Acids and Bases

Question 1

(*e*) Write (*i*) the conjugate acid, (*ii*) the conjugate base, of $\mathbf{H_2PO_4^-}$.

Question 2

(*b*) Define a base according to (*i*) the Arrhenius theory, (*ii*) the Brønsted-Lowry theory. (7)

Give (*i*) the conjugate acid, (*ii*) the conjugate base, of $\mathbf{HPO_4^{2-}}$. (6)

Ammonium hydroxide ($\mathbf{NH_4OH}$) is produced by dissolving gaseous ammonia in water.

Question 3

(*e*) Define a conjugate pair according to the Brønsted-Lowry theory.

Question 4

8. (*a*) Define (*i*) acid, (*ii*) conjugate acid, according to the Brønsted-Lowry theory. (8)

In acting as an acid-base indicator methyl orange behaves like a weak acid. Letting **HX** represent methyl orange, it dissociates as follows:

$$\mathbf{HX} \rightleftharpoons \mathbf{H^+ + X^-}$$

In aqueous solution, the undissociated form (**HX**) is red and the dissociated form ($\mathbf{X^-}$) is yellow.

Distinguish between a strong acid and a weak acid. (6)

What is the conjugate base of **HX**? (3)

Question 5

(*e*) What is (*i*) the conjugate acid and (*ii*) the conjugate base of $\mathbf{H_2O}$?

Question 6

8. (*a*) Define (i) *acid*, (ii) *base*, according to the Brønsted-Lowry theory. (8)

(*b*) Identify **one** species acting as an acid, and also identify its conjugate base, in the following system.

$$\mathbf{H_2F^+ + Cl^-} \rightleftharpoons \mathbf{HCl + HF} \quad (6)$$

Question 7

8. (*a*) Define (*i*) *an acid*, (*ii*) *a base* according to the Brønsted-Lowry theory. (8)

Identify the *acid*, and *conjugate acid* in the following system. (6)

$$\mathbf{H_2S + O^{2-}} \rightleftharpoons \mathbf{OH^- + SH^-}$$