Practice Question Set For A-Level
Subject : Chemistry
Paper-1 Topic: Inorganic 2

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Name of the Student:_____
Max. Marks : 26 Marks **Time : 26 Minutes**

Q1.

(a) A co-ordinate bond is formed when a transition metal ion reacts with a ligand.

Explain how this co-ordinate bond is formed.

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(2)

(b) Describe what you would observe when dilute aqueous ammonia is added dropwise, to excess, to an aqueous solution containing copper(II) ions.
Write equations for the reactions that occur.

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(4)

(c) When the complex ion $[Cu(NH_3)_4(H_2O)_2]^{2+}$ reacts with 1,2-diaminoethane, the ammonia molecules but not the water molecules are replaced.

Write an equation for this reaction.

_____

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(1)

(d) Suggest why the enthalpy change for the reaction in part **(c)** is approximately zero.

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(2)

(e) Explain why the reaction in part **(c)** occurs despite having an enthalpy change that is approximately zero.

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(2)

(Total 11 marks)

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Q2.

Corrosion can be defined as the degradation of a material when it comes into contact with the environment. For iron, this process is called rusting.

(a) When iron rusts it reacts with oxygen and water vapour in the air initially to form a brown, flaky solid that can be regarded as iron(III) hydroxide

Write an equation, including state symbols, for the overall reaction of the iron with oxygen and water vapour to form iron(III) hydroxide.

_____

(2)

(b) Explain why this type of corrosion is not seen on aluminium structures that have been exposed to the environment for a similar time as iron structures.

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(2)

(Total 4 marks)

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Q3.

(a) A sample of solid chromium(III) hydroxide displays amphoteric character when treated separately with dilute hydrochloric acid and with dilute aqueous sodium hydroxide.

Write an ionic equation for each of these reactions. Include the formula of each complex ion formed.
Describe the changes that you would observe in each reaction.

(5)

(b) Aqueous solutions of copper(II) sulfate and cobalt(II) sulfate undergo ligand substitution reactions when treated separately with an excess of dilute aqueous ammonia.

Write equations for these reactions. Include the formulae for any complex ions.
Describe the changes that you would observe in each reaction.

(6)

(Total 11 marks)

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