परमाणु ऊर्जा शिक्षण संस्था
Atomic Energy Education Society
WORK SHEET- Ans key

CLASS—X **MAX.MARKS—80**

Chapter: Acids, Bases & Salts

Section-A

I. This section has 10 multiple choice questions only ONE option is correct. (10 x 1M=10M)

1. (d) All (a), (b) and (c)
2. (a) 7.0 to 7.8
3. (b) H_2SO_4 (*aq*)
4. (c) absorb moisture from the gas
5. (b) Sodium Zincate and hydrogen gas
6. (d) bases, which are soluble in water
7. (a) Methanoic acid
8. (a) pink
9. (a) NaOH
10. (b) X: Zinc; Y: hydrogen.

II. Answer the following questions in brief: (10 x 1M=10M)

11. A substance which gives different colour in acid or base is known as an indicator.
12. An acid produce hydrogen ion [H^+] in aqueous solution. Presence of H^+ is responsible for their acidic properties.
13. When an acid solution is diluted then the concentration of hydronium ions decreases.
14. The solution 'A' with pH 5 is acidic in nature.
15. Salts having the same +ve or –ve radicals are said to belong to the same family. NaCl, KCl, $CaCl_2$, $MgCl_2$ etc belong to the same family of salts called the family of Chloride salts.
16. NaOH, Cl_2 gas and H_2 gas.
17. Calcium Sulphate hemihydrate – $CaSO_4.½H_2O$.
18. $Ca(OH)_2$.
19. Washing Soda $Na_2CO_3.10H_2O$
20. H_2 gas formed gets released.

SECTION -B

III. Answer the following questions: (10 x 2M=20M)

21. A base give OH^- ions in water (1M). NaOH reacts with Zinc to liberate H_2gas with the formation of Sodium Zincate. (½M). NaOH + Zn ---→ Na_2ZnO_2 + H_2 ↑.
Sodium Zincate

22. ANY TWO:

i) Odour: It smells like vinegar & sour in taste.

ii) Solubility in water: It is soluble in water & exhibits acidity.

$CH_3COOH\ (l) + H_2O\ (l) \rightarrow CH_3COO^-\ (aq) + H_3O^+\ (aq)$

iii) Effect on Litmus Paper: If we put a drop of the given colourless liquid on blue litmus paper, if the litmus paper changes to Red, then the given acid is Acetic acid [CH_3COOH].

iv) Reaction with $NaHCO_3$, liberates CO_2, which turns lime water milky.

$CH_3COOH\ (l) + NaHCO_3\ (s) \rightarrow CH_3COONa + CO_2\ (g) + H_2O\ (l)$

$Ca(OH)_2 + CO_2\ (g) \rightarrow CaCO_3\ (s) + H_2O\ (l)$

23. A colourless gas is evolved with brisk effervescence from the test tube.

When a burning matchstick is brought near the gas, the gas burns with a 'pop' sound. The gas evolved is H_2gas.

24. H_2 gas. Equation: $Zn + 2HCl\ (dil) \rightarrow ZnCl_2 + H_2\uparrow$.

25. Those substances whose smell changes in acidic r basic solutions are called olfactory indicators. E.g.: Vanilla essence, onion, clove.

26. CO_2 gas is evolved with brisk effervescence.

$2CH_3COOH + Na_2CO_3 \rightarrow 2CH_3COONa + H_2O + CO_2\ (g)$

Both reactants have to dissociate first in water, their ions then interchange species. Here the 2 Cations Na+ leave the molecule of Carbonate, are attracted by the negative charge of acetate and bond to it. The H^+ is attracted by the CO_3^{--} and molecule of water is formed, a molecule of CO_2 gas is created and tends to join with others to form CO_2 bubbles within the solution to flee it thru its surface.

27. Without aqueous medium, HCl will not ionise to form hydrogen ions (H^+). Hence, it will not show the acidic behaviour.

28. i) The acid is to be added slowly in the water to prevent the mixture to be splashed.

ii) Dilution.

29. i) $Ca(OH)_2 + Cl_2 \rightarrow CaOCl_2 + H_2O$.

ii) $2NaHCO_3 \rightarrow Na_2CO_3 + H_2O + CO_2\ (g)$

30. i) Used in textile industry for bleaching cotton.

ii) Used to disinfect drinking water. OR any other correct answer.

SECTION-C

IV. Answer the following questions **(5 x 3M= 15 M)**

31. i) Acids react with metals to give out H_2gas.

$Zn + 2HCl \rightarrow ZnCl_2 + H_2$.

ii) They react with bases to form salt and water.

$2NaOH + H_2SO_4 \rightarrow Na_2SO_4 + 2H_2O$.

iii) They react with metal Carbonates to liberate CO_2 gas.

$Na_2CO_3 + 2HCL \rightarrow 2\ NaCl + H_2O + CO_2$.

32. i) 'X': $NaNO_3$ (Sodium Nitrate).
iv) 'Y': H_2SO_4 (Sulphuric acid).
v) 'Z': KOH (Potassium Hydroxide)

33. a) Chlor-alkali process.

b) $2NaCl\ (aq) + 2H_2O \rightarrow 2NaOH\ (aq) + Cl_2\ (g) + H_2\ (g)$

34. a) Alkali (NaOH or KOH)

b) When pH of mouth becomes less than 5.5. It can be prevented by using toothpastes which are generally basic.

35. 1) Antacids have been developed on the basis of neutralisation reactions.

2) Toothpastes are basic in nature which neutralises the excess of acid produced in our mouth.

3) Milkmen add a very small amount of baking Soda to milk to neutralise the acetic acid produced in the milk.

SECTION-D

V. Answer the following Long Answer Questions (5 x 5M= 25 M)

34 **a**) Hydrated Copper sulphate $CuSO_4.5H_2O$

Anhydrous Copper Sulphate $CuSO_4$ copper sulphate crystals contain water of crystallisation. Its formula is $CuSO_4.5H_2O$.

On heating the water molecules break away and appear in the form of tiny water droplets on the upper portion of the test tube:

$CuSO_4 + 5H_2O \rightarrow CuSO_4.5H_2O$
(Anhydrous Copper Sulphate)

Copper Sulphate crystals which seem to be dry water of crystallisation. When we heat the crystals, water is removed, and the salt turns white. If you moisten the crystals again with water, you will find that blue colour of the crystals reappears.

Water of crystallisation is the fixed number of water molecules present in one formula unit of a salt. Five water molecules are present in one formula unit of copper sulphate, chemical formula of hydrated copper sulphate is $CuSO_4.5H_2O$.

b) Calcium Sulphate hemihydrate: $CaSO_4.½\ H_2O$

Calcium Sulphate dihydrate: $CaSO_4.2H_2O$.

35 a) Chemical name of Plaster of Paris is Calcium Sulphate hemihydrate. Chemical formula of Plaster of Paris is: $CaSO_4.\ ½\ H_2O$.

b) When it is mixed with water, crystals of gypsum are produced and set into hard mass.

$CaSO_4.\ ½H_2O + 3/2H_2O \rightarrow CaSO_4.2H_2O$
Plaster of Paris Gypsum

c) Uses of Washing Soda:

i) It is used in softening of hard water.

ii) It is used as cleaning agent for domestic purposes.

d) Caustic Soda (NaOH) is obtained by the electrolysis of aqueous solution of Sodium Chloride (called brine) and the process is called Chlor-alkali. Products obtained during this process are chlorine and hydrogen.

$2NaCl\ (aq) + 2H_2O\ (l)$ ------Electric current-----→ $2NaOH\ (aq)$ + $Cl_2\ (g)$ + $H_2\ (g)$
At Cathode at Anode at Cathode

36. a) Metal Carbonates and metal hydrogen carbonates react with acids to give corresponding salt, carbon-dioxide and water.

b) i) Metal Carbonate: $Na_2CO_3\ (s) + 2HCl\ (aq)$ --→ $2NaCl\ (aq) + H_2O\ (l) + CO_2\ (g)$

ii) Metal hydrogen Carbonate: $NaHCO_3\ (s) + HCl\ (aq)$ --→ $NaCl\ (aq) + H_2O\ (l) + CO_2\ (g)$.

c) Gas evolved is carbon-di-oxide (CO_2).

d) When this gas is passed through lime water, it turns milky.

37 a) Hydrochloric acid and sodium hydroxide. NaCl, Sodium Chloride, ocean water.

b) Deposits of solid salt are found in several parts of the world. These large crystals are called rock salt. Brown colour, due to impurities.

c) $2NaCl + 2H_2O$ ----Electricity -----→ $2NaOH$ + Cl_2 + H_2
At Cathode At Anode At Cathode

38 a) The common name of $CaOCl_2$ is Bleaching powder. It is formed by passing chlorine gas into [$Ca(OH)_2$] slaked lime. $Ca(OH)_2 + Cl_2\ (g)$--------→ $CaOCl_2$.

Two uses:

i) Used for bleaching cotton and linen in the textile industry and wood pulp in paper industry, etc.

ii) It is used for disinfecting drinking water.

b) Washing Soda: $Na_2CO_3.10H_2O$.

By heating baking soda, sodium carbonate is obtained, its recrystallisation gives washing soda. $2NaHCO_3$ -------Heat --→ $Na_2CO_3 + H_2O + CO_2$.

$Na_2CO_3 + 10\ H_2O$ -----→ $Na_2CO_3.10H_2O$

SECTION-E

This section has Source based/ Case based questions.

Read the following and answer any four questions from i) to v) 4M

39. i) a) **Turmeric**

ii) (c) **NaOH**. Blue litmus turns red, it means the solution is acidic. Excess addition of base would reverse the change.

iii) (c) **Green.** After adding a universal indicator, yellow to red indicate an acidic solution, blue to violet indicate alkali and green colour indicates that a solution is neutral.

iv) (a) '**A' is strongly basic and 'B' is a weak base**. 'A; turns phenolphthalein pink so it is basic in nature and its pH is greater than 7. On adding 'B; to 'A', pink colour disappears it means it is acidic in nature, so its pH is less than 7.

v) (c) **Green.** Both the acid and base are strong, so they neutralise each other and the colour of neutral solution on universal indicator is green.
