Practice Exam F

This is the sixth of six practice exams. These exam questions have been taken from actual past BIS105 exams. The numbers in parentheses indicate the points for these questions (out of 100 points for the whole exam). Thus these questions represented approximately 1/5 the value of the exam. IF this is a reasonable estimate of the difficulty of these questions, you should be able to answer them in $21/100 \times 50 = 10.5$ minutes.

1. The breakdown of glycogen by phosphorolysis proceeds as,
$$\text{glycogen}_n + P_i \rightarrow \text{glycogen}_{n-1} + \text{glucose-1-P} \quad (P_i \text{ is inorganic phosphate}),$$
with a $\Delta G^\circ = +3.1 \text{ kJ/mol}$.

a) (6) Assuming that the concentration of $P_i$ in the cell is 1 mM, what is the equilibrium concentration of glucose-1-P?

b) (6) Although the synthesis of glycogen by the reverse of the reaction shown above is downhill ($\Delta G^\circ = -3.1$), this is not the way glycogen is synthesized. Diagram the reactions by which one glucose-1-P is added to a growing glycogen chain (give names rather than structures of the substrates and products).

2. (9) How much ATP will be formed from the total metabolism of one molecule of palmitoyl(16C)-S-CoA? Show your work.