insight™
innovative engaging evolving

Year 12 *Trial Exam Paper*

2015

CHEMISTRY

Written examination

Reading time: 15 minutes
Writing time: 2 hours 30 minutes

STUDENT NAME:

QUESTION AND ANSWER BOOK

Structure of book

Section	*Number of questions*	*Number of questions to be answered*	*Number of marks*
A	**30**	**30**	**30**
B	**11**	**11**	**99**
			Total 129

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

Materials provided

- The Question and answer book of 39 pages
- An Answer sheet for multiple-choice questions
- A Data book

Instructions

- Remove the Data book from this book during reading time.
- Write your **name** in the box provided.
- You must answer the questions in English.

At the end of the examination

- Place the Multiple-choice answer sheet inside the front cover of this Question and answer book.

Students are NOT permitted to bring mobile phones or any other unauthorised electronic devices into the examination.

SECTION A – Multiple-choice questions

Instructions for Section A

Answer **all** questions in pencil on the answer sheet provided for the multiple-choice questions.
Choose the response that is **correct** or that **best answers** the question.
1 mark will be awarded for a correct answer; no marks will be awarded for an incorrect answer.
Marks are **not** deducted for incorrect answers.
No marks will be awarded if more than one answer is chosen for any question.

Question 1

An oxide of sulfur is found to be 40.0% sulfur by mass. The empirical formula will be

A. SO

B. SO_2

C. SO_3

D. S_3O

Use the following information to answer Questions 2 and 3.

Copper can react with concentrated nitric acid according to the equation:

$$3Cu(s) + 8HNO_3(aq) \rightarrow 3Cu(NO_3)_2(aq) + 2NO(g) + 4H_2O(l)$$

Question 2

When 0.66 mole of copper reacts with 1.60 mole of nitric acid, the maximum amount of nitrogen monoxide that can form is, in mole

A. 0.40

B. 0.44

C. 0.66

D. 2.26

Question 3

The oxidation state of nitrogen in HNO_3 is

A. –3

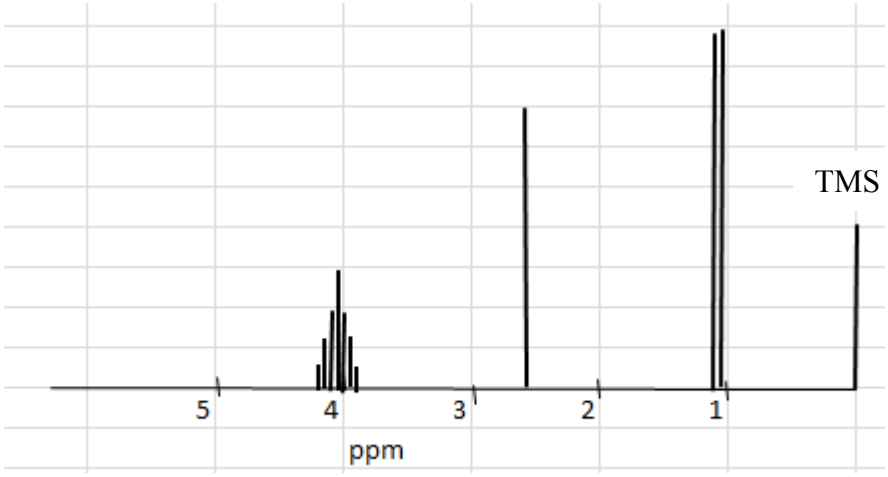
B. +3

C. +5

D. +6

Question 4

A high-resolution proton NMR spectrum is shown below.



This NMR spectrum could be that of

A. 1-propanol.

B. 2-propanol.

C. butane.

D. 2-chloropropane.

Question 5

Several different yellow food dyes have been used over the past 30 years. One of those dyes, known simply as Yellow 5, is a suspected carcinogen, yet it is still legal to use it in food items sold in Australia. Which analytical technique would be best suited to detect the presence of Yellow 5 in cordial?

A. TLC

B. atomic absorption spectroscopy

C. ultraviolet spectroscopy

D. acid–base titration

Question 6

Chlorine gas can react with sodium thiosulfate, NaS_2O_3, when it is bubbled through a solution of sodium thiosulfate. The equation for this redox reaction is

$$2Na^+(aq) + S_2O_3^{2-}(aq) + 4Cl_2(g) + 5H_2O(l) \rightarrow 2Na^+(aq) + 2SO_4^{2-}(aq) + 10H^+(aq) + 8Cl^-(aq)$$

In this reaction

A. sodium ions are oxidised and chlorine atoms are reduced to chloride ions.

B. chloride ions are oxidised to chlorine atoms and sulfur atoms are reduced.

C. sulfur atoms are oxidised from +4 to +6 and chlorine atoms are reduced to chloride ions.

D. sulfur atoms are oxidised from +2 to +6 and chlorine atoms are reduced to chloride ions.

Question 7

A student conducts a titration between a weak acid and a strong base. The aliquot of base is added to the flask and indicator is added to this flask. The student conducts the titration carefully and turns the burette off after the indicator appears to have changed colour. A pH probe shows that the endpoint obtained by the student is significantly different from the equivalence point. The indicator the student used is most likely to be

A. phenolphthalein.

B. methyl orange.

C. phenol red.

D. bromothymol blue.

Question 8

A sample of glucose contains 0.36 g of carbon. What mass, in g, of oxygen will it contain?

A. 0.36

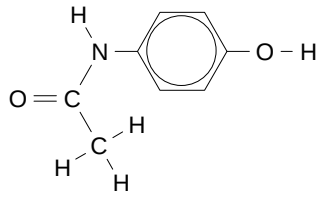
B. 0.40

C. 0.48

D. 0.72

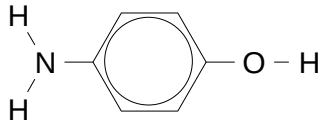
Use the following information to answer Questions 9 and 10.

Tylenol is an analgesic that is often used in combination with codeine. It is a white crystalline powder. The structure of Tylenol is



Question 9

The final step in the manufacture of Tylenol involves the reaction of phenylamine, shown below, and another molecule.



The final reaction will be

A. a condensation reaction between phenylamine and ethanoic acid.

B. a condensation reaction between phenylamine and ethanol.

C. an esterification reaction between phenylamine and methanoic acid.

D. an esterification reaction between phenylamine and ethanol.

Question 10

The molar mass, in g, of Tylenol will be closest to

A. 147

B. 151

C. 157

D. 163

Question 11

The empirical formula of propyl pentanoate is

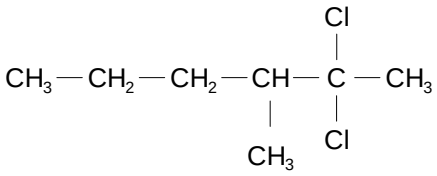
A. CH_2O

B. C_4H_8O

C. $C_4H_8O_2$

D. $C_8H_{16}O_2$

Question 12



What is the systematic name of this molecule?

A. 2,2-dichloro-3-methylhexane

B. 2,2-dichloroheptane

C. 5,5-dichloro-4-methylhexane

D. 3-chloro-2,2-dimethylhexane

Question 13

Which of the following reactions is **not** likely to form ethanol?

A. Fermentation of a glucose solution

B. Bubbling ethane gas through hot water

C. Heating a sample of chloroethane in potassium hydroxide

D. Heating a mixture of ethene, steam and phosphoric acid

Question 14

Four examples of common linkages between molecules are described below

1. glycerol — fatty acid	2. amino acid — amino acid
3. glucose — fructose	4. stearic acid — ethanol

From 1 to 4, the respective names for these linkages are

A. ether, amine, ester, ether.

B. ether, amide, ether, ester.

C. ester, amine, ether, ester.

D. ester, amide, ether, ester.

Question 15

A segment of a DNA strand is found to have 12 hydrogen bonds with its matching strand. The base sequence on this strand could be

A. adenine, cytosine, guanine, guanine, thymine.

B. adenine, adenine, thymine, guanine, thymine.

C. adenine, adenine, cytosine, thymine, guanine.

D. adenine, guanine, thymine, cytosine, cytosine.

Question 16

Two beakers containing HCl are placed on a bench side by side. A marble chip is dropped into each beaker and a reaction starts in both beakers. The percentage of collisions that lead to a reaction is higher in the first beaker. A possible reason for this higher percentage in the first beaker might be that the

A. concentration of the HCl is higher.

B. marble chip is smaller.

C. marble chip is larger.

D. temperature of the HCl is higher.

Question 17

Select the correct statement about enzymes.

A. The mass of an enzyme will not be the same after a reaction.

B. Temperature does not influence the effectiveness of an enzyme.

C. A particular enzyme can act as a catalyst more than once.

D. Several different enzymes can catalyse a specific biochemical reaction.

Question 18

Rank the following 1.0 M acids in order of increasing pH:

benzoic acid hydrochloric acid ethanoic acid sulfuric acid

A. sulfuric, hydrochloric, benzoic, ethanoic

B. sulfuric, hydrochloric, ethanoic, benzoic

C. ethanoic, benzoic, hydrochloric, sulfuric

D. benzoic, ethanoic, hydrochloric, sulfuric

Question 19

In comparison with 20 mL of 1.0 M HCl, 20 mL of 1.0 M solution of ethanoic acid will have a

A. higher pH and will neutralise less 1.0 M NaOH.

B. lower pH and will neutralise less 1.0 M NaOH.

C. lower pH but will neutralise the same volume of 1.0 M NaOH.

D. higher pH but will neutralise the same volume of 1.0 M NaOH.

Question 20

When electricity is produced from uranium, the

A. uranium atoms undergo nuclear fission and release large quantities of electrons.

B. thermal energy released from the fission of uranium can be harnessed to produce electricity.

C. uranium atoms undergo nuclear fusion and release large amounts of energy.

D. uranium reacts very rapidly with oxygen, releasing significant amounts of energy.

Question 21

Ethanol is referred to as 'bioethanol' if the alkanol

A. is produced from plant sources.

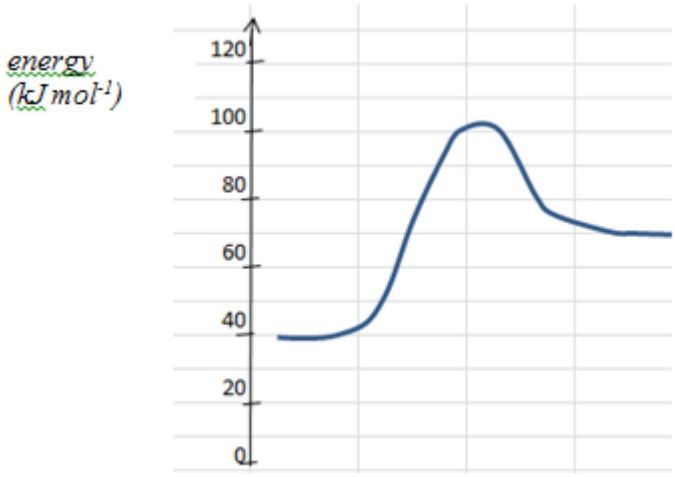
B. undergoes combustion in an efficient engine.

C. is produced from once-living sources.

D. does not produce carbon dioxide when it undergoes combustion.

Question 22

An energy profile diagram for the reaction of A + B $\rightarrow$ Z is shown below.



0.05 mole of A is reacted with excess B in a calorimeter that has a calibration factor of 750 J $°C^{-1}$.
The expected temperature change, in °C, that will occur in the calorimeter is

A. an increase of 2.

B. an increase of 4.

C. a decrease of 2.

D. a decrease of 4.

Use the following information to answer Questions 23 and 24.

A copper electrode is used in an electrolysis cell. Its mass is recorded before the current is applied and then again after the experiment and after drying. The measurements taken are shown in the diagram.

electrode before: 10.0 g

electrode after: 8.22 g

Question 23

Which combination of current and time is most likely to have caused the measured mass change during this experiment?

A. 0.60 amps for 15 minutes

B. 6.0 amps for 15 minutes

C. 12.0 amps for 15 minutes

D. 10.0 amps for 10 minutes

Question 24

Which of the following cells could have been used for this experiment?

A. The copper electrode was the cathode and electrons were produced at this electrode.

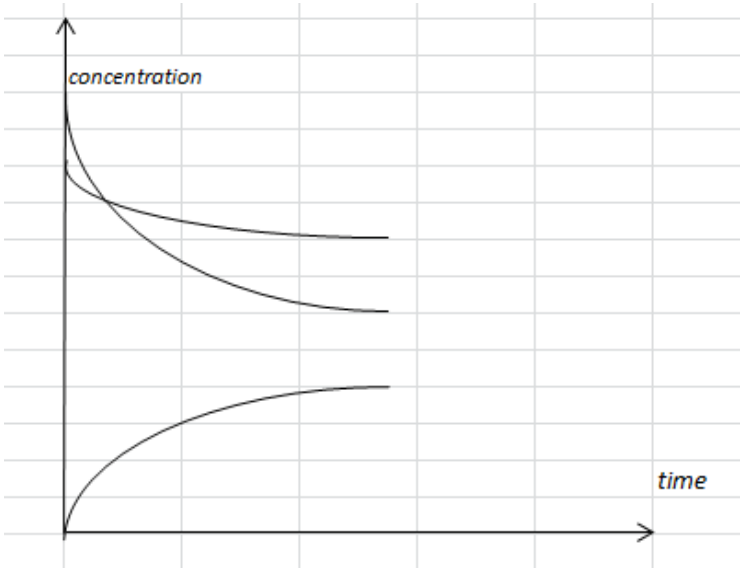
B. The copper electrode was the cathode and the electrolyte was $CuSO_4(aq)$.

C. The copper electrode was the negative electrode and the electrolyte was $CuSO_4(aq)$.

D. The copper electrode was the positive electrode and the electrolyte was $CuSO_4(aq)$.

Question 25

Gaseous reactants are added to an empty reactor and allowed to come to equilibrium. The concentrations of each species present are shown on the graph below.



The reaction taking place could be

A. $2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g)$

B. $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$

C. $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$

D. $N_2O_4(g) \rightleftharpoons 2NO_2(g)$

Question 26

The chemical formula of phosgene is $COCl_2$. Phosgene decomposes to carbon monoxide and chlorine in the reversible reaction

$$COCl_2(g) \rightleftharpoons CO(g) + Cl_2(g)$$

A sample of phosgene is added to an empty reactor and allowed to reach equilibrium. Its concentration is monitored over the next few minutes and the values are recorded in the table below.

Time (min)	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
Phosgene concentration (M)	0.81	0.81	1.46	1.51	1.53	1.54	1.54	1.54

A change was made to the system at the 6.0 minute mark. The data suggests that this change might have been

A. an injection of extra phosgene.

B. the addition of a catalyst.

C. a decrease in pressure in the reactor.

D. a decrease in the volume of the reactor.

Question 27

Dinitrogen tetroxide, N_2O_4, forms an equilibrium with nitrogen dioxide, NO_2.

$$N_2O_4(g) \rightleftharpoons 2NO_2(g)$$

The value of *K* at 25°C for this reaction is 0.0055 M.
Which of the following reactions will have a numerical value for *K* of 0.074?

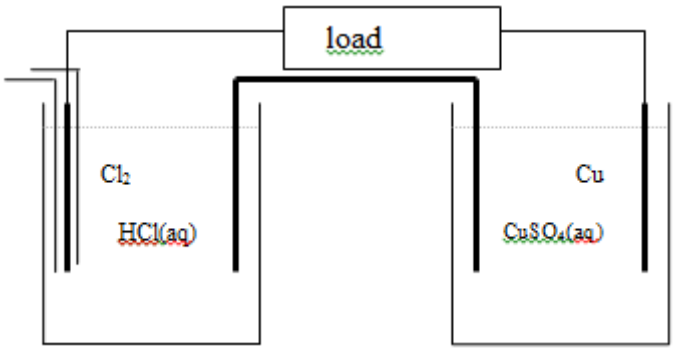
A. $2N_2O_4(g) \rightleftharpoons 4NO_2(g)$

B. $\frac{1}{2}N_2O_4(g) \rightleftharpoons NO_2(g)$

C. $2NO_2(g) \rightleftharpoons N_2O_4(g)$

D. $NO_2(g) \rightleftharpoons \frac{1}{2}N_2O_4(g)$

Use the following information to answer Questions 28 and 29.



A galvanic cell can be constructed when a chlorine half-cell is connected to a copper half-cell, as shown above. For this cell to work, a supply of chlorine gas is connected to a platinum electrode in the chlorine half-cell.

Question 28

Select the correct alternative for this cell.

	Oxidant	Reductant	Anode	Cathode
A.	Cl^-	Cu^{2+}	Cu	Pt
B.	Cl^-	Cu^{2+}	Pt	Cu
C.	Cu	Cl_2	Cu	Pt
D.	Cl_2	Cu	Cu	Pt

Question 29

When this cell is operating, electrons will flow from the

A. copper to the platinum and the copper electrode will be consumed.

B. copper to the platinum and the copper will deposit on the copper electrode.

C. platinum to the copper and chloride ions will form chlorine gas.

D. platinum to the copper and return through the salt bridge.

Question 30

Hydrogen gas and oxygen gas react with each other in an alkaline fuel cell. The half-equation for the reaction at the cathode will be

A. $H_2(g) \rightarrow 2H^+(aq) + 2e^-$

B. $O_2(g) + 4H^+(aq) + 4e^- \rightarrow 2H_2O(g)$

C. $O_2(g) + 2H_2O(l) + 4e^- \rightarrow 4OH^-(aq)$

D. $2H_2(g) + O_2(g) \rightarrow 2H_2O(g)$

END OF SECTION A

SECTION B – Short-answer questions

Instructions for Section B

Answer **all** questions in the spaces provided. Use a black or blue pen.
To obtain full marks for your responses you should

- give simplified answers with an appropriate number of significant figures to 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 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 (9 marks)

A sample of magnesium has oxidised significantly after sitting in a damp environment for several weeks. Its purity is quoted to be 82.4% by mass magnesium.
A student wishes to check the quoted value of 82.4%. She adds the sample to 100.0 mL of 1.0 M hydrochloric acid and catches the gas evolved in a gas syringe. The hydrochloric acid used is retained for further testing.

The data for this experiment is set out below.

mass of impure magnesium:	1.040 g
volume of hydrochloric acid:	100 mL
concentration of hydrochloric acid:	1.0 M
laboratory temperature: 20.0°C and pressure: 1.00 atm	

a. Write a balanced equation for the reaction between magnesium and hydrochloric acid.

1 mark

_____

b. Calculate the expected mass of magnesium in the sample (assuming it is 82.4% Mg).

1 mark

_____

c. Determine the expected volume of hydrogen gas that should be evolved.

3 marks

_____

_____

_____

The purity of the original sample of magnesium is checked further by analysing how much HCl acid remains in the original 100 mL sample after the magnesium has reacted. This analysis is done by titration of the remaining HCl with 0.500 M NaOH. The volume of NaOH required to neutralise the HCl is 72.0 mL

d. **i.** Calculate the number of mole of NaOH used in the titration.

1 mark

_____

ii. Determine the number of mole of HCl that remained after the magnesium had reacted.

1 mark

_____

iii. Determine the number of mole of HCl that did react with the magnesium. Do your calculations suggest the value of 82.4% by mass magnesium is accurate?

2 marks

_____

_____

_____

Question 2 (9 marks)

Give concise explanations for the following.

a. An alkanol molecule with molecular formula C_3H_8O is heated with $K_2Cr_2O_7$ in acid conditions but no oxidation reaction occurs.

2 marks

_____

_____

_____

b. Biodiesel can be produced from canola crops. Biodiesel is considered better for the environment than traditional diesel fuel, yet it produces significant amounts of carbon dioxide when it undergoes combustion in a car engine.

2 marks

_____

_____

_____

c. A mixture of gases has reached equilibrium. The volume of the reactor is halved. However, the change in volume causes no significant shift in the position of equilibrium.

1 mark

_____

_____

_____

d. A sample of highly purified water is found to have a pH of 6.6, not 7.

2 marks

_____

_____

_____

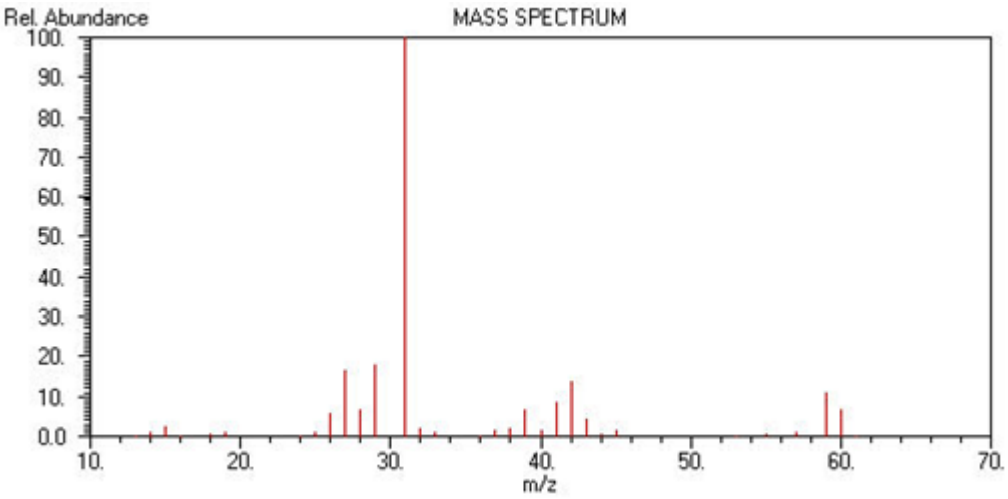
e. A sample of an alkane with molecular formula C_5H_{12} is found to produce only one peak on a proton NMR spectrum.

2 marks

_____

Question 3 (9 marks)

A sample of propylpropanoate is hydrolysed to 1-propanol and propanoic acid. The two products are separated and left in unlabelled containers. The liquids are tested using different forms of spectroscopy. The mass spectrum of one of the liquids is shown below.



a. Identify the liquid represented in this spectrum and give two pieces of information to justify your selection.

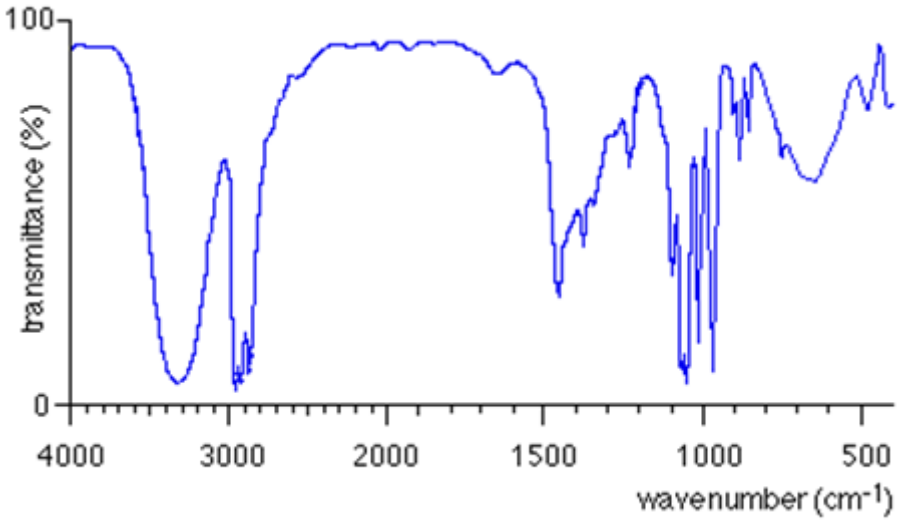
2 marks

_____

_____

_____

The infrared spectrum of one of the liquids is shown below.



b. Identify the liquid in this spectrum. Justify your answer.

2 marks

_____

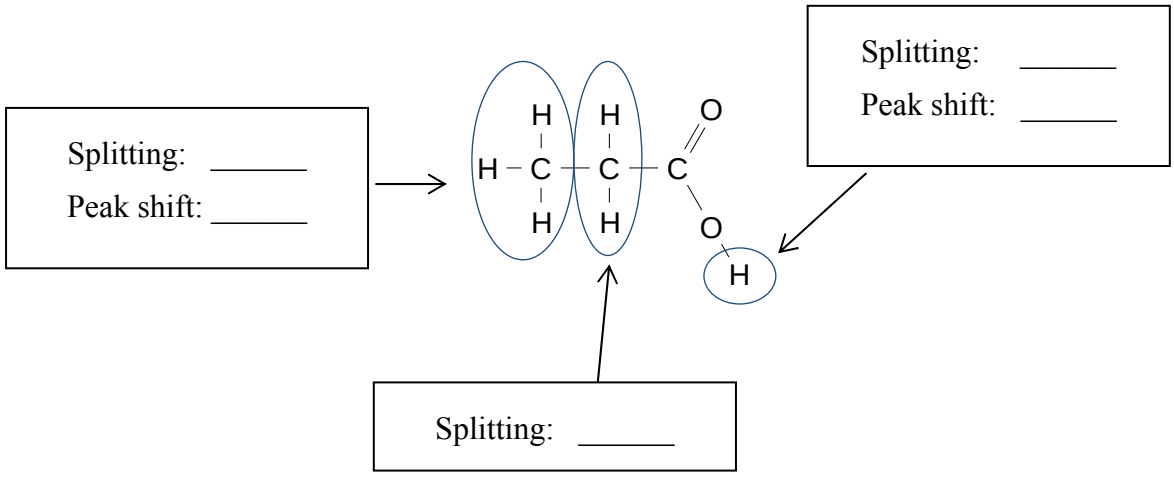
_____

_____

c. A molecule of propanoic acid is drawn below. A sample is tested using high-resolution proton NMR spectroscopy. It has three different hydrogen environments.

Fill in the spaces provided with the splitting arrangement of each peak and the requested shift values.

5 marks



Question 4 (10 marks)

Reactions are carried out on molecules A, B, C and D.

$$A + Cl_2 \rightarrow CH_3CHClCH_2Cl$$

a. **i.** Draw and name molecule A.

2 marks

---

ii. A polymer can be formed when molecule A reacts with itself. Draw a section of this polymer that contains at least three repeating units.

1 mark

b.
$$B + Cl_2 \xrightarrow{\text{UV light}} CH_3CH_2CH_2Cl + HCl$$

Draw and name molecule B.

2 marks

$$C + D \rightarrow CH_3CH_2CH_2COOCH_2CH_3 + H_2O$$

c. **i.** Draw and name molecule C.

2 marks

_____

ii. Draw and name molecule D.

2 marks

_____

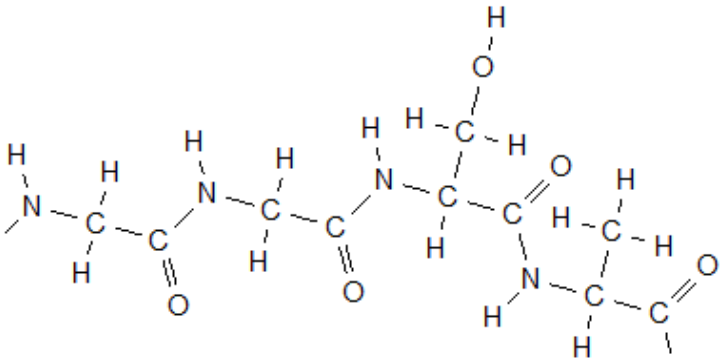
iii. Give the formula of the catalyst used for this reaction.

1 mark

_____

Question 5 (8 marks)

The following structure shows part of a protein molecule.



a. Name the amino acids present in this structure.

3 marks

_____

_____

b. **i.** What is the 'primary structure' of a protein?

1 mark

_____

_____

_____

ii. Describe the bonding that is responsible for the spiral secondary structure of a protein.

2 marks

_____

_____

_____

Invertase is an enzyme that increases the rate of reaction for the hydrolysis of sucrose. The optimum operating temperature for invertase is 40°C.

c. **i.** Explain why invertase functions very poorly at 70°C.

1 mark

_____

_____

_____

ii. Name the monosaccharides formed by the hydrolysis of sucrose.

1 mark

_____

_____

Question 6 (11 marks)

The table below contains the molecular formulas of nine molecules associated in some way with food chemistry. Use the letters assigned to each molecule to answer the questions below.

A $C_{20}H_{32}O_2$	**B** $C_6H_{12}O_6$	**C** $C_3H_7NO_2$
D $C_{12}H_{22}O_{11}$	**E** $C_3H_8O_3$	**F** $C_{18}H_{36}O_2$
G C_2H_6O	**H** $C_7H_6O_2$	**I** $C_4H_8O_2$

Give the letter that matches each description.

a. **i.** A saturated fatty acid

1 mark

_____

ii. Write a balanced equation for the combustion of this fatty acid.

2 marks

_____

b. **i.** An amino acid

1 mark

_____

ii. Name the amino acid.

1 mark

_____

c. A disaccharide

1 mark

_____

d. **i.** An unsaturated fatty acid

1 mark

_____

ii. How many carbon-to-carbon double bonds does this fatty acid have?

1 mark

_____

e. Contains a benzene ring

1 mark

_____

f. **i.** Is a reactant in a fermentation reaction

1 mark

_____

ii. Is a product in a fermentation reaction

1 mark

_____

Question 7 (10 marks)

Propanoic acid is a weak acid. It exists as a colourless liquid at room temperature and it is used as a preservative and as a reactant in the preparation of several esters.

a. What does the term *weak acid* mean?

1 mark

_____

b. Write a chemical equation for the reaction of propanoic acid with

i. water

1 mark

_____

ii. sodium hydroxide, NaOH

1 mark

_____

c. **i.** Write an expression for the acidity constant of propanoic acid.

1 mark

_____

ii. Calculate the pH of a 0.200 M propanoic acid solution.

3 marks

_____

_____

_____

iii. Calculate the percentage ionisation of the propanoic acid in this solution.

1 mark

_____

_____

_____

More water is added to this solution of propanoic acid.

d. **i.** What will be the effect on the pH of the acid?

1 mark

_____

_____

_____

ii. What will be the effect on the percentage ionisation of the propanoic acid?

1 mark

_____

_____

_____

Question 8 (10 marks)
Nitrosyl chloride has the formula NOCl. It can exist in equilibrium with nitrogen monoxide and chlorine gas:

$$2\mathrm{NOCl(g)} \rightleftharpoons 2\mathrm{NO(g)} + \mathrm{Cl_2(g)}$$

a. 0.80 mole of NO and 0.60 mole of Cl_2 are added to an empty reactor. When equilibrium is reached, will the amount of NOCl formed be 0.80 mole? Explain your answer.

1 mark

_____

_____

_____

b. **i.** 0.76 mole of NOCl is added to an empty 1.0 L reactor. When equilibrium is reached, the concentration of NOCl is found to be 0.60 M. Calculate *K*.

3 marks

_____

_____

_____

_____

_____

_____

_____

_____

_____

ii. What will be the value of K at the same temperature for the reaction below?

$$2NO(g) + Cl_2(g) \leftrightharpoons 2NOCl(g)$$

1 mark

_____

_____

_____

c. NOCl is added to an empty reactor and it starts to react. A catalyst is added to the reactor before equilibrium is reached. Describe the effect of the addition of a catalyst on the

i. rate of the forward reaction

1 mark

_____

ii. rate of the back reaction

1 mark

_____

iii. position of equilibrium

1 mark

_____

d. NOCl is added to an empty reactor and allowed to reach equilibrium. More NOCl is then added and the system is allowed to reach equilibrium a second time.

i. What is the effect on the position of equilibrium of this addition?

1 mark

_____

_____

_____

ii. How does the amount of NOCl at the second point of equilibrium compare with the amount at the first point of equilibrium?

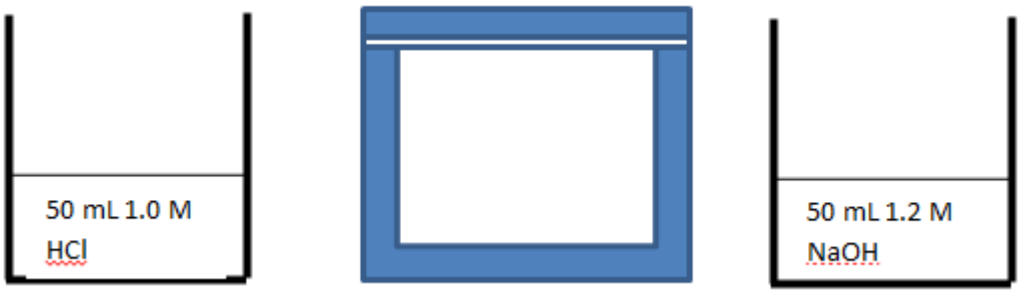
1 mark

_____

_____

Question 9 (6 marks)

A well-insulated foam cup is used in place of a calorimeter to determine the heat of neutralisation, ΔH, for the reaction between HCl and NaOH.



50.0 mL of 1.00 M HCl is mixed in the cup with 50.0 mL of 1.20 M NaOH.
The initial temperature of both liquids is 16.2°C.
The final temperature in the cup is 22.8°C.

Calculate the number of mole of

a. **i.** HCl

1 mark

_____

ii. NaOH

1 mark

_____

b. Use the specific heat capacity of water to calculate ΔH for this reaction.

3 marks

_____

_____

_____

_____

_____

c. If the experiment was repeated with nitric acid instead of hydrochloric acid, what result would you anticipate? Justify your answer.

1 mark

_____

_____

_____

Question 10 (5 marks)

One galvanic cell attracting some commercial interest, in either a button form or a larger form, is the aluminium–air cell. The reactants are cheap and the voltage produced is high. The drawback is the difficulties with the removal of by-products from the electrodes. The electrolyte used is KOH, a strong alkali used to remove any oxide forming on the aluminium.

The overall equation for this cell is:

$$4Al(s) + 3O_2(g) + 6H_2O(l) \rightarrow 4Al(OH)_3(aq)$$

a. Refer to your Data Book to write half-equations for the reactions occurring at each electrode. Keep in mind that the electrolyte used is alkaline.

2 marks

Anode half-equation: _____

Cathode half-equation: _____

b. The supply of oxygen is limitless because the cell is open to the air. This makes aluminium the limiting reagent. Calculate the amount of charge that could be produced from the complete reaction of 20.0 g of aluminium.

2 marks

_____

_____

_____

_____

c. Assuming the cell operates continually at its maximum voltage of 2.74 V, calculate the energy that 20 g of aluminium can produce.

1 mark

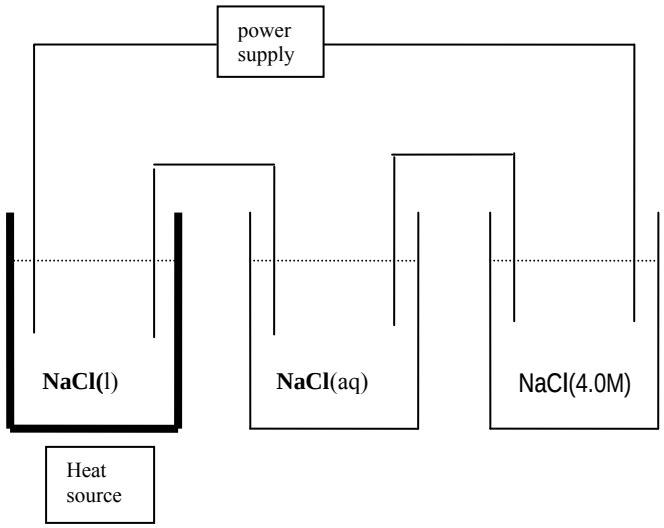
_____

_____

_____

Question 11 (12 marks)

Three cells are connected in series to a power supply. The contents of the cells are listed below the cells. Several relevant half-equations are listed below the diagram.



Cell A: molten NaCl Cell B: dilute NaCl Cell C: concentrated (4.0M) NaCl

1.	$Cl_2(g) + 2e^- \rightarrow 2Cl^-(aq)$	1.36
2.	$O_2(g) + 4H^+(aq) + 4e^- \rightarrow 2H_2O(l)$	1.23
3.	$2H_2O(l) + 2e^- \rightarrow H_2(g) + 2OH^-(aq)$	–0.83
4.	$Na^+(aq) + e^- \rightarrow Na(s)$	–2.71

a. Consider Cell A.

i. Write a balanced equation for the overall reaction occurring in this cell.

1 mark

_____

ii. Give two reasons why serious precautions would be necessary with this cell.

2 marks

_____

_____

_____

iii. How will the number of mole of products at the anode compare with the number of mole of products at the cathode?

1 mark

_____

_____

_____

b. Consider Cell B.

i. Write a balanced equation for the overall reaction occurring in this cell.

1 mark

_____

ii. If a few drops of methyl red indicator had been added to Cell B, what would you notice around the following?

2 marks

Anode: _____

Cathode: _____

c. Consider Cell C.

i. Write the half-equation for the reaction occurring at the anode.

1 mark

_____

ii. Explain why this reaction occurs in preference to other possibilities.

1 mark

_____

_____

_____

iii. A current of 4.0 amps runs for 2.0 hours. How many mole of gas is produced at the cathode?

3 marks

_____

_____

_____

_____

_____

END OF QUESTION AND ANSWER BOOK