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

Merit Minds
www.merit-minds.com
Exam Preparation and Free Resources

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

Mark Schemes

Q1.

(a) In each of **P** and **Q** the oxidation state of Cr is +3 / both contain Cr^{3+}

If oxidation states are different lose M1 and M2

1

In each of **P** and **Q** the electron configuration is the same / d^3 / $3d^3$

Do not allow just same number of electrons

1

Ligands are different

1

Different energies of (d) electrons / different split of (d) electron energy levels / different energy gap of (d) electrons / different (d) orbital energy

1

Different wavelengths / frequencies / energies of light / colours (of light) are absorbed (by the d electrons)

Reference to emission and / or uv light but not to visible loses M5 and M6

1

Different wavelengths / frequencies / energies of light / colours (of light) are transmitted / reflected

1

(b) $[Co(NH_3)_6]^{2+} + 3NH_2CH_2CH_2NH_2 \rightarrow [Co(NH_2CH_2CH_2NH_2)_3]^{2+} + 6NH_3$

Allow $NH_2C_2H_4NH_2$ and $CH_2NH_2CH_2NH_2$

Allow partial substitution

Do not allow en or other formulae for M1 but can score M2

1

4 particles form 7 particles / increase in number of particles

Allow molecules, entities, ions, moles instead of particles

Do not allow atoms

Can score M2 if numbers match candidates incorrect equation provided number of particles increases

1

disorder / entropy increases / ΔS positive

Cannot score M3 if number of particles stated or in equation is the same or decreases

1

Downloaded from www.merit-minds.com

ΔH is approx. zero / no net change in bond enthalpies

Allow same number and type of bonds broken and formed

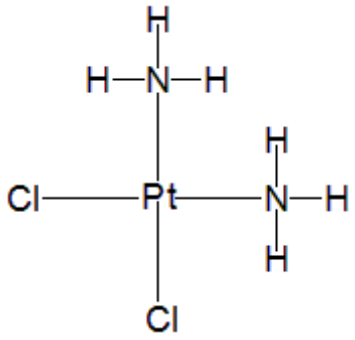
1

ΔG is negative / *ΔG*

Mark M4 and M5 independently

1

(c) (i)



Correct displayed structure

Must show all three N–H bonds on each N

Ignore arrows and lone pairs, attempt to show shape

Ignore charges on atoms in structure for M1

1

Bond angle 90°

Allow 87 to 93 degrees

Allow this angle for any complex with 4 ligands eg if NH_2 or Cl used instead of NH_3

1

Charge of zero

Award this mark if no charge shown on structure but if charges shown on ligands in M1 must state that overall charge = 0

Allow M3 only if cisplatin is correct OR if trans form OR if NH_3 not displayed OR if NH_2 used instead of NH_3

1

(ii) $(NH_3)_2PtCl_2 + H_2O \rightarrow [(NH_3)_2PtCl(H_2O)]^+ + Cl^-$

If formula of cisplatin is incorrect, mark consequentially provided H_2O replaces Cl^- and charge on complex increases by one

1

(iii) Use in small amounts / short bursts / target the application / monitor the patients

Allow: Give patient time between doses

1

(d) $V_2O_5 + SO_2 \rightarrow V_2O_4 + SO_3$ / $V_2O_5 + SO_2 \rightarrow 2VO_2 + SO_3$

Allow multiples

1

$V_2O_4 + \frac{1}{2}O_2 \rightarrow V_2O_5$ / $2VO_2 + \frac{1}{2}O_2 \rightarrow V_2O_5$

1

Acts as a catalyst / lowers the activation energy

1

Downloaded from www.merit-minds.com

Speeds up the (overall) reaction (between SO_2 and oxygen)

1

[20]

Downloaded from www.merit-minds.com