

Exam #2

1. _____	60 pts
2. _____	20 pts
3. _____	20 pts
	100 pts

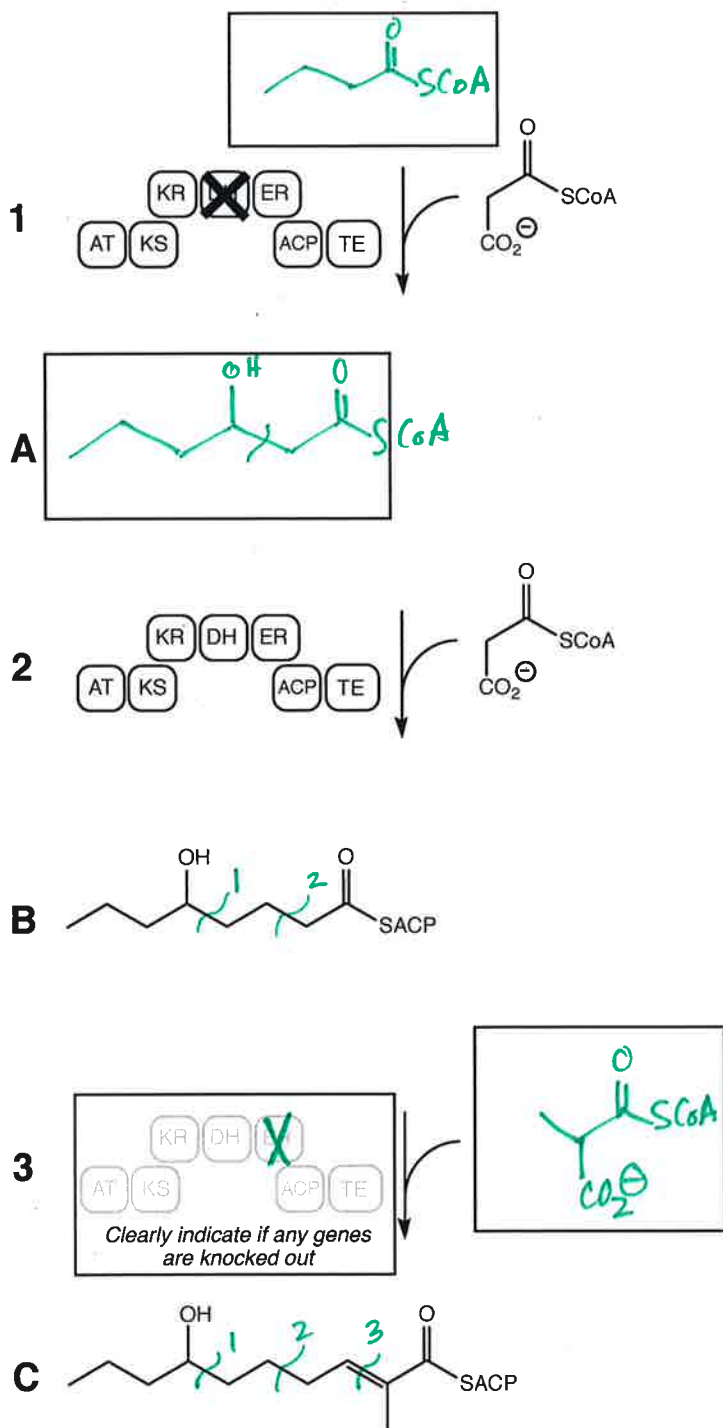
Mechanisms must include:

- Mechanistic arrows
- Lone pairs on all atoms that are giving or receiving electrons
- Formal charges where appropriate
- Structures of intermediates
- Representative and relevant resonance forms when they help to explain the observed reactivity
- Proper ionization state where acids and bases are involved; in other words, respect the *pH*.
- If cofactors are involved, you must show the "business end" of the cofactor structure (the part that is reacting).
- If you wish to abbreviate part of a structure as R, circle the portion to be abbreviated and label it clearly. Otherwise do not abbreviate structures.

Organic chemists may not seem like a humble group. But we should be, because we are humiliated every hour of the day by what nature accomplishes through enzyme catalysis. All those wildly complex natural products that eat up phalanxes of postdocs? They were synthesised by some organism in its spare time, under aqueous conditions, at whatever the local ambient temperature might have been. All those metabolites that the medicinal chemists and drug metabolism folks spend so much effort isolating and identifying? Made inside liver cells, as a small transient item on their agenda, and done in the same casual chainsawing manner that they greet almost everything we throw at them.

Derek Lowe (tinyurl.com/l6fugda)

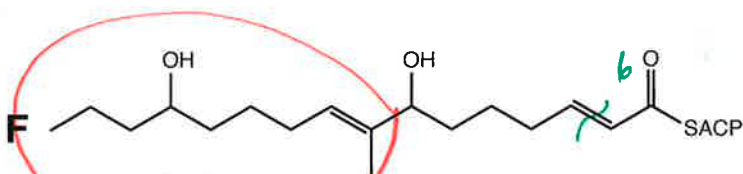
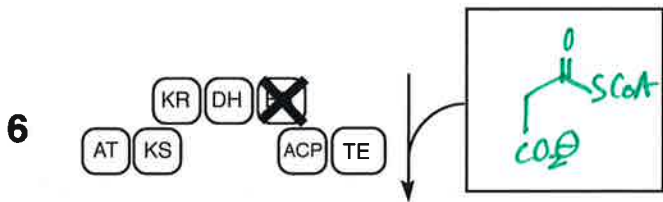
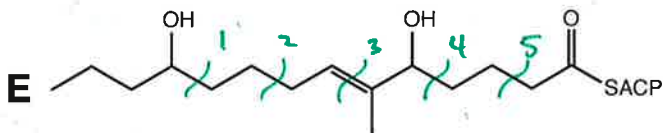
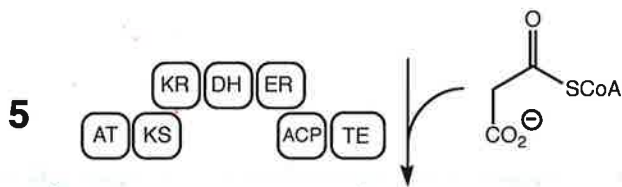
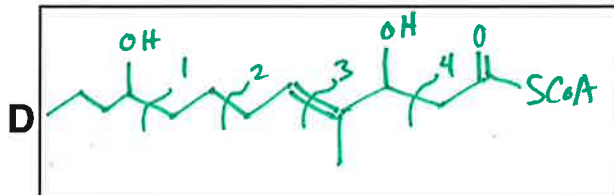
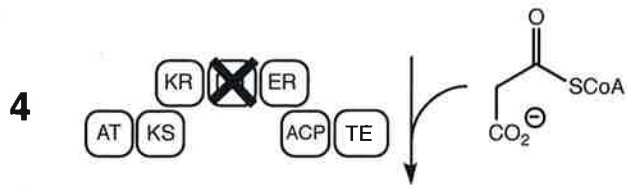
1. (60 points). A PKS assembly line is shown below and is continued on the next page. Reactions are numbered and compounds are lettered. For every box, fill in the missing compound. For reaction three, indicate if any enzymes are knocked out by putting an X.¹



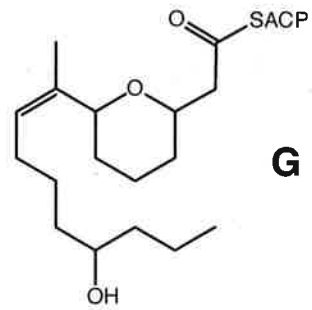
continued next page

¹The entire exam was inspired by Pöplau et al. *Angew. Chemie Intl. Ed. Eng.* vol. 52 pg 13215 (2013).

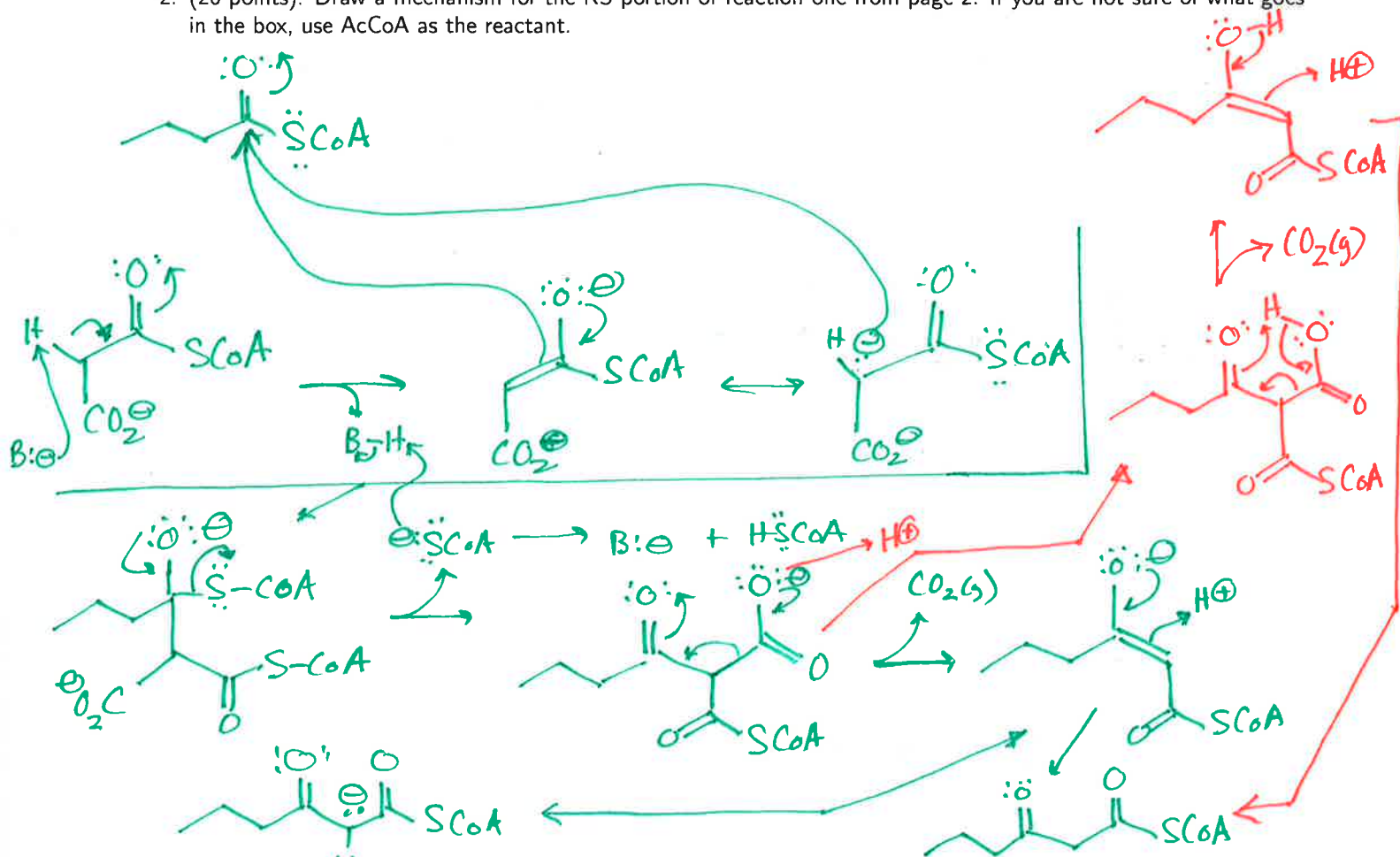
continued from previous page



=R for question 3



2. (20 points). Draw a mechanism for the KS portion of reaction one from page 2. If you are not sure of what goes in the box, use AcCoA as the reactant.



3. (20 points). Draw a mechanism for reaction seven from page 3.

R is defined on the previous page.

