SHREE RADHEY COACHING CENTER

Plot No. 233 Flat no. 102 Niti Khand 1 Indirapuram

CLASS 10 - SCIENCE

Assignment 3

Time Allowed: 3 hours **Maximum Marks: 150**

Section A

1. Name an alloy that contains a non-metal as one of its constituents.
2. Name one property which is not shown by ionic compounds.
3. Name two metals that are obtained by electrolysis of their chlorides in molten form.
4. A non-metal X exists in two different forms Y and Z. Y is hardest natural substance, whereas Z is a good conductor of electricity. Identify X, Y arid Z.
5. Generally, when metals are treated with mineral acids, hydrogen gas is liberated but when metals (except Mn and Mg) are treated with HNO_3, hydrogen is not liberated, why?
6. Write the IUPAC names of the following:
   (i) CH_3OH
   (ii) CH_3COOH
7. "Carbon tetrachloride is not a good conductor of electricity". Give reason to justify this statement.
8. What are constituents of an antifreeze?
9. What happens when a small piece of sodium is dropped into ethanol?
10. An organic compound is a constituent of beer, whisky and some cough syrup. It is produced by the fermentation of sugar. Identify the organic compound.
11. By considering their position in the periodic table, which one of the following elements would you expect to have maximum metallic characteristic?
    Ga, Ge, As, Se and Br
12. Account for the following: Elements of group 17 are monovalent.
13. Give the name and electronic configuration of second alkali metal?
14. What happens to metallic character as we move from left to right in the periodic table?
15. Arrange the following in descending atomic size Na, Mg, K

Section B

16. i. If vapour of dry ammonia gas are brought in contact with red litmus strip, what will happen to the colour of the litmus strip?
    ii. Name the metal whose foils are used for the packing of food materials.
17. Give reason for the following:
    i. School bells are made up of metals.
    ii. Electrical wires are made up of copper.
18. Give reasons for the following: Zinc oxide is considered as an amphoteric oxide.
19. A cleaned aluminium foil was placed in an aqueous solution of zinc sulphate. When the aluminium foil was taken out of the zinc sulphate solution after 15 minutes, its surface was found to be coated

with a silvery grey deposit. From the given observation, what can be concluded?

20. Two elements A and B belong to the 3rd period of modern periodic table and are in group 2 and 13 respectively. Compare their following characteristics in tabular form:
    i. Number of electrons in their atoms
    ii. Size of their atoms
    iii. Their tendencies to lose electrons
    iv. The formula of their oxides
    v. Their metallic character
    vi. The formula of their chlorides
21. Two elements X and Y have atomic number 12 and 16 respectively. Write the electronic configuration of these elements. State the period of these elements. What type of bond will be formed if these two elements combine together?
22. An atom has electronic configuration 2, 8, 7.
    (a) What is the atomic number of this element?
    (b)To which of the following elements would it be chemically similar?
    (Atomic numbers are given in parentheses.)
    N(7), F(9), P(15), Ar(18)
23. Write the formulae of chlorides of Eka-silicon and Eka-aluminium, the elements predicted by Mendeleev.
24. Two carbon atoms cannot be linked to each other by more than three covalent bonds. Why?
25. Why does micelle formation take place when soap is added to water? Will a micelle be formed in other solvents such as ethanol also.
26. Draw the structures of the following compounds: Hexanal
27. Why conversion of ethanol into ethanoic acid is an oxidation reaction?
28. Justify the nature of physical and chemical properties of compounds of homologous series.
29. Why is the conversion of ethanol to ethanoic acid an oxidation reaction?
30. A cyclic compound X has molecular formula C_6H_6. It is an unsaturated compound and burns with sooty flame. Identify X and write its structural formula.. Will it decolourise bromine water or not and why?
31. What is 'baking powder'? How does it make the cake soft and spongy?
32. A dry pellet of a common base B when kept in open absorbs moisture and turns sticky. The compound is also a by-product of chlor-alkali process.
    i. Identify B.
    ii. What type of reaction occurs when B is treated with an acidic oxide?
    iii. Write a balanced chemical equation for one such solution.
33. Write an equation to show the reaction between Plaster of Paris and water.
34. Identify the type of chemical reaction taking place in each of the following.
    i. Barium chloride solution is mixed with a copper sulphate solution and a white precipitate is observed.
    ii. On heating copper powder in the air in a China dish, the surface of copper powder turns black.
    iii. On heating, green coloured ferrous sulphate crystals, reddish brown solid is left and the smell of a gas having the odour of burning sulphur is experienced.

iv. Iron nails when left dipped in blue copper sulphate solution become brownish in colour and the blue colour of copper sulphate fades away.

v. Quicklime reacts vigorously with water releasing a large amount of heat.

35. In the reaction:

$MnO_2 + 4HCl \rightarrow MnCl_2 + 2H_2O + Cl_2$

a. Name the compound

i. oxidised

ii. reduced.

b. Define oxidation and reduction on its basis.

Section C

36. i. State the litmus test to distinguish between an alcohol and a carboxylic acid.

ii. Give the equation for the reaction of a carboxylic acid with an alcohol. State the condition for the reaction and name the product formed. What is this reaction known as?

iii. Write a reaction which is reverse of this reaction? Mention the conditions required for the reaction. Name and write the use of this reaction.

37. Identify the compounds A to E in the following reaction sequence.

i. $CH_3CH_2OH \xrightarrow{KMnO_4+KOH} A$

ii. $CH_3CH_2OH + A \xrightarrow[\triangle]{Conc.\ H_2SO_4} B$

iii. $B + NaOH \rightarrow C + CH_3CH_2OH$

iv. $A + NaHCO_3 \rightarrow C + D + H_2O$

v. $CH_3CH_2OH + E \rightarrow CH_3CH_2ONa + H_2$

38. i. How is vinegar made?

ii. What is glacial acetic acid? What is its melting point?

iii. Why is butanoic acid a weak acid?

iv. Write the name and the formula of the two compounds formed when the ester, $CH_3COOC_2H_5$ undergoes saponification.

39. Write the chemical formula and name of the compound which is the active ingredient of all alcoholic drinks. List its two uses. Write the chemical equation and name of the product formed when this compound reacts with -

a. sodium metal

b. hot concentrated sulphuric acid

40. i. What is the difference between combustion and oxidation?

ii. Under what condition an oxidation reaction can be called as combustion?

iii. Illustrate your answer with one example in each case.

41. The electronic configuration of three elements X, Y and Z are given below:

X = 2; Y = 2, 6; Z = 2, 8,2

i. Which element belongs to the second period?

ii. Which element belongs to the eighteenth group?

iii. Which element belongs to the second group?

iv. What is the valency of Y?

v. Y and Z are metal or non-metal.

42. Consider two elements A (atomic number = 17) and B (atomic number = 19)

i. Write the positions of these elements in the modern periodic table giving justification.

ii. Write the formula of the compound formed when A combines with B.

iii. Draw the electron dot structure of the compound and state the nature of the bond formed between the two elements.

43. a. List any three observations which posed a challenge to Mendeleev's Periodic Law.

b. How does the metallic character of elements vary on moving from

i. left to right in a period,

ii. from top to bottom in a group of the Modern Periodic Table? Give reason for your answer.

44. When CO_2gas pass through saturated solution of ammonical brine, two compound 'X' and 'Y' are formed. 'Y' is used as antacid and decomposes to form another solid 'Z'. Identify 'X', 'Y', 'Z' and write the chemical equations.

45. i. What is meant by pH?

ii. Water is a neutral substance. What colour will you get when you add a few drops of universal indicator to a test tube containing distilled water?

iii. Two solutions A and B have pH values of 3.0 and 9.5, respectively. Which of these will turn litmus solution from blue to red and which will turn phenolphthalein from colourless to pink?

46. i. Predict the reaction, if any, between

a. zinc and silver nitrate solution,

b. magnesium and iron (II) chloride solution,

c. copper and magnesium sulphate solution.

Write the equations, with its physical form symbols, for the reaction.

ii. A lump of element X can be cut by a knife. During its reaction with water, X floats and melts. What is X? Explain.

47. What chemical process is used for obtaining a metal from its oxide.

48. How is copper obtained from its ore (Cu_2S)? Write only the chemical equations. How is copper thus obtained refined? Name and explain the process alongwith a labelled diagram.

49. Convert the following word equations to balanced chemical equations.

(1) Hydrogen gas combines with nitrogen to from ammonia.

(2) Hydrogen sulphide gas burns in air to give water and sulphur dioxide.

(3) Barium chloride reacts with aluminium sulphate to give aluminium chloride and a precipitate of barium sulphate.

(4) Potassium metal reacts with water to give potassium hydroxide and hydrogen gas.

(5) Hydrogen sulphide gas reacts with oxygen gas to form solid sulphur and liquid water.

50. Write the formula and then balance the following equations.

a. Butane (C_4H_{10}) + Oxygen $\rightarrow$ Carbon dioxide + Water

b. Magnesium + Silver nitrate $\rightarrow$ Magnesium nitrate + Silver

c. Lime water + Carbon dioxide $\rightarrow$ Calcium carbonate + Water

d. Sodium + Water $\rightarrow$ Sodium hydroxide + Hydrogen

e. Calcium carbonate + Water + Carbon dioxide $\rightarrow$ Calcium bicarbonate