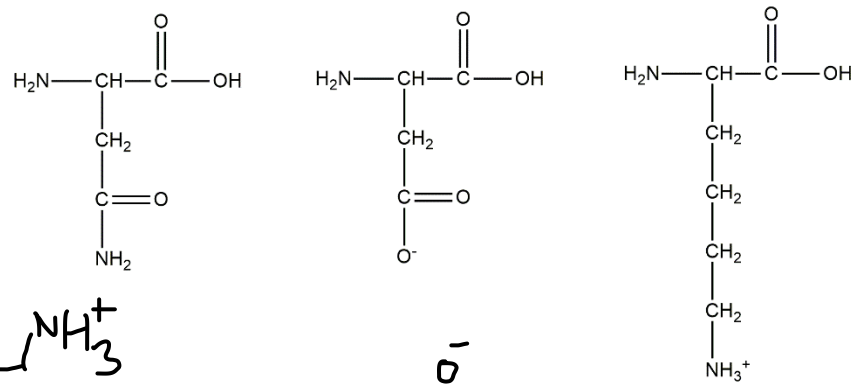
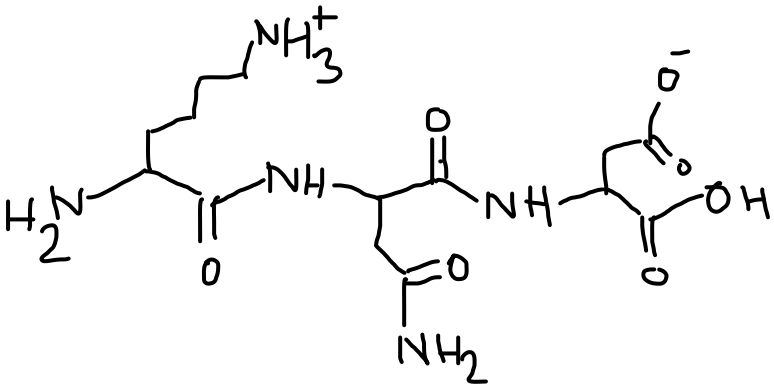
CYL100-Quiz **Name:**

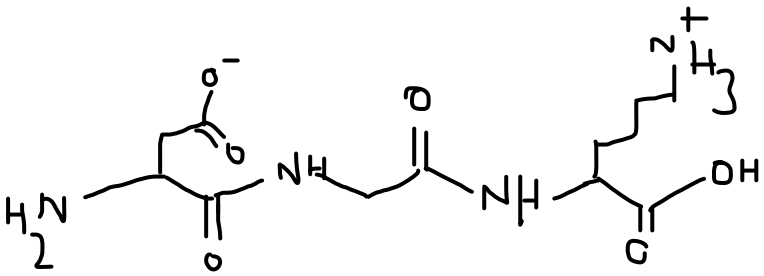
Answer all questions (Open note) **ID Number:**

Full marks: 25(5 marks each), Time: 50 minutes

1. Draw all the tripeptide sequences possible with the following amino acids where positively charged and negatively charged amino acids are not connected via a peptide bond.







2. Use the Michaelis-Menten Equation to calculate the missing values of [S] given below if V_{max} = 5 mmol/s. Plot [S] versus V_0. Draw line parallel to the x-axis at V_{max} and extend your plotted line to show its approach to V_{max}.

[S] mM	V_0 mmol/S
10	1.2
16.3	1.7
22.9	2.1
24.9	2.2
31.7	2.5

Derive for Km

$$V_0 = \frac{V_{max}[S]}{K_m + [S]}$$

$$\Rightarrow K_m = 31.7 \text{ mM}$$

Plug in the Km to find out [S]

For example

$$1.7 = \frac{5 \times [S]}{31.7 + [S]} \Rightarrow [S] = 16.3$$

3. A solution initially contains a catalytic amount of an enzyme with K_M = 1.5 mM, 0.25 M of substrate, and no product. After 45 seconds, the solution contains 25 µM of product. Find Vmax and the concentration of product after 2.0 minutes. Hint: [S] >> K_M.

Since [S]>>Km

Rate=Vmax

$$V_0 = \frac{V_{max} \cdot [S]}{K_m + [S]}$$

$$V_{max} = \text{Rate} = \frac{25}{45}\ \mu M/s = 0.55\ \mu M/s$$

Product after 2 minutes

$$\frac{25 \times 120}{45}\ \mu M = 66\ \mu M$$

4. ~~Write~~ ~~F~~following is the amino acid sequence in a polypeptide: GIVEQCCTSICS
   What is the amine and carboxylic acid terminal amino acids in this polypeptide?
   Which amino acids ~~are~~ in the polypeptide are nonpolar and polar in nature?

   C Terminus S
   Amine terminus G
   Polar AAs: W, Q, C, T, S
   Nonpolar AAs: G,I,V

5. A first order reaction takes 8 hours for 90% completion. Calculate the time required for 80% completion. Provide full calculations.

$$[A] = [A]_0 e^{-kt}$$

$$\Rightarrow k = -\frac{\ln 0.1}{8} h^{-1} = \frac{2.3}{8} h^{-1}$$

Time required for 80% completion:

$$t = -\frac{8}{2.3} \ln 0.2 \; h$$

$$= 5.6 \; h$$