FINAL REVIEW

1. $pH = pKa + \log \frac{[A^-]}{[HA]}$

$[A^-] = (0.05\,L\ OAc^-)\left(0.1 \frac{mol}{L} OAc^-\right] = 0.005\,mol/_{200\,mL}\ OAc^-$

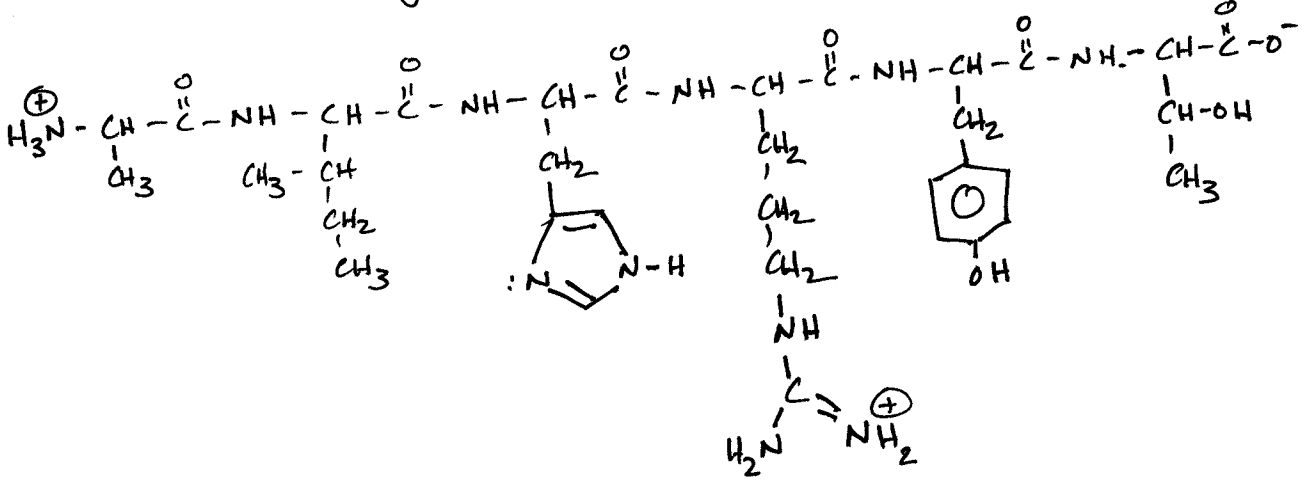
$[HA] = (0.15\,L\ HOAc)\left(1 \frac{mol}{L} HOAc\right) = 0.15\ mol/_{200\,mL}\ HOAc$

$pH = 4.7 + \log \frac{(0.005)}{(0.15)}$

$= 4.7 + (-1.48)$

$= 3.22$, not a good buffer as pH > 1 unit away from pKa.

2.

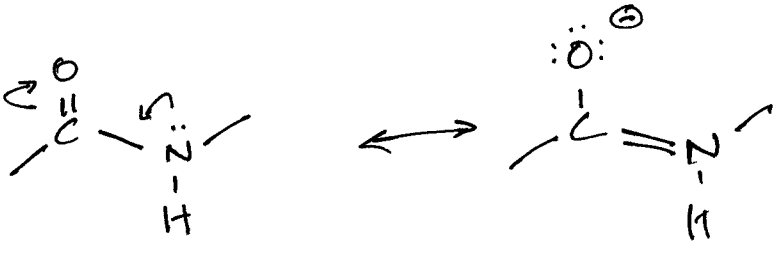


pH = 1 , charge = +3

pH = 7 , charge = +1

pH = 12, charge = −1

3.



double bond character restricts rotation

4. cation exchange resin is $\ominus$ charged.
thus + charged residues will bind

pI (Glu) = 6.8
pI (Ala) = 6.15
pI (Ser) = 5.7
pI (Pro) = 6.3
pI (Arg) = 10.75

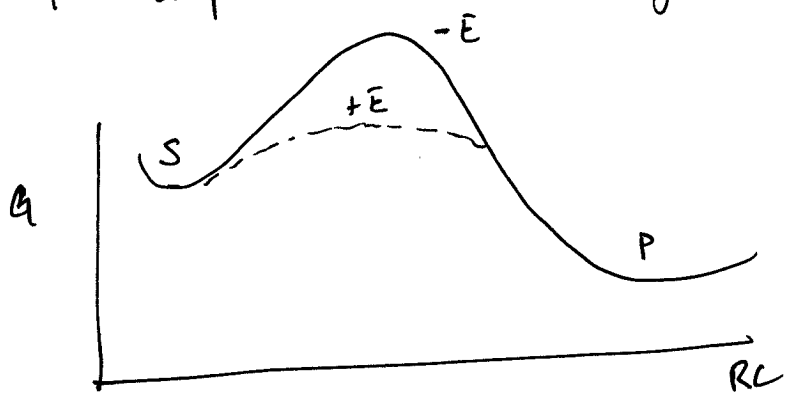
ORDER OF ELUTION

Ser, Ala, Pro, Glu, Arg

5. H-bonding - chaotropic agents, heat
Ionic - high salt
Covalent (S-S) - thiol reducing agents
van der Waals - heat
hydrophobic - detergent

6. 1° - amino acid sequence
2° - local, repeating structures (α-helix, β-structure)
3° - 3-D structure of a polypeptide chain
4° - complete 3-D structure of oligomeric protein

7.



8.

Using $y = mx + b$

$$\frac{1}{V} = \frac{K_m}{V_{max}} \frac{1}{[S]} + \frac{1}{V_{max}}$$

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

$$= \frac{(20\,\mu mol/min)(10^{-6})}{10^{-5} + 10^{-6}}$$

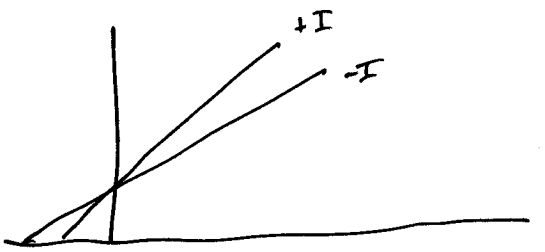
$$= 1.82\,\mu mol/min$$

9. $[E]_{total} = 15 \times 10^{-3} g \left(\frac{1\,mole}{30{,}000\,g}\right) = 5 \times 10^{-7}\,mol$

$$V_{max} = \frac{60\,m\,mol}{min} = 60 \times 10^{-3} \frac{mol}{min}$$

$$k_{cat} = \frac{V_{max}}{[E]_t} = \frac{60 \times 10^{-3}\,mol/min}{5 \times 10^{-7}\,mol} = 1.2 \times 10^{5}\,min^{-1}$$

10.

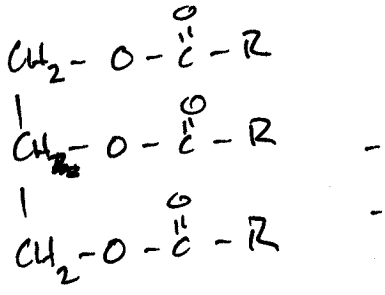


$E + S \rightleftharpoons E \cdot S \rightarrow E \cdot P$

$\downarrow\uparrow +I$

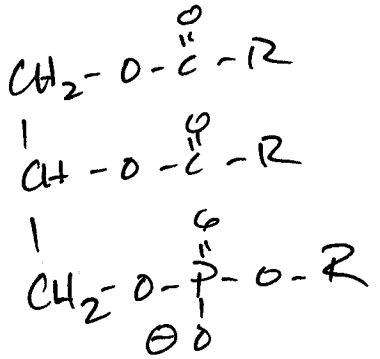
$E \cdot I$

11. T.A.G.



- no polar / ionic group
- cannot form membrane

12. Phospholipids



- phosphate charge provides ionic head group
- can form membrane

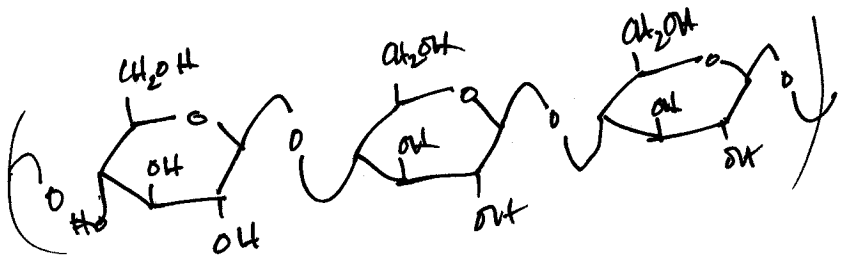
12. $\Delta G = RT \ln \frac{c_2}{c_1} + zF\Delta\phi$

$= \left(8.3 \frac{J}{K \cdot mol}\right)(310\,K) \ln \frac{240}{1.8} + (2)\left(96480 \frac{J}{V \cdot mol}\right)(0.095\,V)$

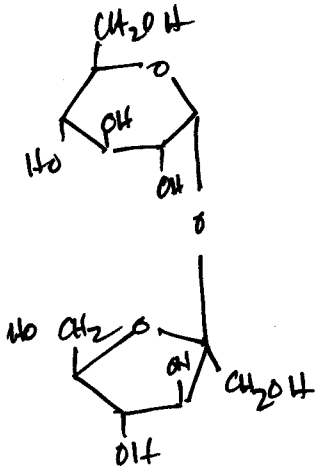
$= 12.6\ kJ/mol + 18.3\ kJ/mol$

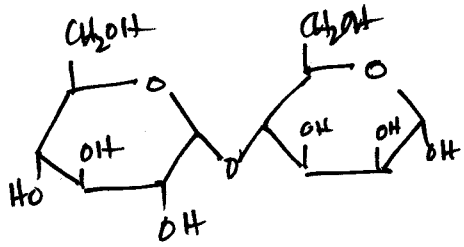
$= 30.9\ kJ/mol$

13.

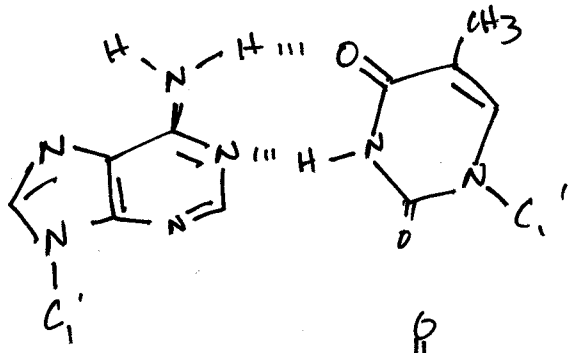


14.

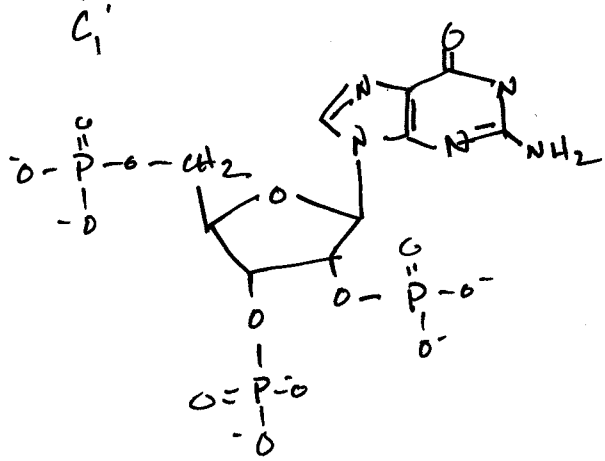




15.



16.



17. G≡C vs. A=T

higher G≡C content will result in higher t_m

18.