Acids Bases and Salts: Exercise Questions

Q.1 A solution turns red litmus blue, its pH is likely to be
(a) 1 (b) 4 (c) 5 (d) 10
Sol. (d) 10
Since solution turns red litmus blue. So it is a basic solution and its pH value must be greater than 7.

Q.2 A solution reacts with crushed egg-shells to give a gas that turns lime-water milky. The solution contains:
(a) NaCl (b) HCl (c) LiCl (d) KCl
Sol. (b) HCl
Egg shells is made up of calcium carbonate ($CaCO_3$), which reacts with HCl and releases CO_2 gas which turn lime water to milky.

Q.3 10 mL of a solution of NaOH is found to be completely neutralised by 8 mL of a given solution of HCl. If we take 20 mL of the same solution of NaOH, the amount HCl solution (the same solution as before) required to neutralise it will be
(a) 4 mL (b) 8 mL (c) 12 mL (d) 16 mL
Sol. (d) 16 mL
Given: 10 ml of NaOH requires HCl = 8 ml
So, 20 ml of NaOH require HCl = 8 x 2 = 16ml

Q.4 which one of the following types of medicines is used for treating indigestion?
(a) Antibiotic (b) Analgesic (c) Antacid (d) Antiseptic
Sol. (c) Antacid

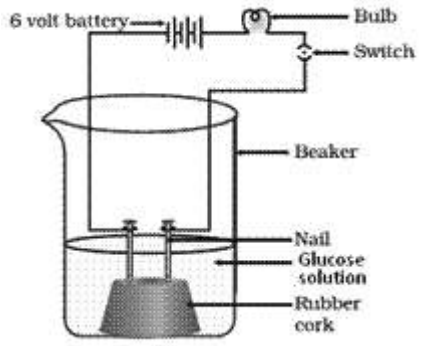
Q.5 Write word equations and then balanced equations for the reaction taking place when –
(a) Dilute sulphuric acid reacts with zinc granules.
(b) Dilute hydrochloric acid reacts with magnesium ribbon.
(c) Dilute sulphuric acid reacts with aluminium powder.
(d) Dilute hydrochloric acid reacts with iron filings.
Sol.
(a) Sulphuric acid (Dil.) + Zinc (s) → Zinc sulphate (aq.) + Hydrogen (g)
H_2SO_4 (aq.) + Zn (s) → $ZnSO_4$ (aq.) + H_2 (g)

(b) Hydrochloric acid (Dil.) + Magnesium → Magnesium chloride (aq.) + Hydrogen (g)
2HCl (aq.) + Mg (s) → $MgCl_2$ (aq.) + H_2 (g)

(c) Sulphuric acid (Dil.) + Aluminium → Aluminium sulphate (aq.) + Hydrogen gas (g)
$3H_2SO_4$ (aq.) + 2Al(s) → $Al_2(SO4)_3$ (aq.) + $3H_2$ (g)

(d) Hydrochloric acid (Dil.) + Iron (s) → Ferric chloride (aq.) + Hydrogen gas (g)
6HCl (aq.) + 3Fe(s) → $3FeCl_2$ (aq.) + $3H_2$ (g)

Q.6 Compounds such as alcohols and glucose also contain hydrogen but are not categorised as acids. Describe an Activity to prove it.
Sol. **Activity:** Take a beaker and insert two nail on rubber cork in it as shown in fig. Now connect these iron nails with bulb, switch and 6 volt battery with help of connecting wires.
Put the solutions of glucose into the beaker and the switch is turned on. The bulb does not glow. It means glucose does not dissociate into ions in the solution. So, glucose is not an acid. Similarly, alcohol is also not an acid.



Q.7 Why does distilled water not conduct electricity, whereas rain water does?

Sol. Distilled water does not contains any ionic compounds. It does not dissociate into ions. So, it does not conduct electricity. While rain water contains dissolved acidic CO_2 gas in it which becomes carbonic acid.

$$CO_2 + H_2O \rightarrow H_2CO_3$$

This carbonic acid dissociates into ions in rain water.

$$H_2CO_3 + 2H_2O \rightarrow (H_3O^+)_2 + CO_3^{-2}$$

These ions are responsible for conduction of electricity.

Q.8 Why do acids not show acidic behaviour in the absence of water?

Sol. In absence of water, acids do not dissociated in to ions. So, they do not show acidic behaviour.

Q.9 Five solutions A, B, C, D and E when tested with universal indicator showed pH as 4, 1, 11, 7 and 9, respectively. Which solution is:

(a) Neutral?
(b) Strongly alkaline?
(c) Strongly acidic?
(d) Weakly acidic?
(e) Weakly alkaline?

Arrange the pH in increasing order of hydrogen-ion concentration.

Sol.

(a) **Neutral**: D
(b) **Strongly alkaline:** C
(c) **Strongly acidic:** B
(d) **Weakly acidic:** A
(e) **Weakly alkaline:** E

Increasing order of H^+ concentration: C (pH-11) < E (pH-9) < D (pH-7) < A (pH-4) < B (pH-1).

Q.10 Equal lengths of magnesium ribbons are taken in test tubes A and B. Hydrochloric acid (HCl) is added to test tube A, while acetic acid (CH_3COOH) is added to test tube B. In which test tube will the fizzing occur more vigorously and why?

Sol. HCl is a strong acid and dissociate more. While acetic is a weaker acid. So, in test tube A, fizzing occur more vigorously.

Q.11 Fresh milk has a pH of 6. How do you think the pH will change as it turns into curd? Explain your answer.

Sol. The fresh milk is converted in to due to formation of lactic acid which means its pH will reduce from 6.

Q.12 A milkman adds a very small amount of baking soda to fresh milk.
(a) Why does he shift the pH of the fresh milk from to slightly alkaline?
(b) Why does this milk take a long time to set as curd?
Sol. (a) Milkman shifted the pH of the fresh milk from slightly alkaline because baking soda is alkaline and from this, he wants to prevent the milk from getting sour due to the formation of lactic acid.
(b) This milk takes a long time to set as curd because now this milk has become alkaline due to baking soda and curd needs acidic condition to set.

Q.13 Plaster of Paris should be stored in a moisture-proof container. Explain why?
Sol. Plaster of Paris should be stored in a moisture-proof container because moisture slows down the setting of Plaster of Paris due to hydration. This will make the plaster useless.

Q.14 what is a neutralisation reaction? Give two examples.
Sol. When an acid and a base react each other and form a salt and water, this reaction is known as a neutralisation reaction.
$NaOH\ (aq.) + HCl\ (aq.) \rightarrow NaCl\ (aq.) + H_2O\ (l)$
$Mg(OH)_2\ (aq.) + H_2SO_4\ (aq.) \rightarrow MgSO_4\ (aq.) + H_2O\ (l)$

Q.15 Give two important uses of washing soda and baking soda.
Sol.
Important uses of Washing Soda:
(i) Washing soda is used different industries.
(ii) It is used in the production of sodium compounds like-borax.
(iii) It is used in domestically as water softener.

Important Uses of Baking Soda:
(i) Sodium hydrogen carbonate is also an antacids. It neutralises excess acid in our stomach and provides relief.
(ii) It is also used for making baking powder which is used to make the cakes, bread etc.