D) Soln. of Acidic Salt

$NaHCO_3$

HCO_3^- : Amphoteric

Look at both acid ionization & anion hydrolysis.

1) Acid Ionization

$$HCO_3^- \rightleftharpoons H^+ + CO_3^{2-} \qquad K_{a2} = 5.6 \times 10^{-11}$$

K_a for HCO_3^- acting as an acid

2) Anion Hydrolysis

$$HCO_3^- + H_2O \rightleftharpoons H_2CO_3 + OH^- \qquad K_{a1} = 4.3 \times 10^{-7}$$

(H_2CO_3)

$$K_b = \frac{K_w}{K_{a1}} = 2.3 \times 10^{-8}$$

K_b for HCO_3^- acting as a base

HCO_3^-

This is K_a for the conj acid of bicarbonate, H_2CO_3

$K_b > K_{a2} \Rightarrow$ soln. is Basic

K_b for HCO_3^- acting as a base

K_a for HCO_3^- acting as an acid