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

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Name of the Student:_____
Max. Marks : 20 Marks **Time : 20 Minutes**

Q1.

The characteristic properties of transition metals include coloured ions, complex formation and catalytic activity.

(a) Consider the chromium complexes **P** and **Q**.

$[Cr(H_2O)_6]^{3+}(aq)$ → $[Cr(H_2O)_5Cl]^{2+}(aq)$

red-violet → green

P → **Q**

Explain, with reference to oxidation states and electron configurations, why the chromium ions in complexes **P** and **Q** contain the same number of d electrons.
You should **not** consider the electrons donated by the ligands.

Explain, in terms of electrons, why the complexes are **different** colours.
(You are **not** required to explain why the observed colours are red-violet and green.)

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(6)

(b) Write an equation to show how the $[Co(NH_3)_6]^{2+}(aq)$ ion reacts with 1,2-diaminoethane. Explain the thermodynamic reasons why this reaction occurs.

(5)

(c) The toxic complex cisplatin is an effective anti-cancer drug because it reacts with the DNA in cancer cells, preventing cell division.

(i) Draw the **displayed** structure of cisplatin.
On your structure, show the value of one of the bond angles at platinum.
State the charge, if any, on the complex.

(3)

(ii) When cisplatin is ingested, an initial reaction involves one of the chloride ligands being replaced by water.

Write an equation for this reaction.

(1)

(iii) Suggest how the risk associated with the use of this drug can be minimised.

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(1)

(d) Explain, with the aid of equations, how and why vanadium(V) oxide is used in the Contact Process.

(4)

(Total 20 marks)

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