Practice Question Set For A-Level
Subject : Chemistry
Paper-2 Topic: AminoAcids, Proteins & DNA

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

Name of the Student:_____
Max. Marks : 22 Marks **Time : 22 Minutes**

Mark Schemes

Q1.

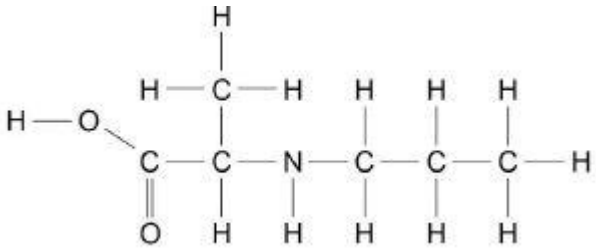
(a) One circled C atom only – The C attached to CH_3/C=O/ H and NH

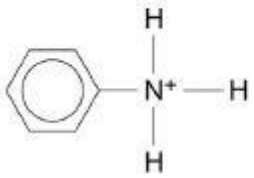
1

(b) Two ticks only for amine and amide

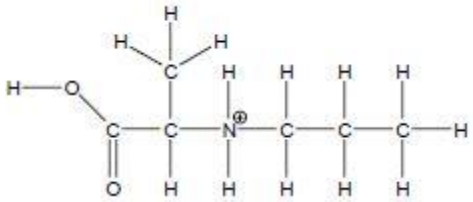
1

(c)





M1 *for choosing the correct bond to hydrolyse*
M2 *and* ***M3*** *for the correct structures of the products*
Allow protonated amino acid for M2



Allow $C_6H_5NH_3^+$ *or + outside a square bracket*

3

(d) **M1** Enzyme has an <u>active site</u>

1

M2
The G-Enantiomer / Enzyme has the correct stereo chemistry / stereospecific
Or
The G-Enantiomer / Enzyme has the complementary shape
For M2 allow opposite argument for F-Enantiomer

1

[7]

Downloaded from www.merit-minds.com

Q2.

(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*

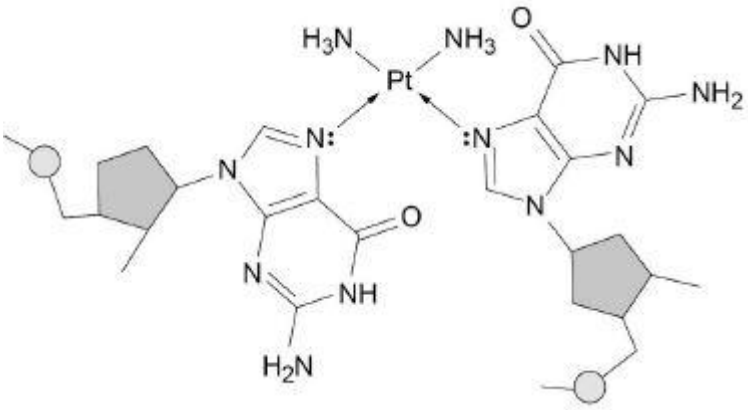
1

***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
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

Downloaded from www.merit-minds.com

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*

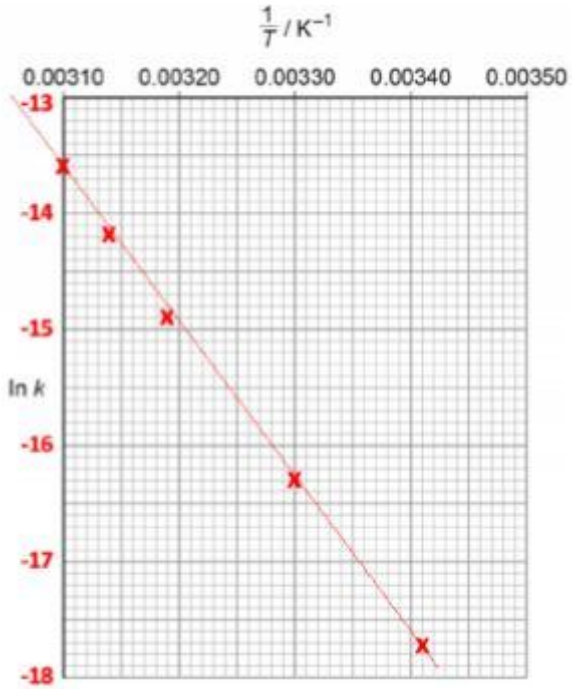
(e)

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)



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)

Downloaded from www.merit-minds.com

Gradient calculated within range: 12876 - 13598 **1**

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

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

NOT a negative activation energy **1**

[15]

Downloaded from www.merit-minds.com