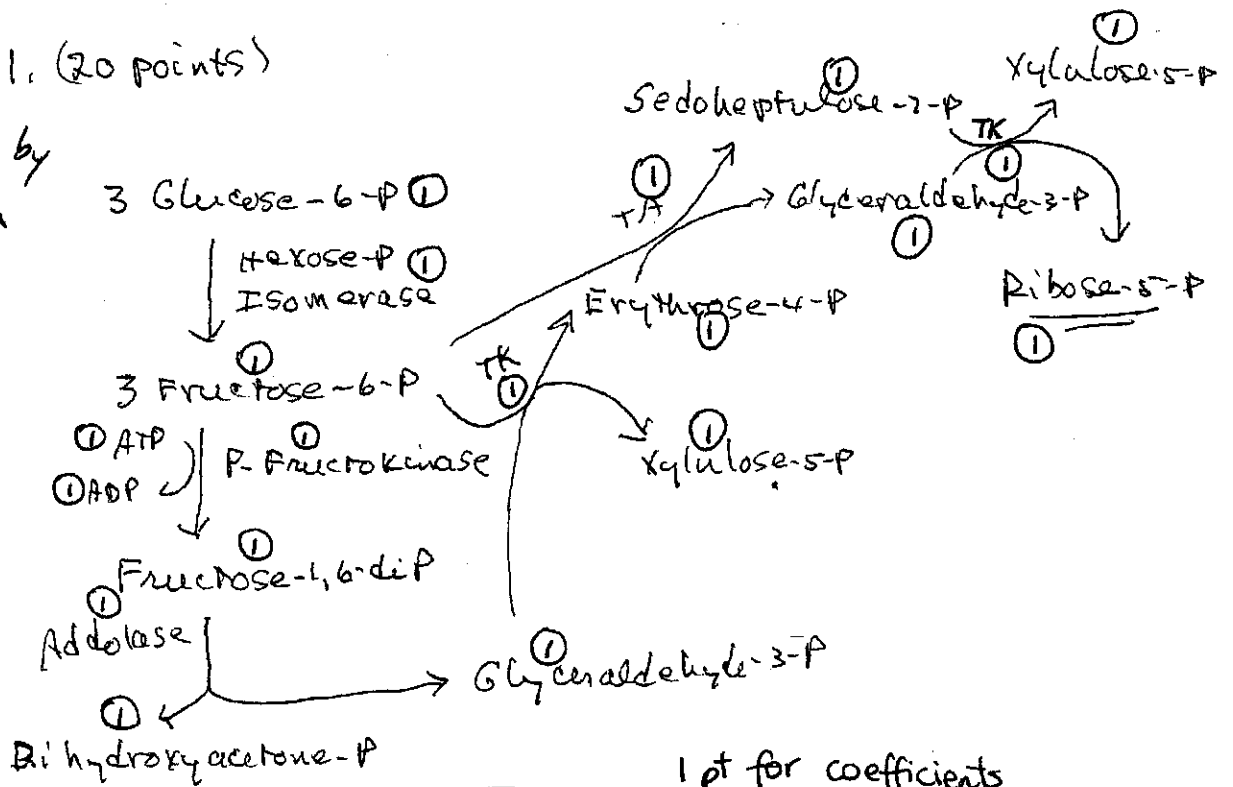


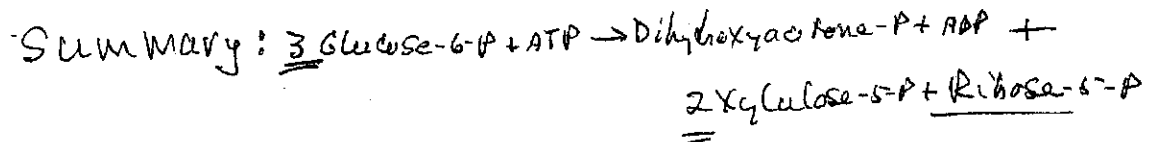
Answers for 2.05 Exam of May 7, 2001

1. (20 points)

Graded by
Karolina



1 pt for coefficients



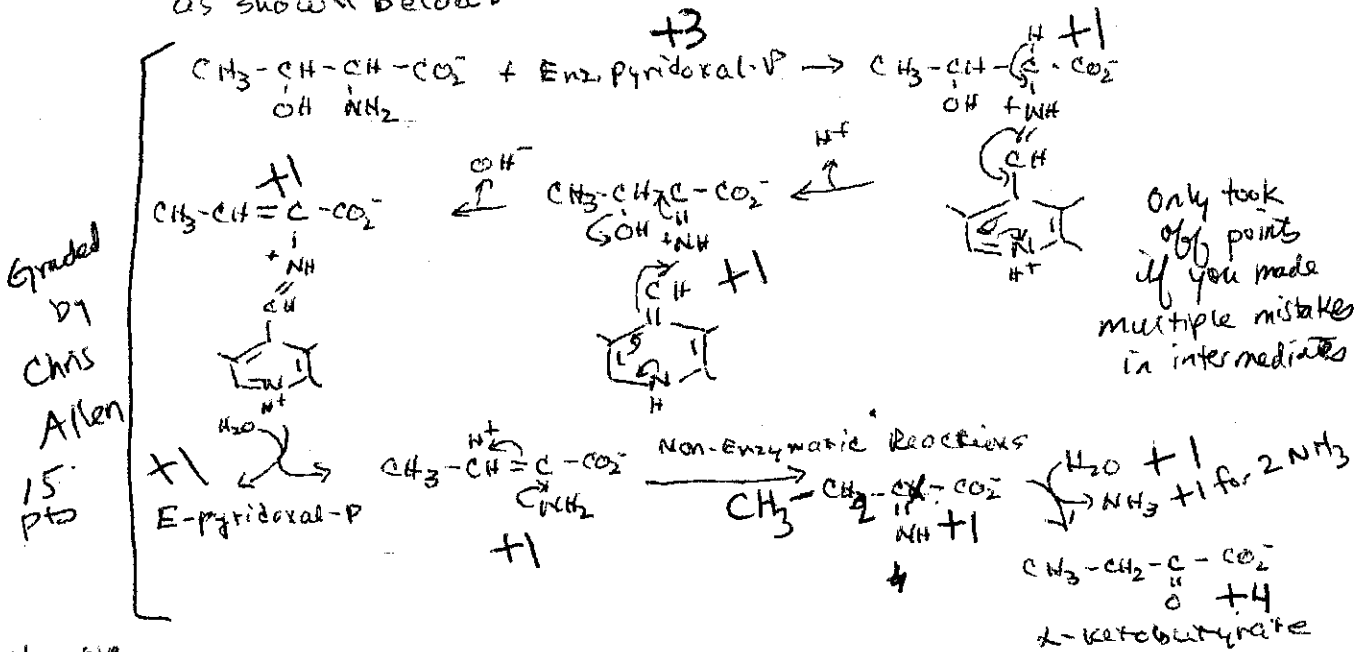
TK = Transketolase

TA = Transaldolase

1 pt for each product/substrate/enzyme
1 pt for correct coefficient

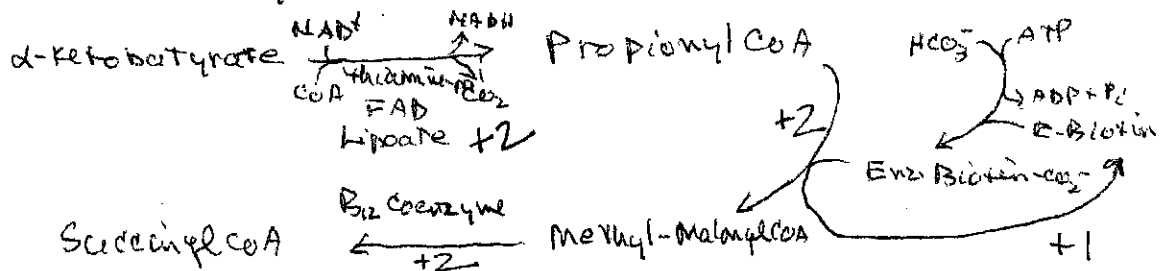
* Note: A few people copied the Pentose Cycle Handout. I could not accept this as an answer. Sorry.

2. (30 points) Graded by Julia Flynn + Chris Allen
 2 threonines will be subjected to a β -elimination reaction catalyzed by an enzyme containing pyridoxal-P as shown below.



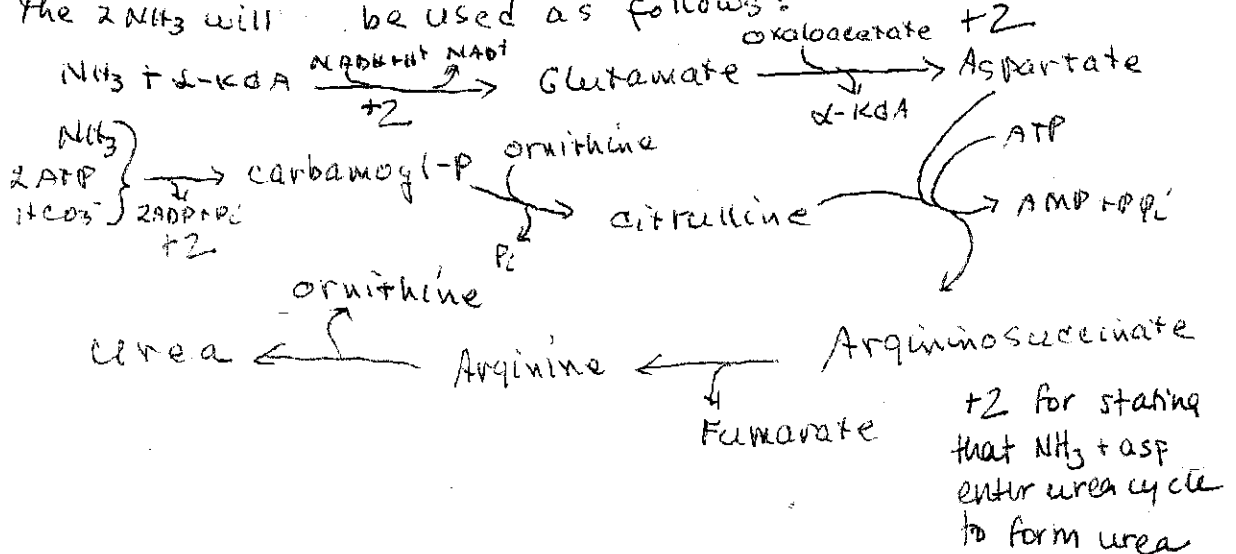
Alternative answers received consideration and were given partial credit.

Thus, the 2 threonines will yield 2 α -ketobutyrate + 2 NH_3
 The 2 α -ketobutyrate will be metabolized as shown below:

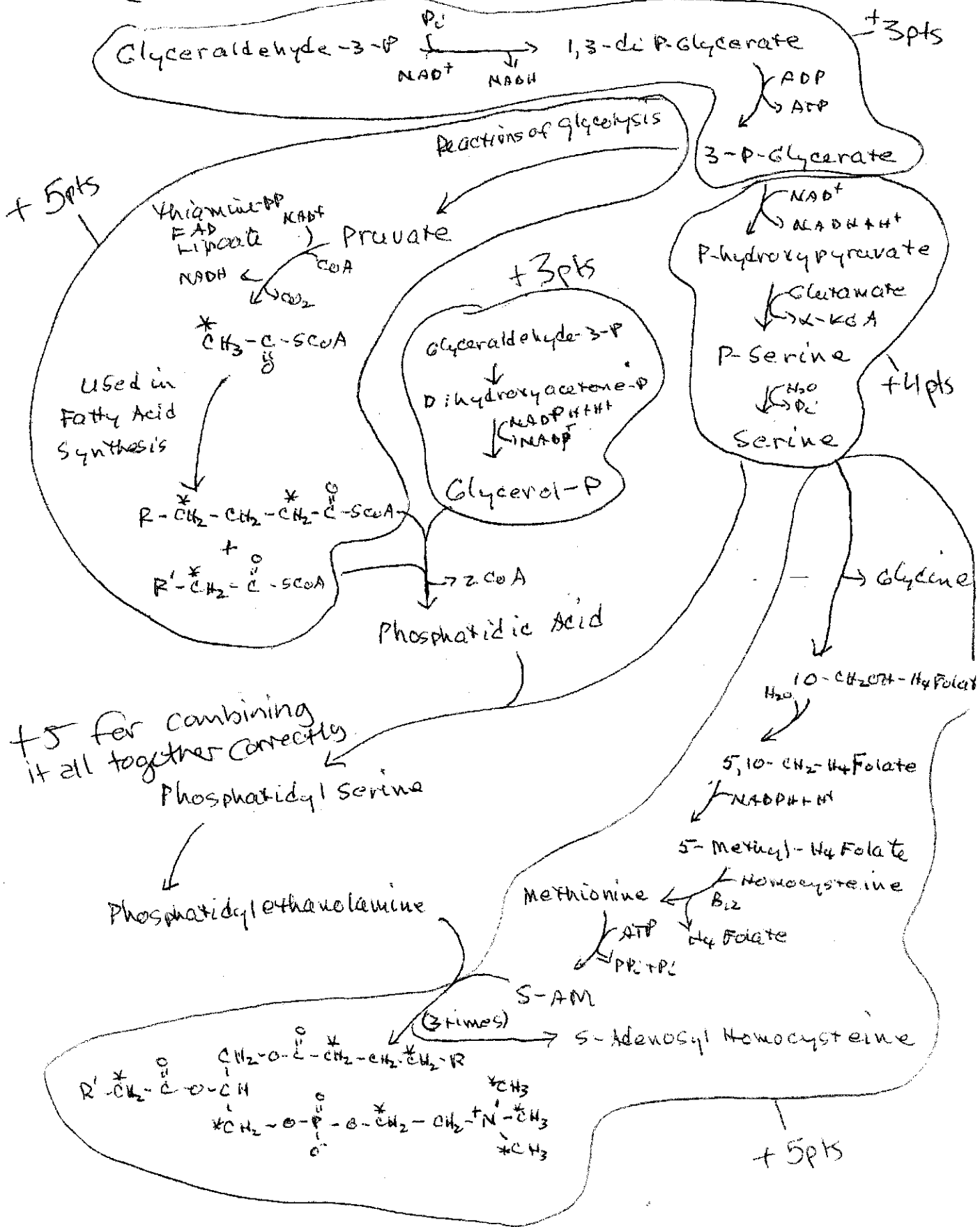


Thus, 2 α -ketobutyrate \rightarrow 2 Succinyl CoA

The 2 NH_3 will be used as follows:



3. (25 points) Graded by MCGregg

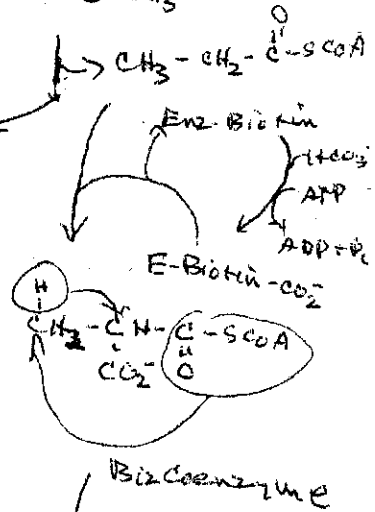
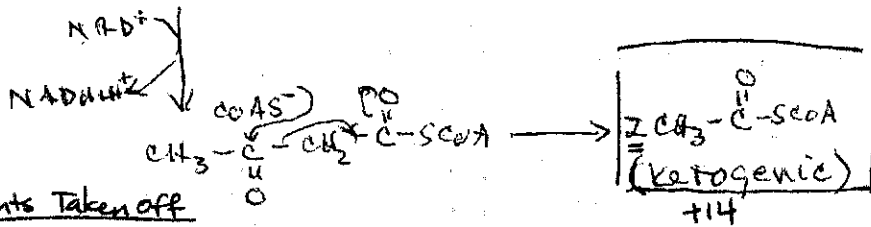
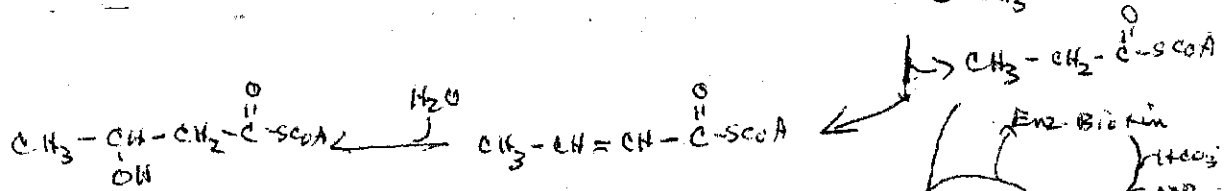
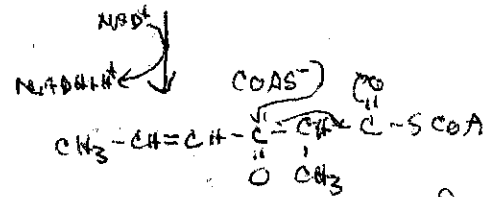
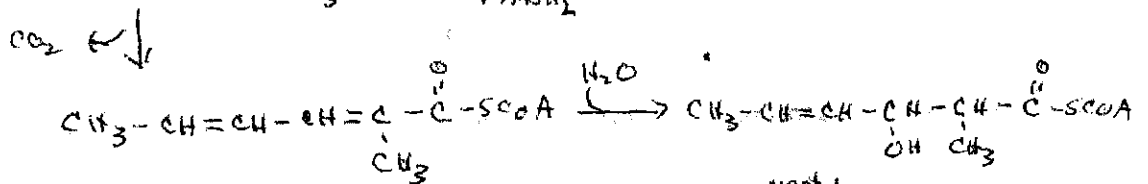
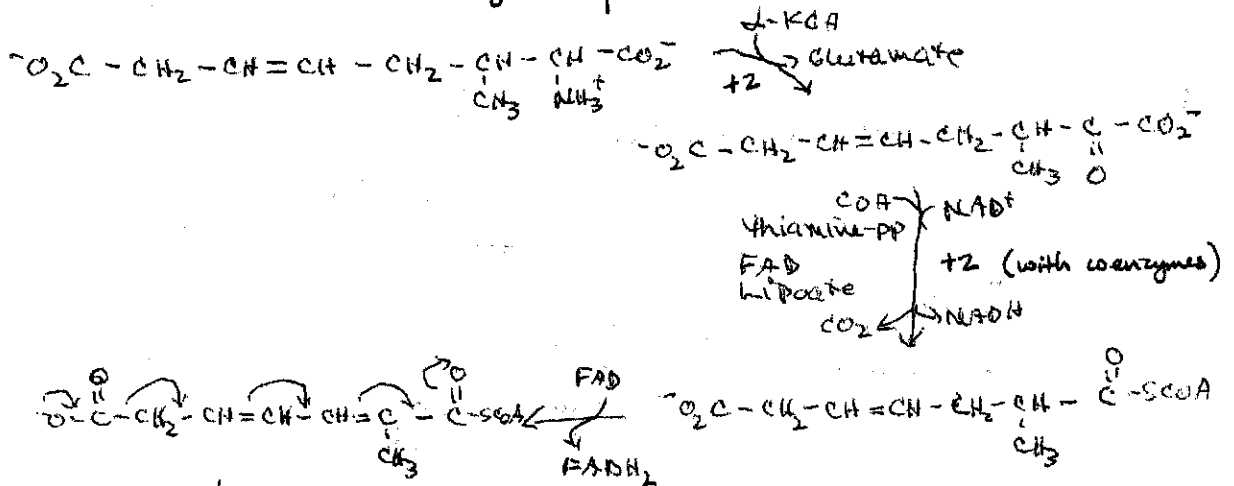


Grading Rubric for Q3

This question was very difficult to grade given the nebulousness of what was asked of you. There were two types of answers: one similar to the one on the previous page and one in the form of paragraphs. I accepted both answers. If you lost points, it was because you weren't specific enough for my grading. People particularly missed points on the single-C metabolism. Some synthesized S-AM from G3P, but didn't construct its methyl group from G3P. That was incorrect. Others just couldn't combine all of the interrelated pathways. You received 20 pts for all of the correct steps and 5 points for bringing the pathways together.

-MC Gregor

4, (25 points) Graded by Stacy Chen



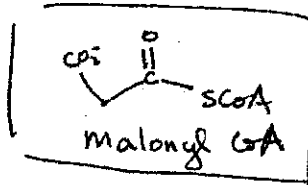
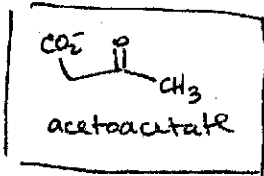
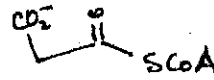
Points Taken off

- 3pt for wrong or no decarboxylation
- 3pt for wrong or no conversion of propionyl CoA to succinyl CoA
- 2pt for missing or extra carbons.
- 2pt for each invalid pathway step.
- 4pt for not showing the cycle of 1 round of fatty acid break down.
- 5pt for generating wrong products and not have both ketogenic & glycogenic prod.
- 1 for not converting Malonyl CoA → acetyl CoA, but labeled it correctly.

General Note on Question 4:

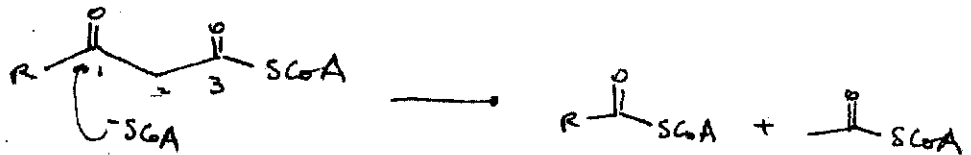
1

This is not acetoacetate:



2

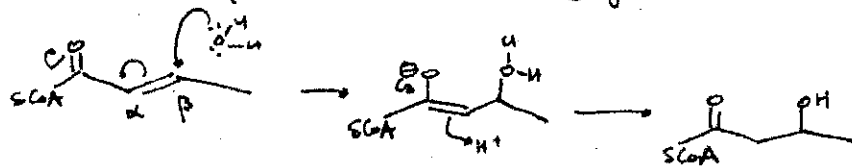
Reverse ~~Claisen~~ Claisen Reaction,



* 1,3 di-carbonyl is required for this reaction.
You cannot randomly break carbon bonds with attack of -SCoA.

3

Hydration to α - β double bonds conjugated to a carbonyl.

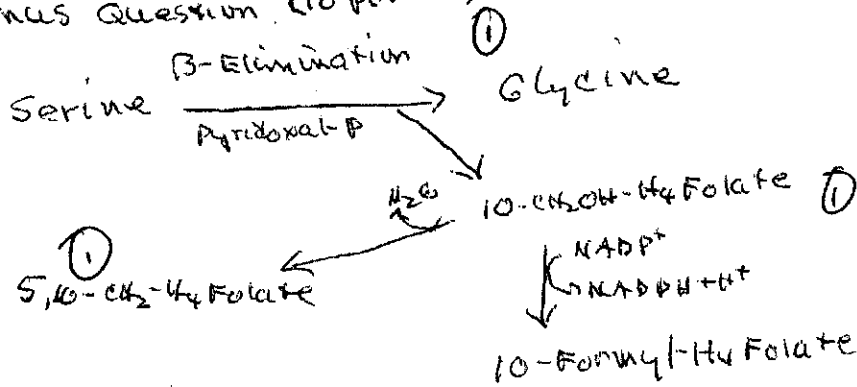


* Similar to reverse aldol dehydration.

You cannot hydrate at random double bonds not conjugated to carbonyl.

Xu

5. Bonus Question (10 points)



The glycine is used to provide the "backbone" structure (2 carbons) of IMP and 10-formyl-H₄Folate is used to provide the 2 other carbons labeled ② with an asterisk in IMP.

④ ~~3~~ 5,10-CH₂-H₄Folate is used as substrate along with dUMP to produce TMP and H₂Folate. The methyl of TMP is thus derived from 5,10-CH₂-H₄Folate which originally came from serine.

1 pt Ser → gly

1 pt Ser → 10-formyl THF

1 pt Ser → 5,10-CH₂-H₄folate

1 pt Gly → "backbone" of IMP

1 pt each carbon on IMP that comes from 10-formyl THF (1 pt. total for saying they come from formate)

1 pt each component of

