Write THIS…NOT That!

For All Questions		
Write THIS...	**NOT That!**	**Rational**
Handwriting that is clear, legible, dark enough and large enough to be read by someone who doesn't know you	Messy, illegible, light, tiny writing that cannot be read	Answers deemed illegible by a reader and the table leader will earn no points on corresponding parts/questions
Variables that are clearly denoted and appropriately used	Variables that are incorrectly represented	Variables have specific meaning and must be correctly denoted/abbreviated; case matters for many variables: · M (not m) for molarity, · K (equilibrium constant) vs k (rate constant) · m is meters, not minutes, moles or molarity, etc.
Abbreviations that are generally accepted (M, min, s, IMF, LDF, etc.)	Abbreviations that are not generally accepted/ are incorrect/ change the meaning (ex: mol for molecule, CL instead of Coulomb's Law, etc)	Abbreviations still must convey the correct information; if in doubt, avoid them – don't create ambiguity in an answer by using an abbreviation
Answer the specific question first, then "justify", "explain" etc.	Burying the answer in the text of the response	Make it easy to follow your answer and give you points
Answers that are concise and direct	Burying the answer in long response	Make it easy to follow your answer and give you points
Names of specific elements and compounds, "reactants", "products", etc.	"it"	Ambiguous
"Species"	"It", "stuff", etc.	Be formal in language
A justification or explanation when it is part of the question	Only the answer without supporting it	Justification/explanation required to earn point
"mass", "volume", etc.	"size"	Be specific to indicate understanding
References to specific data or graphs when prompted to "explain how the data…", "using the table below…" or something similar	Generalizations about the data without specifically citing provided data or trials	Required to earn point
Particle view diagrams with ions and polar molecules orientated in the correct direction relative to each other	Incorrectly oriented dipoles	Drawings must demonstrate understanding of interactions at the molecular level (ex. 2015 #4)
An answer with units if "include units" is stated in the problem	An answer without units	If "include units" is written in the prompt, a unit is required to earn full points
Complete dimensional analysis/work with units	Incomplete dimensional analysis without units	Including units clearly shows intended work, and allows points for "implied" calculations to be earned
Values with units that match constants and that are the same throughout the equation	Values with units that do not match other values/constants	Values must be the same unit through an equation, for both constants and variables
Answers expressed to the correct number of significant figures, based on data given in the problem	Answers with an incorrect number of sig figs or sig figs limited by molar mass, constants, etc.	1 pt traditionally is assessed somewhere in the FR for significant figures (typically found in a laboratory data question)
Answers that only refer to substances/data included in the prompt	Answers with justifications based on situations or data that are not indicated in the prompt	Do not claim something happened that was not present in prompt– any valid assumptions would be stated
Analysis of given data in a thoughtful way that is based on chemical principals	Saying that data is wrong, that the data is impossible, calling the test writers liars, etc.	The AP Exam is never going to try to trick you- it will not give false or impossible data
Answers that refer to specific and correct glassware and interpret figures correctly	Answers that use incorrect glassware for the task, particularly with regard to precision and/or misread figures of glassware	Glassware has different specialized uses, and should be appropriately referenced/used/read based on the task
Explanation of an application of usage of a term	Definition of a term	A definition is not required on the exam – an explanation of how this term applies is needed
An explanation of the reason behind an observation of phenomena.	Stating a law/rule or observation without explaining the chemical principles or phenomena behind the law/rule/trend.	Simply stating the end result without discussing the reason for that result does not fully answer the question. Evidence and reasoning must both be included. (ex. 2019 #4)
Using deductive reasoning to make conclusions or approximate values when the terms "estimate" or "justify" are in the prompt	Using long, time-intensive math reasoning when "calculate" is not indicated in the prompt	While correct calculations will earn credit, the loss in this type of answer is the amount of time spent on the calc.s when an assessment without lengthy calculations can be done instead (ex: 2018 #2e-f, 2019 #3g)
Answers that pay attention to the relative scale on graphs	Answers that make assumptions on the scale without examining data	Don't assume that marked lines are increments of 1, 10, etc. – use the data to determine scale (ex. 2019 #5a)

Unit 1: Atomic Structure and Properties		
Write THIS...	**NOT That!**	**Rational**
"period"	"shell" when referring to elements and their location on the Periodic Table	Elements are in a period, electrons are in a shell
Ion electron configurations that show electrons were removed from valence shell orbitals	Ion electron configurations that show electrons were removed from inner orbitals	Ions form by electrons being lost from the outermost shell; this may or may not be the electrons that were filled last in the electron configuration (ref. 2018 #3a)
Reference reasons for periodic trends (i.e. effective nuclear charge, Coulomb's law, polarizability, etc.)	Stating the trend as the reason ("because it is to the left", "because it is further down the periodic table", etc.)	State the actual reason not the memory aid
"Effective nuclear charge increases"	"It wants to have a full octet"; "it's close to having a full octet"	State the actual reason not the memory aid
"It has a more polarizable cloud of electrons"	"It has more electrons", "it has more mass", "it has more surface area", "it is bigger", "it has more protons"	State the actual reason not the memory aid
"Electrons in higher energy levels are farther from the nucleus, resulting in a larger atom/ion."	"More electrons/more energy levels makes the atom/ion bigger."	Explanation of reason, not just statement of fact, required for point (Ref 2016 #1)

Unit 2: Molecular and Ionic Compound Structure		
Write THIS...	**NOT That!**	**Rational**
"ionic compound"	"molecule" when discussing an ionic compound	A molecule is a covalent compound
"ions"	"atoms" when discussing ionic compounds	Ionic compounds contain ions – this shows the understanding that it is the charges that form the bond
"atoms"	"ions" when discussing covalent compounds	Covalent compounds do not contain ions
"Coulombic attraction"	"Opposites attract"	State the actual reason not the memory aid
Lewis structures that are complete with necessary lone pairs and/or resonance	Lewis structures that are missing lone pairs and/or resonance (if needed for correct structures)	Lewis structures are incorrect without necessary lone pairs/resonance
Multiple bonds when there are not enough valence electrons to satisfy the octet rule	Multiple bonds when the octet rule for the structure would have been satisfied without them	Multiple bonds are only needed when there are not enough valence electrons to satisfy the octet rule
Stating a VSEPR geometry/hybridization that thinks about the 3D arrangement of atoms in a molecule	State a VSEPR geometry/hybridization that thinks about a molecule based on its 2D representation	VSEPR/hybridization are used to describe the 3D arrangement of atoms in a molecule; failing to recognize the difference between the way a Lewis structure is drawn and the way the actual molecule is arranged may lead to an incorrect analysis of structure (ref. 2018 #2d)

Unit 3: Intermolecular Forces and Properties		
Write THIS...	**NOT That!**	**Rational**
Hydrogen bonding, dipole-dipole, London dispersion forces, etc. when asked to identify intermolecular forces	Ionic bonds, covalent bonds, metallic bonds when asked to identify intermolecular forces	Intermolecular forces are attractions between molecules; bonds are intramolecular forces (within molecules)
Discussion of ALL intermolecular forces when prompted to do so	Neglecting IMFs that may be weaker	If asked to state all IMFs, all points will not be earned if some of the IMFs are not stated (ref. 2018 #4a and 2019 #2c)
"Can form hydrogen bonds between the molecules"	"Has hydrogen bonds"	Is unambiguous - Shows that you understand hydrogen bonds are not actually bonds
Electrical conductivity is a property of an ionic solution due to the charges on the dissociated ions	Electrical conductivity is due to the ionic precipitate, electrical conductivity is due to the water	Conductivity is due to the ability of a ion to carry charge; precipitate would not influence in solid form; pure water is non-conductive, (ref. 2019 #3e)
"Overcome intermolecular forces"	"break up" a solid/liquid, break covalent bonds	IMFs should be used to justify phase changes

"Stronger intermolecular forces increase boiling point"	"Stronger covalent bonds increase boiling point"	IMF's, not bonds, are what must be overcome during phase changes
Ion interactions when discussing ionic compounds	LDF's when discussing ionic compounds	Ionic compounds have ions with whole charges, which dominate interactions
"Coulombic attraction"	"Opposites attract"	State the actual reason not the memory aid
Describe the process of overcoming intermolecular forces/polarity	"Like dissolves like"	State the actual reason not the memory aid
Hydrogen bonding, dipole-dipole, London dispersion forces, etc. when asked to identify intermolecular forces	Ionic bonds, covalent bonds, metallic bonds when asked to identify intermolecular forces	Intermolecular forces are attractions between molecules; bonds are intramolecular forces (within molecules)
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Electrical conductivity is a property of an ionic solution due to the charges on the dissociated ions	Electrical conductivity is due to the ionic precipitate, electrical conductivity is due to the water	Conductivity is due to the ability of a ion to carry charge; precipitate would not influence in solid form; pure water is non-conductive, (ref. 2019 #3e)
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"Coulombic attraction"	"Opposites attract"	State the actual reason not the memory aid
Describe the process of overcoming intermolecular forces/polarity	"Like dissolves like"	State the actual reason not the memory aid
Identify specific intermolecular forces at play	"stronger intermolecular forces"	Shows your understanding of the particulate-level chemistry
LDFs increase with an increasing number of electrons and therefore polarizability	LDFs increase with increasing size/mass	Increased number of electrons in an atom is what increases LDF; increased size is not the reason for increased strength of LDF
<u>Inter</u>molecular forces in discussing physical properties (MP, BP, etc)	<u>Intra</u>molecular forces ("bonds") in discussing physical properties	Bonds are not broken and so intramolecular forces are not the determining factors (ref. 2018 #4a and 2019 #2c)
Pressure is caused by the collision of gas particles with the walls of a container.	Pressure is caused by the collision of gas particles.	Unclear wording – implies pressure is caused by gas particles colliding with each other not with the container (ref. 2019 #4c)
Use R with corresponding units to those used in work (and correctly report final unit)	R value with mismatched units	Units used in Ideal Gas Law must match units on the R value (ref. 2018 #4b and 2019 #2d)
Comparison of R_f values in chromatography	Comparison of absolute height of spots on chromatograms	Take into account a difference in the distance the solvent front travelled between different chromatograms (ref. 2017 #4)
Discussion of intermolecular forces between analyte molecules and stationary/mobile phases	Repulsions between analyte molecules and stationary/mobile phases	The movement in chromatography is determined by the attraction for the stationary/mobile phase (ref. 2017 #4)
"Solution" when an ionic compound is dissolved in water	"Liquid" instead of solution	An ionic compound dissolved in water is a solution, not a liquid (the word liquid indicates a molten compound) (ref. 2019 #3e)

Unit 4: Chemical Reactions		
Write THIS...	**NOT That!**	**Rational**
Net ionic equations only containing species that change	Aqueous ionic compounds in their undissociated form, spectator ions	Including these is not a net ionic, it's a molecular or complete ionic
Polyatomic ions that are shown as a compound with the correct charge in solution	Polyatomic ions that are broken down into elemental ions in solution	Polyatomic ions themselves do not dissociate in solution, they only dissociate from the other ion in an ionic compound
Net ionic equations with correct species, ionic charges and stoichiometric coefficients	Net ionic equations that contain incorrect formulas or ions without associated charges or that are not stoichiometrically balanced	Net ionic equations must correctly represent the ions and other species (ref. 2018 #6a and 2019 #3a)

Determination of the concentration of an analyte in a titration that takes into account the stoichiometry of the reaction	Applying $M_1V_1=M_2V_2$ as a blanket method for determining concentration at an end point if the stoichiometry is not 1:1	While acid-base titrations are often 1:1, not all titrations (especially REDOX titrations) follow this stoichiometry; in situations that are not 1:1, the stoichiometric ratios must be accounted for in calculations (ref. 2018 #3e)
Justification of whether a species is oxidized/reduced by referencing oxidation numbers	A justification of oxidation/reduction that uses charge on an ion	Oxidation numbers are assigned to individual atoms in the reaction, and they are not automatically the same as the charge in a polyatomic ion (ref. 2019 #7a)
Hydrogen bonding, dipole-dipole, London dispersion forces, etc. when asked to identify intermolecular forces	Ionic bonds, covalent bonds, metallic bonds when asked to identify intermolecular forces	Intermolecular forces are attractions between molecules; bonds are intramolecular forces (within molecules)

Unit 5: Kinetics		
Write THIS...	**NOT That!**	**Rational**
A rate law based only on reactants	A rate law that includes products	Rate laws are based only on reactants
A rate law that includes the rate constant k as part of it	A rate law without k being included	Incomplete rate law if k is not included
Value of k with units	Value of k without units	Units required to earn point
Specific parts of the molecules must collide in the correct orientation in order for the reaction to occur	"Molecules must collide right"	Show your understanding of the chemistry at play
A validation of a proposed mechanism by showing that the rate law matches the slow (rate-determining step) and the mechanism matching the overall stoichiometry for the reaction.	A justification of a mechanism just by saying "it matches the rate law" or "the intermediates cancel to give the overall process".	The rate law must be discussed as matching the rate-determining step, and the overall stoichiometry should always match for any proposed mechanism – an understanding of the rate determining step must be demonstrated. (ref. 2019 #6b)

Unit 6: Thermodynamics		
Write THIS...	**NOT That!**	**Rational**
"Thermodynamically favorable", "thermodynamically feasible"	"Spontaneous"	Preferred AP language
Values with correct signs	Values with incorrect signs	Necessary for correct calculations and determinations – watch signs based on bonds breaking/forming, heat flow in calorimetry indicated by temperature changes, signs that may change in application of Hess' Law, etc.
Using values of q recognizing that it is the amount of energy absorbed/released during a thermodynamic change	Using values of q interchangeably as values of ΔH without taking the entire situation into account.	ΔH and q do not have identical meaning; ΔH is the enthalpy change for a reaction, q is the overall amount of heat exchanged ; Stoichiometric relationships, the component of the system being examined, etc. may influence how q should be manipulated to determine ΔH (ref. 2018 #1)
In using $q=mc\Delta T$ for solutions, using mass of ENTIRE solution for m	Using mass of only one component of solution	When using $q=mc\Delta T$, the mass of the entire system being examined must be used
Use a thermometer to measure temperature values, and then subtract to find ΔT	Use a thermometer to measure ΔT	A thermometer doesn't measure ΔT, it measures T values that can then be used to calculate ΔT (ref. 2019 #1e)
$\Delta H°=\Sigma$(enthalpies of bonds broken) – Σ(enthalpies of bonds formed) when calculating $\Delta H°_{rxn}$ from bond energies	$\Delta H°_{rxn} = \Delta H_{products} - \Delta H_{reactants}$ when calculating $\Delta H°_{rxn}$ from bond energies	Applying the wrong formula will give an incorrect sign for the $\Delta H°_{rxn}$ (ref. 2017 #2b)
Multiplying bond energy values by stoichiometric factors as well as number of bonds in a molecule when calculating ΔH from bond energies	Only using number of bonds in a single molecule without taking stoichiometric factors into account	Stoichiometry factors represent the number of molecules taking part in the reaction, so number of bonds in a single molecule must be multiplied by this coefficient (ref. 2019 #2g)

Unit 6: Equilibrium		
Write THIS...	**NOT That!**	**Rational**
Correct formulas (including charges!) for all species in equilibrium expressions	Substitutions, abbreviations, chargeless ions, other shorthand that may work out in calculations but does not represent the correct species	Equilibrium expressions must be written formally when requested
In K_p expressions: $P_{species}$	In K_p expressions: [species]	Concentration (which is indicated by brackets around the species) is not used in K_p - partial pressures are
K expressions with EITHER concentration "[ ]" or partial pressures "P"	K expressions that include both concentration "[ ]" and partial pressures "P" in the same expression	Equilibrium expressions are written for either concentration values or partial pressure values, not both at the same time in a single expression (ref. 2019 #2e)
K without units	K with units	K is a unitless constant
"K is greater than 1, indicating that the products are present in a higher concentration and therefore equilibrium lies to the right"	"K is large"	Use specific values to demonstrate understanding about the meaning of K relative to the equilibrium position (ref. 2017 #2d)
"Proceeds"	"Shift" – if equilibrium has not yet been established (i.e. a precipitate has not yet been formed when evaluating K_{sp})	If equilibrium is not yet established, then it cannot "shift" – rxn will proceed in a certain direction until equilibrium is established
Calculations of K expressions that use concentrations/partial pressures at equilibrium	Calculations of K expressions that use initial concentrations/partial pressures	K values can only be calculated using equilibrium values; if initial values are given, an ICE table (or similar method) should be used to determine equilibrium values before calculating the K value (ref. 2018 #5b)
Using stoichiometric factors in ICE tables	Neglecting stoichiometry when calculating change in equilibrium scenarios	Stoichiometry ratios impact how much an initial value is changed during the establishment of equilibrium (ref. 2019 #2f)
"x has been assumed to be so small relative to the original concentrations that it can be ignored"	Nothing about why you ignore x to avoid quadratics	Show you understand why you are making the decision
Discussion of Q vs. K	"reduce the stress", or "due to Le Châtelier's Principle"	Preferred AP language-shows a deeper understanding of chemical principals (ref. 2018 #5c)
K_{sp} expressions that only contain the ions	K_{sp} expressions that contain or imply a species in the denominator	Solids and liquids are not included in equilibrium expressions

Unit 8: Acid Base		
Write THIS...	**NOT That!**	**Rational**
"The solution is neutral when $[H_3O^+] = [OH^-]$."	"The solution is neutral when pH=7."	True definition of neutral – neutral is only pH of 7 when $K_w = 1.0 \times 10^{-14}$ (at 298 K)
"The pH > 7 because the salt produced in the neutralization behaves as a base: $A^- + H_2O$ $HA + OH^-$"	"The pH > 7 because it's a battle between weak acid and strong base and strong base wins."	State the actual reason not the memory aid
HCl, HBr, HI, $HClO_4$, HNO_3 as strong acids	Any other acid as strong	These are the strong acids listed in the Course and Exam Description
$K_w = K_a \times K_b$ for a conjugate pair	$K_w = K_a \times K_b$ for an unrelated acid/base pair	This equation only holds true for conjugate acid-base pairs
A buffer system containing a weak acid and its conjugate base (or a weak base and its conjugate acid)	A buffer system that contains a strong acid or base; a buffer containing any acid/base with a common ion	A buffer results from the presence of a weak acid or base and its conjugate; a strong-strong system will neutralize without buffering
"This buffer has a higher buffering capacity because it contains a higher concentration of weak acid/base and its conjugate to react with added H^+ or OH^- ions."	"Higher volume of weak acid/base"	Buffering capacity is related to the presence of both the weak species and its conjugate.
Identifying a salt as making a good choice for a specified buffer because the pK_a is close to the desired pH for the buffer.	Identifying a salt as making a good choice for a specified buffer because the pK_b is close to the desired pH for the buffer.	An effective buffer is one in which is pKa of the weak acid is approximately equal to the target pH. (ref. 2019 #3h)

Unit 9: Applications of Thermodynamics		
Write THIS...	**NOT That!**	**Rational**
Reference number of molecules and phases when justifying a change in ΔS based on a reaction	Making vague references to "similar structures" or no justification	An increase in ΔS is due to an increase in number of gaseous products (ref. 2017 #2c)
Justify thermodynamic favorability in terms of both enthalpy and entropy	A thermodynamic favorability discussion referencing only enthalpy or entropy	Thermodynamic favorability depends on both ΔH and ΔS
Arrangement/Dispersions of matter or energy along with particle-level reasoning for explaining the sign of ΔS	Disorder, chaos	Disorder is the effect, not the cause, of an increase in entropy (ref. 2019 #1g)
ΔG determines thermodynamic favorability	Referencing ΔH or ΔS alone as determining thermodynamic favorability	All the thermodynamic properties contribute to favorability – hence using ΔG = ΔH-TΔS which takes all into account (ref. 2019 #1h)
Use of correct value of R with thermodynamic data (that corresponds to energy units)	R value that does not correspond to the units needed in the problem	Units of the R value must match those used in the problem, and correct units must be applied at the end, or the answer is incorrect (ref. 2018 #2b)
"Ions flow through the salt bridge to maintain a charge balance in each half-cell."	"Electrons flow through the salt bridge to equilibrate charge."	Electrons do not flow through the salt bridge; ions flow through the salt bridge, electrons flow through the wire (ref. 2018 #6a)
Loss of mass of electrode is due to atoms of electrode going into solution as ions	Loss of mass of electrode is due to loss of electrons	Electrons have extremely small (negligible in this case) mass (ref. 2014 #3)
Discussion of Q vs. K for changes in cell potential after a change, or qualitative discussion of Nernst Equation	Discussion of Le Châtelier's principle	An galvanic cell does not attain equilibrium while working – when it does, it stops producing current (is "dead") (ref. 2014 #3)
An equation that is balanced with respect to both number of atoms and charge	An equation that is unbalanced in atoms, charge or both; an equation that shows electrons	Recognize that equations need to be balanced with respect to both atoms and charge – this means that half-reactions may need to multiplied by a coefficient to balance charge for the overall reaction, even if atoms are already balanced, and then the electrons on both sides cancel out and are not written (ref. 2018 #3d)
E° value not multiplied by stoichiometric factors	E° value that has been multiplied by a stoichiometric value	E° is intensive and therefore does not change if the half-cell is multiplied by a stoichiometric factor to balance charge (ref. 2018 #6b)
Standard cell potential when discussing a REDOX reaction	Standard reduction potential when discussing a REDOX reaction	A redox reaction contains both oxidation and reduction; therefore the E° for the reaction is the sum of the standard reduction potentials of both the oxidation and reduction half-reactions
When writing $E°_{cell}$ for redox reactions, one rxn must be reversed so that $E°_{cell}$ is positive	An $E°_{cell}$ that is negative	There has to be thermodynamic favorability, which depends on the $+E°_{cell}$, in order for the rxn to work (ref. 2019 #2b)
Using the cell potential for E° in ΔG = -nFE° calculations	Using a half-cell potential for E° in ΔG = -nFE° calculations	This equation uses the full cell potential, not for a half-reaction (ref. 2018 #6b)

Any others you can think of?!
Tell Mrs. Farmer so she can add them for next year!

See any weird ones that you think need to be rewritten/fixed? Tell Mrs. Farmer so she can fix them!