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

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Name of the Student:_____
Max. Marks : 15 Marks **Time : 15 Minutes**

Mark Schemes

Q1.

(a) DNA Replication

NOT mitosis
NOT DNA synthesis
Ignore terms relating to cell division processes
Ignore 'damages DNA'
Ignore DNA transcription
Ignore 'cell replication'

1

(b) $[Pt(NH_3)_2Cl_2] + H_2O \rightarrow [Pt(NH_3)_2Cl(H_2O)]^+ + Cl^-$

M1 *Correct formula* ***and*** *charge of B*

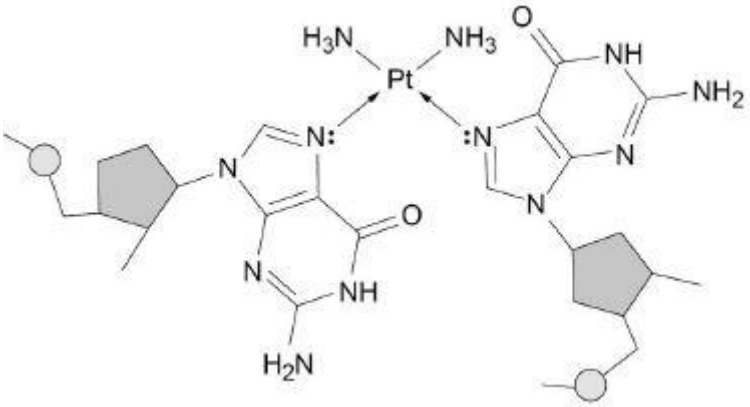
1

M2 *Correct balancing* ***and*** *charges in equation*

1

Allow ***M2*** *if the* ***only*** *error in complex B is the charge*
*(****M1*** *not awarded) with* Cl^- ***only***
ALLOW complexes without [ ] and/or ( ) around H_2O
IGNORE ( ) around Cl
NOT any additional different species (loses ***M2****)*
(allow uncancelled water on both sides)

(c)



M1 *Pt in a cis-diammine complex bonded to the correct nitrogen atoms*
Pt must have the two ammonia ligands shown
NOT if drawn as trans
IGNORE any charge on Pt

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Ignore any wedges and dashes (3D representations)

1

M2 *both lone pairs shown* ***OR*** *two arrows indicating co-ordinate bonds*

Allow ***M2*** *if bonds to platinum are from the incorrect nitrogen atoms*

1

(d) **M1** plot concentration (y-axis) against time (x-axis) **and** take tangents / (calculate the) gradients (to calculate rates)

Allow concentration-time graph

NOT time-concentration graph (unless clarified in words or sketch) but mark on

1

M2 Plot rate/gradients against conc

1

M3 straight line through origin / directly proportional confirms first order

allow first order if rate halves/doubles when conc halves/doubles

1

Alternatives to ***M2*** *and* ***M3****:*

M2 *Plot a graph of log rate vs log conc*
M3 *(Straight) line of gradient = 1*

M2 *measure (at least) two half-lives (in this case, tangents not required for M1)*
M3 *constant half-life means first order*

M2 *compare rates/gradients at different concentrations*
M3 *first order if rate halves when conc halves*

(e)

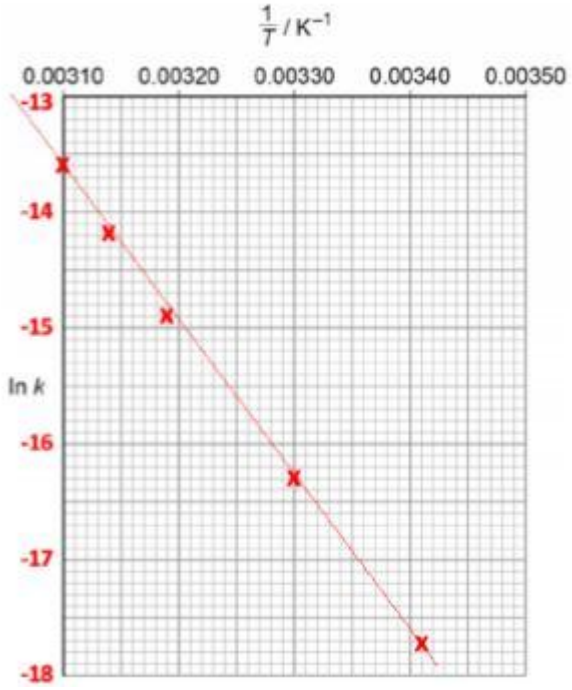
temperature, T / K	$\frac{1}{T}$ / K^{-1}	rate constant, k / s^{-1}	ln k
318	0.00314	6.63×10^{-7}	–14.2

Allow 3.14×10^{-3}

2

(f)

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Gradient = −13 125

$\left(-13125 = \frac{-E_a}{R}\right)$

E_a = 13 125 x 8.31 = 109 069

= 109 (kJ mol^{-1})

Vertical axis with sensible scales (plotted points must take up more than half the grid) NOT M1 if y-axis in wrong direction

1

all points plotted correctly (within ±0.5 small square)

1

Best fit straight line based on the student's data (ignoring anomalous point if relevant)

1

Gradient calculated within range: 12876 - 13598

1

Mark is for their (gradient x 8.31) ***and*** *conversion into kJmol^{-1}*

E_a in the range: 107 – 114 kJ mol^{-1}

NOT a negative activation energy

1

[15]

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