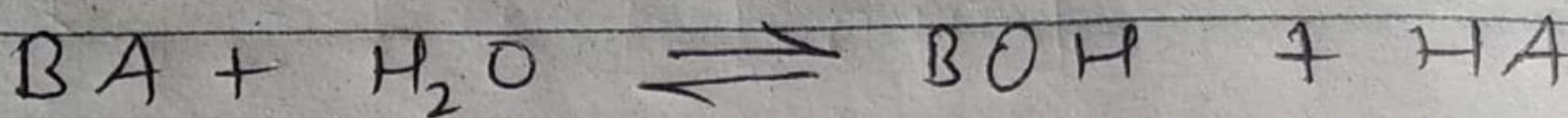


Semester 32
B.Sc. II
Group B

Group No. 1
Date

Hydrolysis Constant (K_h)

General equation



Applying law of chemical equilibrium

$$\frac{[HA][BOH]}{[BA][H_2O]} = K \quad (\text{equilibrium constant})$$

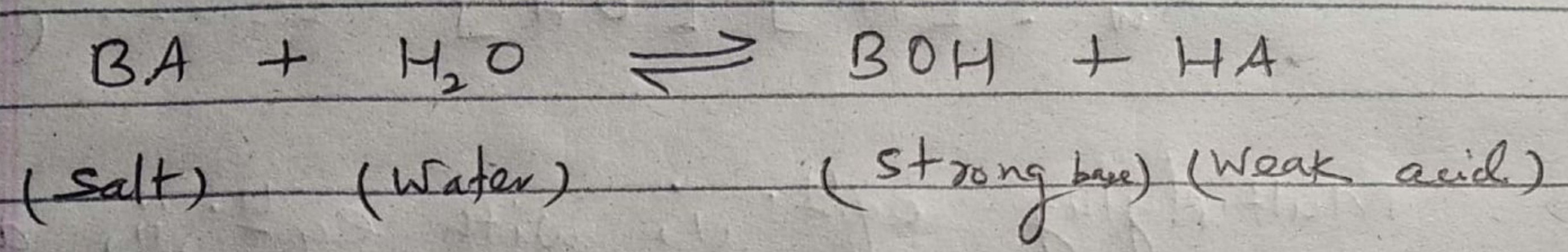
Water present in large excess in solution so consider it as a constant.

then,

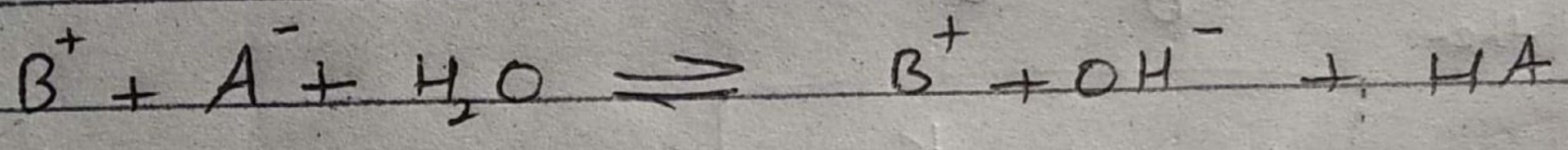
$$\frac{[HA][BOH]}{[BA]} = K[H_2O] = K_h$$

K_h is hydrolysis constant

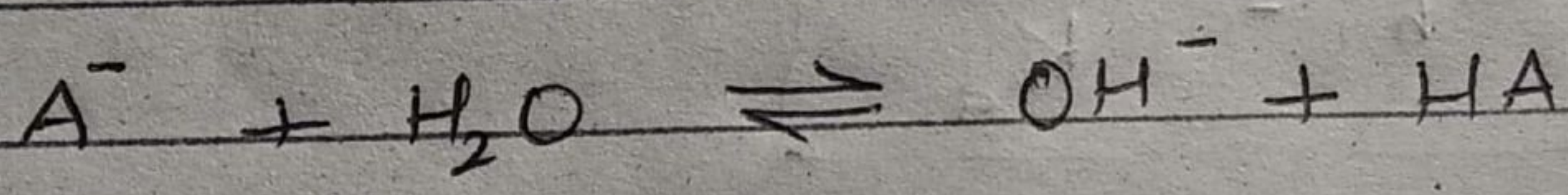
Step I : K_h of salts of weak acid and strong base.



or,



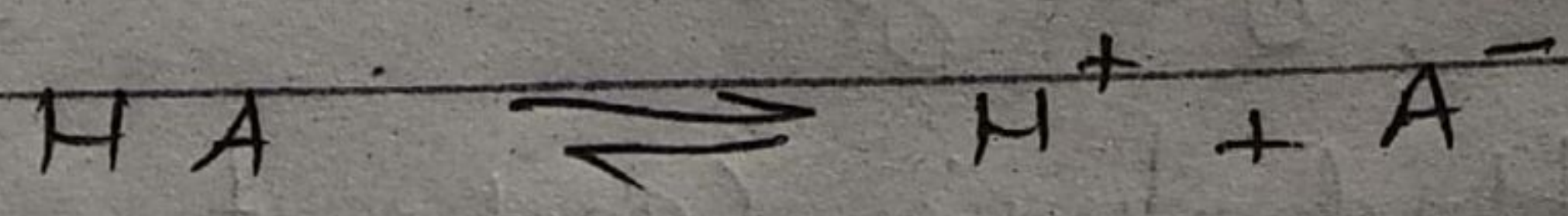
or,



means Anion hydrolysis
hydrolysis constant (K_h)

$$K_h = \frac{[OH^-][HA]}{[A^-]} \quad \dots \dots (i)$$

For the weak acid (HA), the dissociation equilibrium is



∴ Dissociation constant (K_a) is

$$K_a = \frac{[H^+][A^-]}{[HA]} \quad \dots \dots (ii)$$

We know,

Ionic product of water (K_w) is

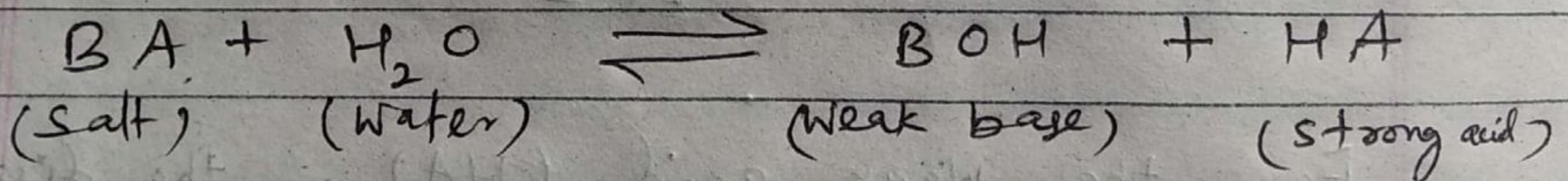
$$K_w = [H^+] [OH^-] \text{ --- (iii)}$$

Multiplying eqⁿ. (i) with eqⁿ. (ii) and dividing by eqⁿ. (iii)

then

$$K_h = \frac{K_w}{K_a} \text{ --- (iv)}$$

Step II : K_h of salts of strong acid and weak base

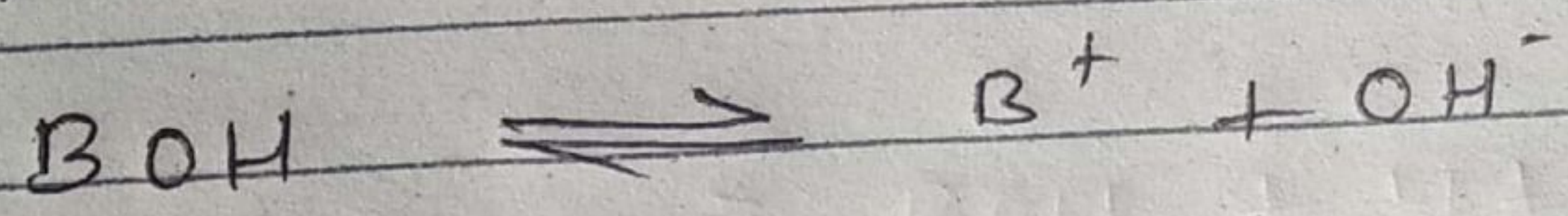


Means Cation hydrolysis

Hydrolysis constant (K_h)

$$K_h = \frac{[BOH] [H^+]}{[B^+]} \text{ --- (i)}$$

BOH weak base, the dissociation equilibrium is



∴ dissociation constant (K_b) is

$$K_b = \frac{[B^+][OH^-]}{[BOH]} \quad \text{--- (ii)}$$

Ionic Product of Water

$$K_w = [H^+][OH^-] \quad \text{--- (iii)}$$

Multiplying eqn. (i) with eqn. (ii) and dividing by eqn. (iii)

then,

$$K_h = \frac{K_w}{K_b} \quad \text{--- (iv)}$$

Step III: K_h of salts of weak acid and weak base

$$K_h = \frac{K_w}{K_a K_b}$$

Teacher's Signature