitric acid has a pH = 3.4. Find the molar concentration of the nitric acid.

2 marks

Question 9

A student set up a laboratory experiment in which a beaker contained a strip of magnesium, an iron nail, and a solution of iron(II) sulfate and magnesium sulfate. This was left for several days.



Describe what would happen in this experiment. Include relevant chemical equations in your answer.

5 marks

Question 10

Salinity in soil is a widespread problem across Victoria and other states of Australia.

In order to determine the salt (sodium chloride) content of a soil sample, two students took a 50.0 g sample of soil and added 100 mL of de-ionised water. After stirring the sample for several minutes, they filtered out the undissolved material and then titrated the remaining solution with 0.4998 M $AgNO_3(aq)$.

Using the titration data, the amount of sodium chloride in the soil sample was determined to be 1.58 per cent by mass.

a. What type of analysis is this process?

1 mark

b. Calculate a numerical value, in mL, of the volume of silver nitrate used in the titration and give your answer to the appropriate number of significant figures.

4 marks

END OF TRIAL EXAMINATION

CHEMISTRY DATA SHEET

Directions to students

This data sheet is provided for your reference.
Detach this data sheet during reading time.

SI prefixes, their symbols and values

SI prefix	Symbol	Value
giga	G	10^{9}
mega	M	10^{6}
kilo	k	10^{3}
deci	d	10^{-1}
centi	c	10^{-2}
milli	m	10^{-3}
micro	μ	10^{-6}
nano	n	10^{-9}
pico	p	10^{-12}

1 ppm (m/v) = 1 mg L^{-1}

N_A = 6.02×10^{23} mol^{-1}

Specific heat capacity (c) of water = 4.18 J g^{-1} $°C^{-1}$

Density (*d*) of water at 25 °C = 1.00 g mL^{-1}

Ionic product of water, $K_w = [H_3O^+]\,[OH^-]$ = 1.0×10^{-14} M^2 (at 25 °C)

$pH = -\log_{10}[H_3O^+]$ $pOH = -\log_{10}[OH^-]$ $pH + pOH = 14.0$ (at 25 °C)

Some Solubility Data

Level of Solubility	Ionic compounds containing	Exceptions
Generally soluble	Na^+, K^+, NH_4^+, NO_3^-, CH_3COO^-	None
	Cl^-, Br^-, I^-	Ag^+ compounds
	SO_4^{2-}	Pb^{2+}, Ba^{2+}, Ag^+ and Ca^{2+} compounds
Low solubility	CO_3^{2-}, PO_4^{3-}, S^{2-}	Na^+, K^+, and NH_4^+ compounds
	OH^-	Na^+, K^+, NH_4^+, Ba^{2+} and Sr^{2+} compounds

Some electronegativity values

				H	2.1								
Li	1.0	Be	1.6	B	2.0	C	2.5	N	3.0	O	3.5	F	4.0
Na	0.9	Mg	1.3	Al	1.6	Si	1.9	P	2.2	S	2.6	Cl	3.2

An abridged Reactivity Series

$Au^{+}(aq) + e^{-} \rightleftharpoons Au(s)$

$Ag^{+}(aq) + e^{-} \rightleftharpoons Ag(s)$

$Fe^{3+}(aq) + 2e^{-} \rightleftharpoons Fe^{2+}(aq)$

$O_2(g) + 2H_2O(l) + 4e^{-} \rightleftharpoons 4OH^{-}(aq)$

$Cu^{2+}(aq) + 2e^{-} \rightleftharpoons Cu(s)$

$Sn^{4+}(aq) + 2e^{-} \rightleftharpoons Sn^{2+}(aq)$

$2H^{+}(aq) + 2e^{-} \rightleftharpoons H_2(g)$

$Pb^{2+}(aq) + 2e^{-} \rightleftharpoons Pb(s)$

$Sn^{2+}(aq) + 2e^{-} \rightleftharpoons Sn(s)$

$Ni^{2+}(aq) + 2e^{-} \rightleftharpoons Ni(s)$

$Co^{2+}(aq) + 2e^{-} \rightleftharpoons Co(s)$

$Fe^{2+}(aq) + 2e^{-} \rightleftharpoons Fe(s)$

$Zn^{2+}(aq) + 2e^{-} \rightleftharpoons Zn(s)$

$2H_2O(l) + 2e^{-} \rightleftharpoons H_2(g) + 2OH^{-}(aq)$

$Al^{3+}(aq) + 3e^{-} \rightleftharpoons Al(s)$

$Mg^{2+}(aq) + 2e^{-} \rightleftharpoons Mg(s)$

$Na^{+}(aq) + e^{-} \rightleftharpoons Na(s)$

$Ca^{2+}(aq) + 2e^{-} \rightleftharpoons Ca(s)$

$K^{+}(aq) + e^{-} \rightleftharpoons K(s)$

Key to table

79
Au
197.0
Gold

– Atomic number
– Symbol of element
– Relative atomic mass
– Name of element

1 H 1.0 Hydrogen																	**2** He 4.0 Helium
3 Li 6.9 Lithium	**4** Be 9.0 Beryllium											**5** B 10.8 Boron	**6** C 12.0 Carbon	**7** N 14.0 Nitrogen	**8** O 16.0 Oxygen	**9** F 19.0 Fluorine	**10** Ne 20.2 Neon
11 Na 23.0 Sodium	**12** Mg 24.3 Magnesium											**13** Al 27.0 Aluminium	**14** Si 28.1 Silicon	**15** P 31.0 Phosphorus	**16** S 32.1 Sulfur	**17** Cl 35.5 Chlorine	**18** Ar 39.9 Argon
19 K 39.1 Potassium	**20** Ca 40.1 Calcium	**21** Sc 44.9 Scandium	**22** Ti 47.9 Titanium	**23** V 50.9 Vanadium	**24** Cr 52.0 Chromium	**25** Mn 54.9 Manganese	**26** Fe 55.8 Iron	**27** Co 58.9 Cobalt	**28** Ni 58.7 Nickel	**29** Cu 63.5 Copper	**30** Zn 65.4 Zinc	**31** Ga 69.7 Gallium	**32** Ge 72.6 Germanium	**33** As 74.9 Arsenic	**34** Se 79.0 Selenium	**35** Br 79.9 Bromine	**36** Kr 83.8 Krypton
37 Rb 85.5 Rubidium	**38** Sr 87.6 Strontium	**39** Y 88.9 Yttrium	**40** Zr 91.2 Zirconium	**41** Nb 92.9 Niobium	**42** Mo 95.9 Molybdenum	**43** Tc 98.1 Technetium	**44** Ru 101.1 Ruthenium	**45** Rh 102.9 Rhodium	**46** Pd 106.4 Palladium	**47** Ag 107.9 Silver	**48** Cd 112.4 Cadmium	**49** In 114.8 Indium	**50** Sn 118.7 Tin	**51** Sb 121.8 Antimony	**52** Te 127.6 Tellurium	**53** I 126.9 Iodine	**54** Xe 131.3 Xenon
55 Cs 132.9 Caesium	**56** Ba 137.4 Barium	**57** La 138.9 Lanthanum	**72** Hf 178.5 Hafnium	**73** Ta 180.9 Tantalum	**74** W 183.9 Tungsten	**75** Re 186.2 Rhenium	**76** Os 190.2 Osmium	**77** Ir 192.2 Iridium	**78** Pt 195.1 Platinum	**79** Au 197.0 Gold	**80** Hg 200.6 Mercury	**81** Tl 204.4 Thallium	**82** Pb 207.2 Lead	**83** Bi 209.0 Bismuth	**84** Po (209) Polonium	**85** At (210) Astatine	**86** Rn (222) Radon
87 Fr (223) Francium	**88** Ra (226) Radium	**89** Ac (227) Actinium	**104** Rf (261) Rutherfordium	**105** Db (262) Dubnium	**106** Sg (263) Seaborgium	**107** Bh (264) Bohrium	**108** Hs (265) Hassium	**109** Mt (268) Meitnerium	**110** Ds (271) Darmstadtium	**111** Rg (272) Roentgenium	**112** Cn (285) Copernicium	**113** Uut (284)	**114** Uuq (289)	**115** Uup (288)	**116** Uuh (293)	**117** Uus (294)	**118** Uuo (294)

58 Ce 140.1 Cerium	**59** Pr 140.9 Praseodymium	**60** Nd 144.2 Neodymium	**61** Pm (145) Promethium	**62** Sm 150.3 Samarium	**63** Eu 152.0 Europium	**64** Gd 157.2 Gadolinium	**65** Tb 158.9 Terbium	**66** Dy 162.5 Dysprosium	**67** Ho 164.9 Holmium	**68** Er 167.3 Erbium	**69** Tm 168.9 Thulium	**70** Yb 173.0 Ytterbium	**71** Lu 175.0 Lutetium
90 Th 232.0 Thorium	**91** Pa 231.0 Protactinium	**92** U 238.0 Uranium	**93** Np 237.1 Neptunium	**94** Pu (244) Plutonium	**95** Am (243) Americium	**96** Cm (247) Curium	**97** Bk (247) Berkelium	**98** Cf (251) Californium	**99** Es (254) Einsteinium	**100** Fm (257) Fermium	**101** Md (258) Mendelevium	**102** No (255) Nobelium	**103** Lr (260) Lawrencium

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CHEMISTRY

Unit 2 Trial Examination

MULTIPLE CHOICE ANSWER SHEET

STUDENT NAME:	

INSTRUCTIONS: **USE PENCIL ONLY**

- Write your name in the space provided above.
- Use a **PENCIL** for **ALL** entries.
- If you make a mistake, **ERASE** it – **DO NOT** cross it out.
- Marks will **NOT** be deducted for incorrect answers.
- **NO MARK** will be given if more than **ONE** answer is completed for any question.
- Mark your answer by **SHADING** the letter of your choice.

	ONE ANSWER PER LINE					ONE ANSWER PER LINE				
1	A	B	C	D	11	A	B	C	D	
2	A	B	C	D	12	A	B	C	D	
3	A	B	C	D	13	A	B	C	D	
4	A	B	C	D	14	A	B	C	D	
5	A	B	C	D	15	A	B	C	D	
6	A	B	C	D	16	A	B	C	D	
7	A	B	C	D	17	A	B	C	D	
8	A	B	C	D	18	A	B	C	D	
9	A	B	C	D	19	A	B	C	D	
10	A	B	C	D	20	A	B	C	D	