BMB401 Exam I Practice Exam 1

ID Page

SA Key Show all your work for questions that involve calculations

. 1) Please name one conservative substitution for the following; do not use the same amino acid twice:

a) Arg____ *pos charged AA* ___

b) Leu_____*Branched AA*_____

c) Asp_____*Glu or Gln, Asn*

d) Thr___*Ser*

e) Asn_____*Gln, Asp, Glu*_____

. 2) Please solve for pKa if pH = 4.5, the concentration of A- is 10 mM, the concentration of HA is 100 µM.

. pH = pKa + log [A-]/[HA] 4.5 = x + log (10mM/0.1mM)

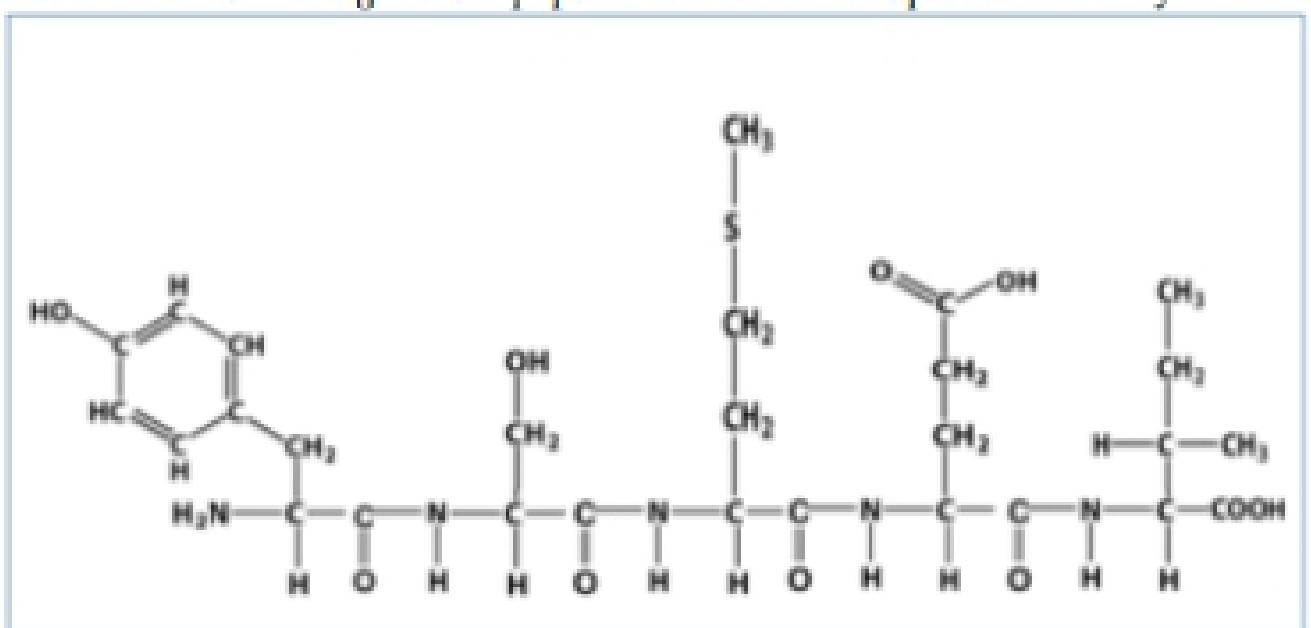
. You an write this as 4.5 = x+ log (10^{+1} mM/ 10^{-1} mM) and you know that when you divide exponents you subtract them so we get:

. 4.5 = x+ log $10^{(+1-(-1)}$ So 4.5 x plus the log of 10^2, and all a log is, is the number to which 10 is raised. so the log of $10^2 = 2$

. 4.5 = X + 2 therefore 2.5 = X

.

. 3) Please solve for the charge on the peptide shown below at pH 2 and show your work:



. +1 0 0 = ±1

. 4) Please solve for ΔG when ΔS = 100 J/mole K, ΔT= 298 K, and ΔH = 0.1kJ/mole

. ***Always write the equation First to receive partial credit:*** *ΔG = ΔH-TΔS*

. *ΔG = ΔH-TΔS where T is in Kelvin. Put these in the same terms. kilo-Joule works for me. So ΔS is 0.1 kJ mole^{-1} K^{-1}*

. *ΔG= 0.1 kJ mole^{-1} - 298 K * 0.1 kJ mole^{-1} K^{-1}*

. *ΔG= 0.1 kJ mole^{-1} - 29.8 kJ mole^{-1} = -29.7 kJ mole^{-1}*

.

. 5) Please identify the globin composition of:

a. Adult hemoglobin_____*alpha2 Beta 2*

b. Fetal hemoglobin_____*alpha 2 Gamma2*_

. EC) What is the role of the distal histidine in hemoglobin function?_ *The distal His helps to regulate the entry and exit form the Fe^{2+} O_2 binding site. Large molecules like CO_2 have a harder time getting in, and O_2 is stabilized to leave as O_2 and not superoxide, O_2^-. You had to mention both portions of these attributes entry and exit –*

not just say it's a gatekeeper.