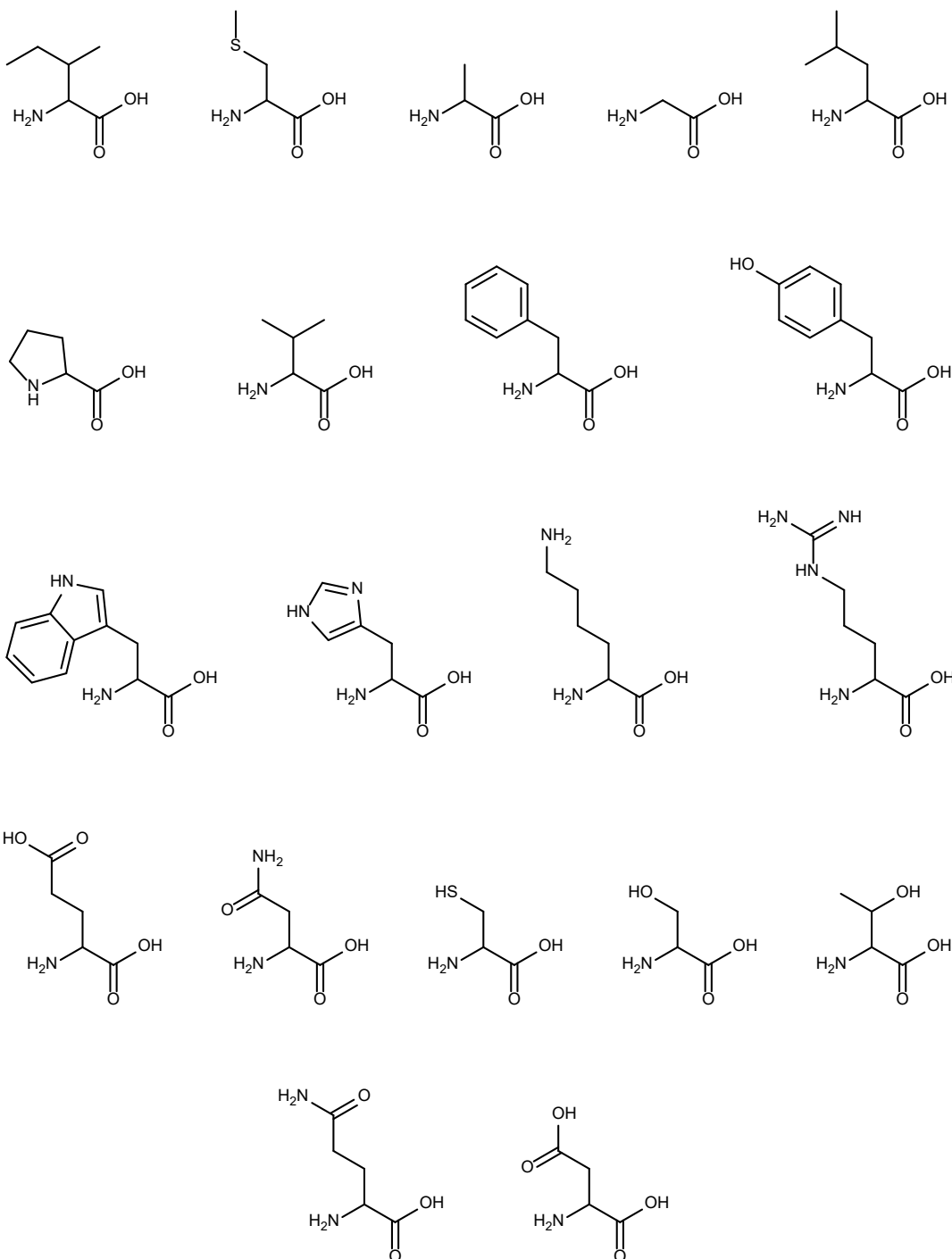


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## Worksheet # 4: Amino Acids & pI

1. **Timed Test.** Below are unlabeled structures of the 20 common amino acids. You will have five minutes to identify as many as possible by writing their three-letter and one-letter abbreviations. For each amino acid with an ionizable side chain, circle or add the ionizable proton and write its approximate pKa, rounded to the nearest whole number.



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2. Calculate the pI point for the peptides below. Use the exact pKa values for each of the amino acids for the calculations. For each peptide determine the overall charge at pH 1, 7, and 14.

a. AAWERT

b. FGHILLV

c. NKMIIPK

d. SADEQN