Unit test No. 3

Online unit test contains 30 questions randomly chosen from the previous tests.

Sample examination paper

1. Draw structural formulae of aniline and ethylamine. Compare their relative basicities.

a) Assign the pK_{BH^+} values (10.63 and 4.60) to the compounds. Draw the formulae for their conjugate acids.

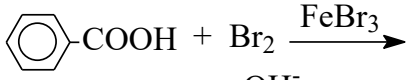
b) Explain your answer by stating the substituent effects (+I, –I, +M and/or –M).

c) Calculate the pH value of a 0.01 M aqueous solution of ethylamine.

2. Complete the following reactions:

a) $C_2H_5C(=O)NHCH_3 \xrightarrow[\text{hydrolysis}]{H_2O\,/\,H^+}$

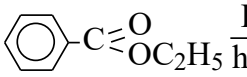
b) $\begin{matrix}CH_3O\\CH_3O\end{matrix}\!>\!CHCH_3 \xrightarrow[\text{hydrolysis}]{H_2O\,/\,H^+}$

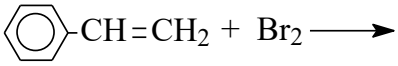
c)  $+\ Br_2 \xrightarrow{FeBr_3}$

d) $2\ CH_3C(=O)H \xrightarrow[\text{aldol condensation}]{OH^-}$

e) $CH_3OCH_2CH{=}CH_2 \xrightarrow{O_2/X^\bullet}$

f) $CF_3CH{=}CH_2 + HCl \longrightarrow$

g) 

h) 

i) $C_2H_5NH_2 + CH_3Br \longrightarrow$

j) $CH_3CH{=}NCH_3 \xrightarrow{H_2O\,/\,H^+}$

3. For each reaction from part 2, state its type (halogenation, hydrohalogenation, peroxidation, hydration, hydrolysis, deamination, alkylation, acylation, etc.), name the products or state their class names.

4. For reaction (a), state the reaction type (S_R, A_E, S_E, etc.), substrate, reagent, reaction center in the substrate and its nature (electrophilic, nucleophilic, etc.). Draw the reaction mechanism, state the type of bond cleavage (homolytic or heterolytic) and the type of organic intermediate(s) formed (carbocation, carboanion, etc.).