## Acids and Bases

**21.** The compound that is not a Lewis acid is
(a) $HSO_4^-$ (b) $AlCl_3$
(c) $BeCl_2$ (d) $NH_3$

**22.** Which of the following dissolves in water to give a neutral solution
(a) $(NH_4)_2SO_4$ (b) $Ba(NO_3)_2$
(c) $CrCl_3$ (d) $CuSO_4$

**23.** Which of the following is the strongest acid
(a) $H_3PO_4$ (b) $H_2SO_4$
(c) $HNO_2$ (d) $CH_3COOH$

**24.** An example of a Lewis acid is
(a) $NaCl$ (b) $25^oC$
(c) $AlCl_3$ (d) $SnCl_4$

**25.** In the equilibrium $HClO_4+H_2O \rightleftharpoons H_2O^+ + ClO_4^-$
(a) $HClO_4$ is the conjugate acid of $H_2O$
(b) $H_2O$ is the conjugate acid of $H_3O^+$
(c) $H_3O^+$is the conjugate base of $H_2O$
(d) $ClO_4^-$ is the conjugate base of $HClO_4$

**26.** Which of the following would be expected to form ionic solution in water
(a) $CCl_4$ (b) $O_2$
(c) $NaBr$ (d) $CHBr_3$

**27.** A solution of sodium bicarbonate in water turns
(a) Phenolphthalein pink
(b) Methyl orange yellow
(c) Methyl orange red
(d) Blue litmus red

**28.** Accepting the definition that an acid is a proton donor, the acid in the following reaction $NH_3 + H_2O \rightarrow NH_4^+ + OH^-$ is
(a) $NH_3$ (b) $H^+$
(c) $NH_4^+$ (d) $H_2O$

**29.** With reference to protonic acids, which of the following statements is correct
(a) $PH_3$is more basic than $NH_3$
(b) $PH_3$is less basic than $NH_3$
(c) $PH_3$is equally basic as $NH_3$
(d) $PH_3$ is amphoteric while $NH_3$ is basic

**30.** $NH_4OH$ is weak base because
(a) It has low vapour pressure
(b) It is only slightly ionized
(c) It is not a hydroxide of metal
(d) It has low density

**31.** $HNO_3$ in liquid hydrogen fluoride behaves
(a) As an acid
(b) As a base
(c) Neither as a base nor as an acid

(d) As a base and as an acid

**32.** Aqueous solution of $CuSO_4.5H_2O$ changes blue litmus paper to red due to
(a) Presence of $Cu^{++}$ ions
(b) Presence of $SO_4^{--}$ ions
(c) Hydrolysis taking place
(d) Reduction taking place

**33.** In the following reaction
$HC_2O_4^- + PO_4^{---} \rightleftarrows HPO_4^{--} + C_2O_4^{--}$
Which are the two Bronsted bases
(a) $0.1MHCN$ and $PO_4^{---}$
(b) $HPO_4^{--}$ and $C_2O_4^{--}$
(c) $NH_4Cl$ and $PO_4^{---}$
(d) $PO_4^{---}$ and $pH$

**34.** Which of the following is the weakest acid
(a) *HF* (b) *HCl*
(c) *HBr* (d) *HI*

**35.** The degree of dissociation in a weak electrolyte increases
(a) On increasing dilution
(b) On increasing pressure
(c) On decreasing dilution
(d) None of these

**36.** $H^+$ is a
(a) Lewis acid
(b) Lewis base
(c) Bronsted-Lowry base
(d) None of the above

**37.** Dissociation of $H_3PO_4$takes place in following steps
(a) 1 (b) 2
(c) 3 (d) 4

**38.** The aqueous solution of disodium hydrogen phosphate is
(a) Acidic (b) Neutral
(c) Basic (d) None

**39.** Which of the following is a conjugated acid-base pair
(a) $HCl, NaOH$
(b) $NH_4Cl, NH_4OH$
(c) $H_2SO_4, HSO_4^-$
(d) $KCN, HCN$

**40.** The solution of strong acid and weak base $NH_4Cl$is
(a) Acidic
(b) Basic
(c) Neutral
(d) None of the above

**41.**