

Problems – Set 1: Acids and bases

Problem 1

Put in order of acidity the following compounds and justify: CH_4 , H_2O , NH_3 , H_2S , HBr and HF .

Problem 2

Give the order of basicity:

- a) pyridine, ammoniac, triethylamine, aniline
- b) 4-aminopyridine, 2,6-dimethylpyridine, 2-chloropyridine
- c) NaOEt , NaO^tBu , NaOH , NaO^nBu , NaOMe

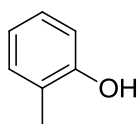
Problem 3

Place the following series of compounds in order of acidity and provide the explanation.

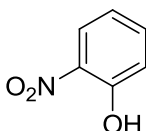
- (a) $\text{ClCH}_2\text{CO}_2\text{H}$, $\text{FCH}_2\text{CO}_2\text{H}$, $\text{BrCH}_2\text{CO}_2\text{H}$, $\text{ICH}_2\text{CO}_2\text{H}$;
- (b) $\text{CH}_2\text{CHCO}_2\text{H}$, HCCCO_2H , $\text{CH}_3\text{CH}_2\text{CO}_2\text{H}$;
- (c) $\text{CH}_3\text{CO}_2\text{H}$, $\text{CH}_3\text{CH}_2\text{CO}_2\text{H}$, $(\text{CH}_3)_3\text{CCO}_2\text{H}$;
- (d) $\text{CH}_3\text{CO}_2\text{H}$, $\text{FCH}_2\text{CO}_2\text{H}$, $\text{F}_2\text{CHCO}_2\text{H}$, $\text{F}_3\text{CCO}_2\text{H}$.

Problem 4

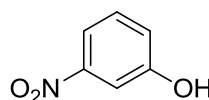
How many resonance structures exist for the anion of *ortho*-cresol, 2-nitrophenol, and 3-nitrophenol? Classify the order of acidity of these compounds.



o-cresol



2-nitrophenol

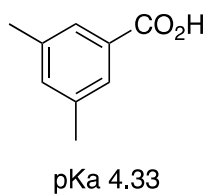
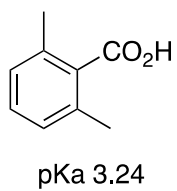


3-nitrophenol

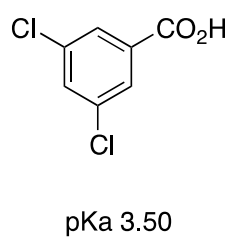
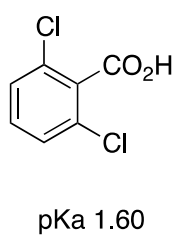
Problem 5

Explain the following observations:

a)



b)



c)

