

CONFIDENTIAL**UNIVERSITI TUN HUSSEIN ONN MALAYSIA****FINAL EXAMINATION
SEMESTER I
SESSION 2016/2017****TERBUKA**

COURSE NAME : CHEMISTRY FOR BIODIVERSITY
AND CONSERVATION

COURSE CODE : BWJ 10303

PROGRAMME CODE : BWW

EXAMINATION DATE : DECEMBER 2016 /JANUARY 2017

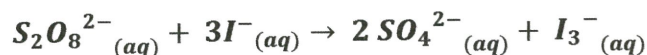
DURATION : 3 HOURS

INSTRUCTION : ANSWER ALL QUESTIONS

THIS QUESTION PAPER CONSISTS OF FIVE (5) PAGES

CONFIDENTIAL

- Q1 (a) (i) The peroxydisulfate ion $S_2O_8^{2-}$ is a potent oxidizing agent that reacts rapidly with iodide ion in water



The table lists kinetics data for this reaction at 25 °C. Determine the rate law and the rate constant.

Experiment	$[S_2O_8^{2-}]$	$[I^-]$	Initial Rate
1	0.27	0.38	2.05
2	0.40	0.38	3.06
3	0.40	0.22	1.76

(5 marks)

- (ii) The thermal decomposition of phosphine (PH_3) into phosphorus and molecular hydrogen is a first-order reaction:



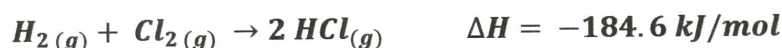
The half-life of the reaction is 35.0s at 680 °C. Calculate the 1st order rate constant for the reaction.

(2 marks)

- (iii) Referring to Q1 (a) (ii), determine the time required for 95 % of phosphine to decompose.

(3 marks)

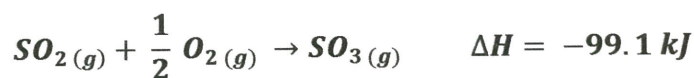
- (b) (i) Consider the reaction



If 3 moles of H_2 reacts with 3 moles of Cl_2 to form HCl against a pressure of 1 atm at 25 °C. What is ΔE for this reaction? Assume the reaction goes to completion. (Given that $R = 8.314 \text{ J/K}\cdot\text{mol}$)

(4 marks)

- (ii) Given that the thermochemical equation



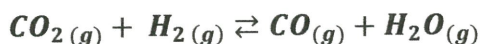
Calculate the heat evolved when 74.6 g of SO_2 is converted to SO_3 .

(2 marks)

TERBUKA

CONFIDENTIAL

- (c) (i) Consider the following equilibrium process at 686 °C



The equilibrium concentrations of the reacting species are $[\text{CO}] = 0.050 \text{ M}$, $[\text{H}_2] = 0.045 \text{ M}$, $[\text{CO}_2] = 0.086 \text{ M}$ and $[\text{H}_2\text{O}] = 0.040 \text{ M}$. Calculate K_{eq} for the reaction at 686 °C.

(3 marks)

- (ii) Heating solid sodium bicarbonate in a closed vessel establishes the following equilibrium



Conclude what will happen to the equilibrium position if some solid Na_2CO_3 were added to the system.

(1 mark)

- Q2 (a) 3-bromopentanoic acid reacted with an organic compound A with the aid of an acid catalyst B producing ethyl 3-bromopentanoate and water.

- (i) What is acid catalyst B?

(1 mark)

- (ii) Illustrate the organic reaction occurs and give the systematic nomenclature of A.

(2 marks)

- (iii) Determine the functional group of organic compound A.

(2 marks)

- (b) Starting with an alkene, illustrate how could a 1-bromocyclohexane compound can be synthesis.

- (i) Indicate the type of reaction occurs.

(1 mark)

- (ii) Illustrate the reaction and give the systematic nomenclature for each organic compound.

(4 marks)

- (c) (i) List down **THREE (3)** recycling codes for plastics and the used of the recycled polymer.

(6 marks)

- (ii) Explain briefly the difference between melt transition temperature T_m and glass transition temperature T_g

(4 marks)

TERBUKA

CONFIDENTIAL

- Q3** (a) (i) Describe the unique feature of water and define what groundwater is. (3 marks)
- (ii) Illustrate the location of groundwater in soil and differentiate between zone of aeration and aquifer. (4 marks)
- (b) (i) Explain in details and illustrates the water cycle process. (4 marks)
- (ii) List down **FOUR (4)** different ions that may presence in the rain and the initial sources of these ions. (2 marks)
- (c) (i) SO₂ and NO₂ gases play an important role in the formation of acid precipitation in the environment. Determine if these gases are primary or secondary pollutant and write the chemical reactions of these gases with water. (3 marks)
- (ii) Acid precipitation may cause adverse effect to the environment. With the aid of an illustration, explain the effect of acid precipitation towards the environment. (4 marks)
- Q4** (a) Define "Primary Protein Structure". (2 marks)
- (b) Secondary Protein Structure commonly takes two forms which are α -helix and β -pleated sheet. Differentiate between these **TWO (2)** forms. (4 marks)
- (c) There are **EIGHT (8)** steps in Tricarboxylic Acid (TCA) cycle. Explain the first **FOUR (4)** steps in TCA cycle. (8 marks)
- (d) There are **THREE (3)** specificity types of enzyme activity. Explain each type. (6 marks)

TERBUKA

- Q5** (a) (i) Determine the number of protons and electrons of the following common ions: Mg^{2+} and Br^- . (2 marks)
- (ii) Classify if K_2O have an ionic or covalent bonding. Justify your answer. (3 marks)
- (b) A certain amount of gas at $25\text{ }^\circ\text{C}$ and at pressure of 0.8 atm is contained in a glass vessel. The vessel can withstand a pressure of 2 atm . How high can we raise the temperature (in Kelvin and Celsius) without bursting the vessel? (5 marks)
- (c) Demonstrate **THREE (3)** important roles of drugs in human society. (6 marks)
- (d) Many of the conservation genetics studies have utilized the sequence information of mitochondrial DNA (mtDNA) marker for wildlife conservation. Explain **TWO (2)** advantages of using mtDNA marker over other tools. (4 marks)

-END OF QUESTIONS-

TERBUKA

CONFIDENTIAL