**CHEMISTRY UNIT 3 & 4 EXTENDED RESPONSE #2**

In this extended response you will receive **three questions** (see full text below). Each question is worth 15 marks. For Questions 2 and 3 you will receive one of the provided options. The questions will be decided by coin-flip on the day of the extended response, and everyone will complete the same questions.

**DATE OF EXTENDED RESPONSE: THURSDAY 27th APRIL (TERM 2, WEEK 1)**

**Question 1: Ocean Acidification**

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| Changing levels of carbon dioxide in the atmosphere are having a significant impact on the health of marine organisms and ecosystems, such as coral reefs. This has led to international action to reduce carbon dioxide emissions.  In your extended response you should:   * Explain the link between CO2 emissions and ocean acidification. **(5 marks)** * Describe and explain the effects of ocean acidification on marine organisms. **(6 marks)** * Describe the actions taken by international governments and organisations to reduce future CO2 emissions, including the role of the Kyoto Protocol and the IPCC. **(4 marks)** |

**Question 2: Acids and Bases**

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| *‘Models and theories are contested and refined or replaced when new evidence challenges them, or when a new model or theory has greater explanatory scope.’*  The Arrhenius theory of acids and bases was contested and replaced by the Bronsted-Lowry model of acids and bases.  Outline the differences between these two models and explain why the Bronsted-Lowry model was accepted as a better model. | **or** | Buffers and indicators are two types of substances which both involve weak acids and their conjugate bases.  Demonstrate how Le Châtelier's Principle can be used to account for the properties of buffers and indicators. For each type of substance, include a specific example and demonstrate how that system is affected by the addition of acids and bases. |
| **(15 marks)** |  | **(15 marks)** |

**Question 3: Reduction and Oxidation**

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| Electrorefining and electroplating are two industrial applications of electrolysis. Describe how these processes are used in industry, and explain how these processes can be understood using concepts of oxidation and reduction.  Your answer should include labelled diagrams and equations where relevant. Key terms should be described to show your understanding of concepts related to redox and electrolysis. | **or** | The proton exchange membrane fuel cell (PEMFC) was first developed in the late 1960s. but are currently being looked at as a power source for modern vehicles.   * Explain, in terms of redox concepts, how the PEMFC is able to generate an electrical current. Your answer should include a labelled diagram of the PEMFC, anode and cathode half-equations and an overall equation. * Identify the source of reactants for the fuel cell, and use this as a basis to evaluate whether or not hydrogen fuel cars should be considered ‘environmentally friendly’.   Each of the above dot points should be given roughly equal weight in your response. |
| **(15 marks)** |  | **(15 marks)** |