



CATHOLIC SECONDARY SCHOOLS
ASSOCIATION OF NEW SOUTH WALES

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Centre Number

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Student Number

2005
TRIAL HIGHER SCHOOL CERTIFICATE
EXAMINATION

Chemistry

Afternoon Session
Friday 5 August 2005

General Instructions

- Reading time – 5 minutes
- Working time – 3 hours
- Write using blue or black pen
- Draw diagrams using pencil
- Board-approved calculators may be used
- Use the Data Sheet and Periodic Table provided
- Use Multiple Choice Answer Sheet provided
- Write your Centre Number and Student Number and the top of this page and page 9

Total marks – 100

Section I

Pages 3-20

75 marks

This section has two parts, Part A and Part B

Part A – 15 marks

- Attempt Questions 1-15
- Allow about 30 minutes for this part

Part B – 60 marks

- Attempt Questions 16-29
- Allow about 1 hour and 45 minutes for this part

Section II

Pages 21-28

25 marks

- Attempt ONE question from Questions 30-34
- Allow about 45 minutes for this section

Disclaimer

Every effort has been made to prepare these 'Trial' Higher School Certificate Examinations in accordance with the Board of Studies documents, *Principles for Setting HSC Examinations in a Standards-Referenced Framework* (BOS Bulletin, Vol 8, No 9, Nov/Dec 1999), and *Principles for Developing Marking Guidelines Examinations in a Standards Referenced Framework* (BOS Bulletin, Vol 9, No 3, May 2000). No guarantee or warranty is made or implied that the 'Trial' Examination papers mirror in every respect the actual HSC Examination question paper in any or all courses to be examined. These papers do not constitute 'advice' nor can they be construed as authoritative interpretations of Board of Studies intentions. The CSSA accepts no liability for any reliance use or purpose related to these 'Trial' question papers. Advice on HSC examination issues is only to be obtained from the NSW Board of Studies.

2801-1

EXAMINERS

Christopher Warren (convenor)	Kincoppal-Rose Bay, Rose Bay
Karen Bertinshaw	Gilroy College, Castle Hill
Philip McIntosh	Mt Carmel College, Varroville
Jo McGrouther	St Vincents College, Potts Point

Sources

Diagrams for Question 32 – Roebuck, C (2000), *Excel HSC Chemistry*, Pascal Press, Sydney, p177

Diagram for Question 34(b) – www.wcsscience.com/dna/molecule2.html (Accessed 13/4/05)

Section I
75 marks

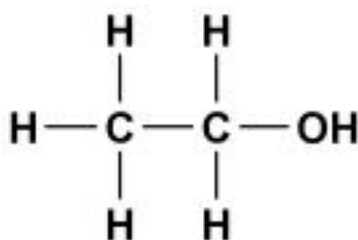
Part A – 15 marks

Attempt Questions 1-15

Allow about 30 minutes for this part

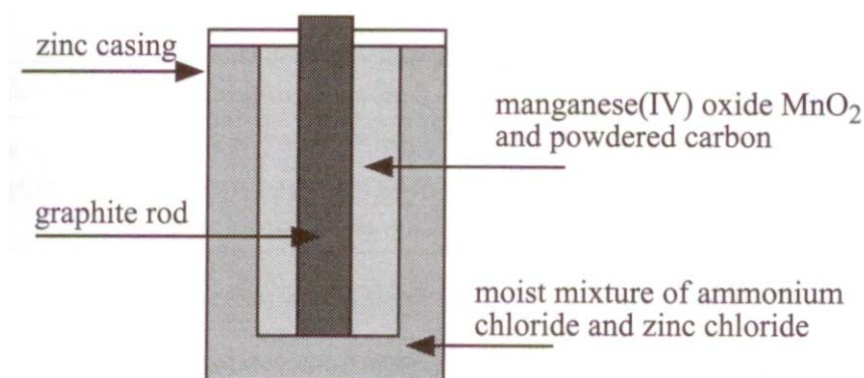
Use the Multiple Choice Answer Sheet provided

- 1** Identify the following compound.



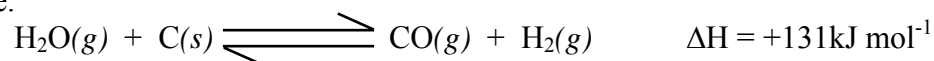
- (A) Ethanoic acid
(B) Ethylene
(C) Ethanol
(D) Ethene
- 2** Which of the following is an alternative source of the compounds presently obtained from the petrochemical industry?
- (A) Biomass
(B) Haber process
(C) Photovoltaic cells
(D) Radioisotopes
- 3** Australians have recently become more aware of the ‘hole’ in the ozone layer above Antarctica. The reason that we should be concerned is that it will
- (A) allow oxygen to escape and we will have to wear oxygen equipment on Antarctic expeditions
(B) expose us to increased levels of ultra violet radiation
(C) cause an increase in ozone levels in the troposphere
(D) expose us to more CFCs

- 4 In an investigation to compare the pH of a strong acid and a weak acid, which pair of solutions would be most appropriate?
- (A) 1.0 molL^{-1} citric acid and 1.0 molL^{-1} acetic acid
(B) 0.10 molL^{-1} acetic acid and 10 molL^{-1} hydrochloric acid
(C) 0.30 molL^{-1} citric acid and 0.10 molL^{-1} hydrochloric acid
(D) 0.10 molL^{-1} acetic acid and 0.10 molL^{-1} hydrochloric acid
- 5 The diagram below shows a dry cell battery.



- Which of the following statements is correct for this dry cell battery?
- (A) The manganese(IV) oxide is the electrolyte
(B) The graphite rod is the anode
(C) Graphite is reduced at the cathode
(D) Zinc is oxidised to zinc (II) at the anode
- 6 A student used a pH meter to measure the acidity of 100 mL of 0.1 molL^{-1} HCl . She found that the pH was 1. She then added 900 mL of water and tested the pH again.
- The value for pH that she obtained for the new concentration was
- (A) 10
(B) 2
(C) 1
(D) 0.5

- 7 The hydrogen for the Haber process can be obtained from the reaction of steam on red-hot coke.



Use Le Chatelier's Principle to predict the conditions required for the efficient production of hydrogen.

- (A) High pressure and high temperature
(B) High pressure and low temperature
(C) Low pressure and high temperature
(D) Moderate temperature, high pressure and a catalyst
- 8 Which pair of equations correctly describes the behaviour of the oxides of lithium and carbon when placed with water?

- (A) $\text{Li}_2\text{O}(s) + \text{H}_2\text{O}(l) \longrightarrow 2 \text{LiOH}(aq)$
 $2 \text{CO}_2(g) + \text{H}_2\text{O}(l) \longrightarrow \text{HCO}_3(aq) + \text{HCO}_2(aq)$
- (B) $\text{Li}_2\text{O}(s) + \text{H}_2\text{O}(l) \longrightarrow 2 \text{LiOH}(aq)$
 $\text{CO}_2(g) + \text{H}_2\text{O}(l) \longrightarrow \text{H}_2\text{CO}_3(aq)$
- (C) $2 \text{Li}_2\text{O}(s) + \text{H}_2\text{O}(l) \longrightarrow \text{HLiO}_3(aq) + \text{HLiO}_2(aq)$
 $\text{C}_2\text{O}(s) + \text{H}_2\text{O}(l) \longrightarrow 2 \text{COH}(aq)$
- (D) $\text{Li}_2\text{O}(s) + \text{H}_2\text{O}(l) \longrightarrow \text{HLiO}_3(aq) + 2 \text{HLiO}_2(aq)$
 $\text{CO}(s) + \text{H}_2\text{O}(l) \longrightarrow \text{C}(\text{OH})_2(aq)$

- 9 Which of the following isotopes is the most unstable?

- (A) ${}^1_1\text{H}$
(B) ${}^{12}_6\text{C}$
(C) ${}^{14}_7\text{N}$
(D) ${}^{18}_8\text{O}$

- 10** A student tested 4 household substances using indicators. Which of the following results is recorded correctly?

	Substance	Colour with phenolphthalein	Colour with methyl orange
(A)	wine	pink	red
(B)	ammonia cleaner	pink	yellow
(C)	vinegar	red	blue
(D)	bicarbonate of soda	clear	blue

- 11** A student added a solution of barium nitrate to a solution of lawn fertilizer in order to determine the sulfate content of the fertilizer. The resulting solution was heated and stirred and then filtered. Barium nitrate was then added to the filtrate.

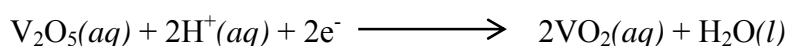
It is true to say that

- (A) the barium nitrate is added to the filtrate to determine whether sulfate ions were still present
 - (B) the solution was heated and stirred to dissolve the fertilizer and the barium nitrate
 - (C) barium nitrate was added to dissolve the fertiliser
 - (D) the solution was filtered to remove any impurities in the fertilizer
- 12** Oysters provide a rich source of zinc, an essential trace element in our diet. The minimum recommended intake for an adult is 12mg per day.

If a sample of oysters was found by AAS to contain an average of 200ppm of zinc per oyster how many oysters would an adult have to eat to reach the minimum recommended daily intake?

- (A) 0.2
- (B) 1.7
- (C) 6
- (D) 12

- 13 The following cathode reaction occurs in the vanadium redox cell.



The *oxidation state* of vanadium changes from

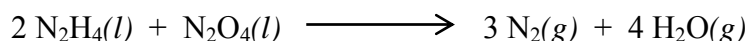
- (A) +5 to +4
(B) +5 to +2
(C) +2 to +1
(D) +4 to +5
- 14 Two water samples from a waste water recycling plant were tested for their level of biochemical oxygen demand.

The following results were obtained.

<i>Water sample</i>	<i>BOD (mg L⁻¹)</i>
1	2
2	16

Using these results, it would be true to conclude that

- (A) sample 2 has 8 times the level of dissolved oxygen of sample 1
(B) sample 2 was taken in the final stage of treatment
(C) sample 1 was taken at the beginning of the treatment
(D) sample 1 has the least amount of biodegradable waste in it
- 15 When the lunar module of Apollo 11 landed on the moon, the fuel used was hydrazine (N₂H₄) and dinitrogen tetroxide(N₂O₄). When these were mixed a spontaneous reaction occurred.



What volume of gas would be expelled at, 100kPa and 25°C, for each kilogram of hydrazine used?

- (A) 31 L
(B) 109 L
(C) 2707 L
(D) 5414 L

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