STUDENT NAME

Kennedy College
CHEMISTRY
Most Difficult Multiple-Choice Questions
From VCAA Chemistry Past Papers (2017-2021)

Units 3 and 4

QUESTION AND ANSWER BOOK

Structure of book

Section	*Number of questions*	*Number of questions to be answered*	*Number of marks*
A	10	10	10
			Total 10

- Students are permitted to bring into the examination room: pens, pencils, highlighters, erasers, sharpeners, rulers and one scientific calculator.
- Students are NOT permitted to bring into the examination room: blank sheets of paper and/or correction fluid/tape.

Materials supplied

- Question and answer book of 5 pages
- Data book
- Answer sheet for multiple-choice questions

Instructions

- Write your **name** in the space provided at the top of this page.
- Unless indicated, the diagrams in this book are **not** drawn to scale.
- All written responses must be in English.

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

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 marks will be given if more than one answer is completed for any question.
Unless otherwise indicated, the diagrams in this book are **not** drawn to scale.

Question 1 2017 Question 15

Which one of the following is a correct statement about the denaturation of a protein?

A. Denaturation is characterised by the release of peptides.
B. Alcohol denatures proteins by disrupting the hydrogen bonding.
C. Denaturation involves disruption of all bonds in the tertiary structure.
D. The primary and secondary structures are disrupted when denaturation occurs

Question 2 2017 Question 18

Ammonia, NH3, can be produced by the reaction of hydrogen, H2, and nitrogen, N2. When this reaction takes place in a sealed container of fixed volume, an equilibrium system is established.

The equation for the reaction is shown below.

$$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g) \qquad \Delta H = -92 \text{ kJ mol}^{-1}$$

If the pressure and volume remain constant when the temperature is increased, the forward reaction rate will

A. increase and the $[NH_3]$ will increase.
B. increase and the $[NH_3]$ will decrease.
C. decrease and the $[NH_3]$ will decrease.
D. decrease and the $[NH_3]$ will remain the same.

Question 3 2019 Question 13

Which one of the following statements about flashpoints is correct?

A. The flashpoint of butane is lower than 25 °C.
B. As a flashpoint increases, the viscosity decreases.
C. The flashpoint of a compound is higher than its boiling point.
D. The flashpoint of butane is greater than the flashpoint of butan-1-ol.

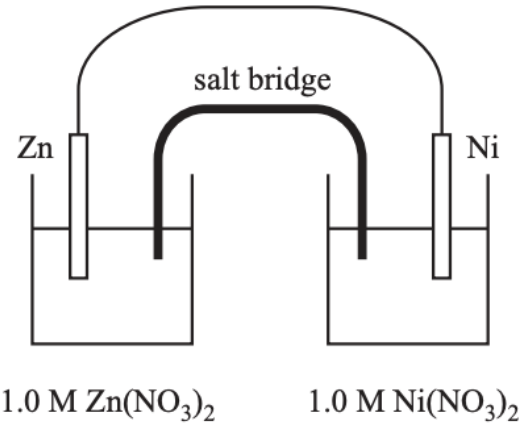
Question 4 2021 NHT Question 12

Which one of the following molecules can be oxidised to produce a carboxylic acid?

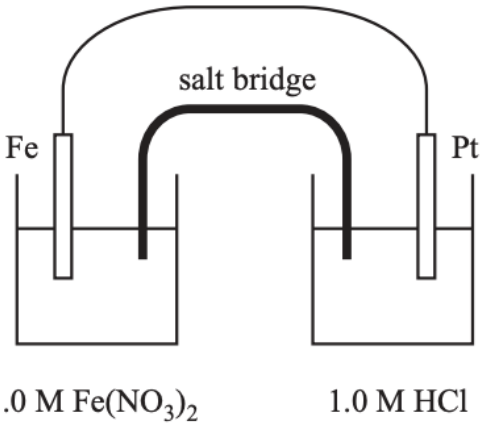
A. propan-2-ol
B. 1-chlorobutan-1-ol
C. 2,2-dichloroethanol
D. 2-methylpropan-2-ol

Question 5 2019 Question 18

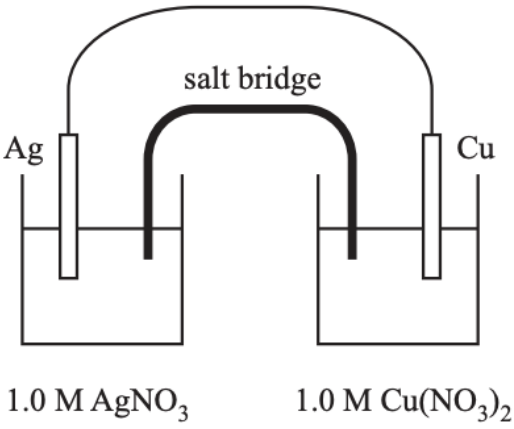
A.



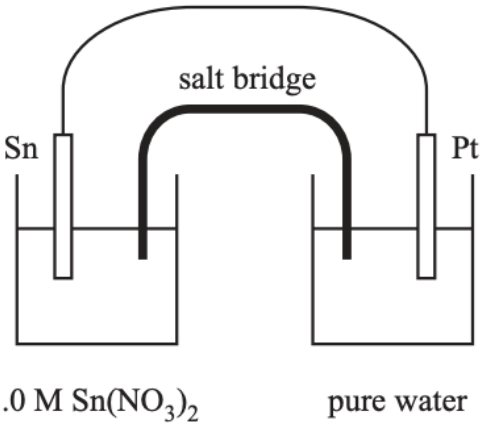
B.



C.



D.



Question 6 2021 NHT Question 16

Carbon monoxide, CO, and oxygen, O_2, dissociate from haemoglobin, represented by Hb, in the blood according to two reactions.

Reaction 1	$Hb(O_2)_4 \rightleftharpoons Hb + 4O_2$	K_1
Reaction 2	$Hb(CO)_4 \rightleftharpoons Hb + 4CO$	K_2

Which one of the following statements is true?

A. K_2 is much greater than K_1.

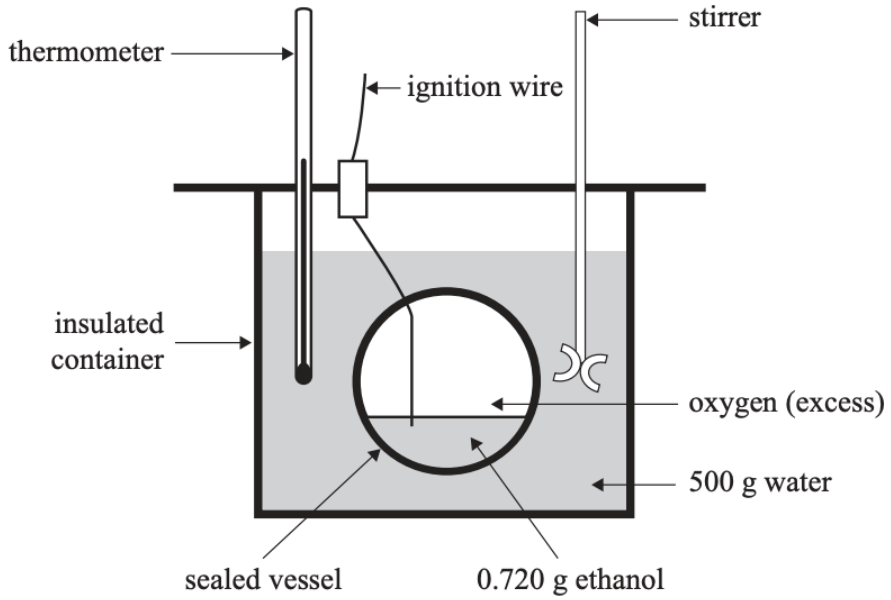
B. O_2 binds more readily to Hb than CO.

C. Increased levels of CO in the blood favour the forward reaction for Reaction 1.

D. Breathing 100% O_2 increases the amount of free Hb in a person exposed to CO.

Question 7 2021 NHT Question 22

The diagram below shows the apparatus for a bomb calorimeter.



The bomb calorimeter containing 500 g of water was chemically calibrated by combusting 0.720 g of ethanol with an excess of oxygen. The increase in temperature was found to be 22.0 °C.

Which one of the following best explains these results?

A. The stirrer was not working.

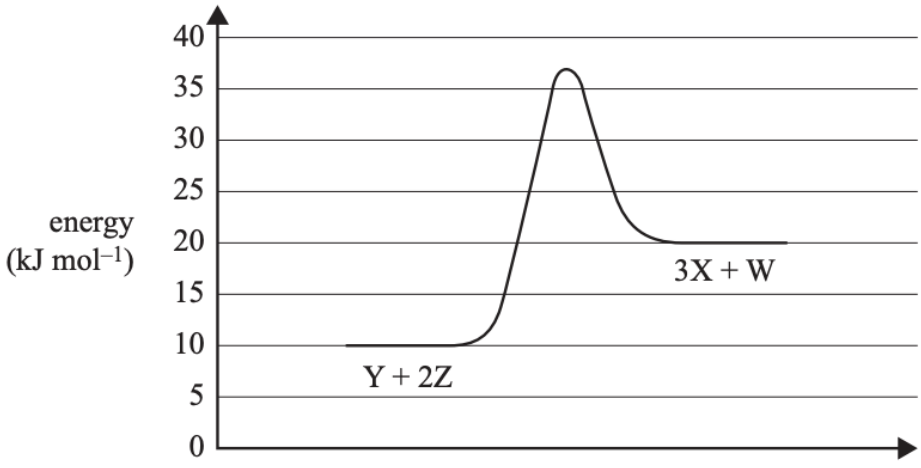
B. The calorimeter actually contained 450 g of water.

C. The temperature in the calorimeter was still rising after the final temperature was noted.

D. Some of the ethanol evaporated after it was weighed, but before it was added to the calorimeter.

Question 8 2021 NHT Question 24

Below is an energy profile diagram for an uncatalysed reversible reaction.



A catalyst was added to the system, causing the rate of the forward and reverse reactions to increase. Which one of the following could be true for the catalysed reaction?

A. The activation energy to produce 1 mol of W is 29 kJ.

B. The activation energy to produce 1 mol of Z is 12 kJ.

C. The activation energy to produce 0.5 mol of X is 5 kJ.

D. The activation energy to produce 9 mol of Y is 120 kJ.

Question 9 2021 NHT Question 27

A high-performance liquid chromatography (HPLC) column has a non-polar stationary phase and a polar solvent as the mobile phase.

Which one of the following substances would have the lowest retention time?

A. tetrachloromethane
B. chloromethane
C. bromomethane
D. hexane

Question 10 2021 NHT Question 30

The glycaemic index of a food can be

A. determined using a bomb calorimeter.
B. calculated if the amount of glucose present in the food is known.
C. determined experimentally using human subjects with varied rates of metabolism.
D. determined in the laboratory by hydrolysing a food sample and measuring the yield of glucose after two hours.

END OF QUESTION AND ANSWER BOOK

Solutions