CHEMISTRY

BOOKS - S DINESH & CO CHEMISTRY (HINGLISH)

METALS AND NON-METALS

Example Solution

1. Four test tubes were taken and marked A, B, C and D respectively. 2 mL of solution of $Al_2(SO)_3$ in water was filled in each of the four test-tubes. Clean piece of metal zinc was placed in test tube A, clean iron nail was put in test tube B, clean copper wire was placed in test tube C and a clean aluminium wire was placed in test tube D. What colour change would you observe in all the four tubes ?

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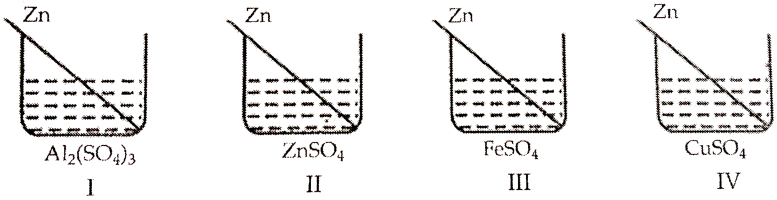
2. Four students A,B,C and D noted the initial colour of the solutions in beakers I, II, III and IV. After inserting zinc rods in each solution and leaving it undisturbed for two hours, noted the colour of each solution again.



They recorded their observations in thr form of a table given below:

Student	Colour of the solution	I	II	III	IV
A	Initial Final	Colourless Colourless	Colourless Colourless	Light green Colourless	Blue Colourless
B	Initial Final	Colourless Colourless	Light yellow Colourless	Light green Light green	Blue Colourless
C	Initial Final	Colourless Light blue	Colourless Colourless	Light green Colourless	Blue Light blue
D	Initial Final	Light green Colourless	Colourless Colourless	Light green Dark green	Blue Colourless

Which student noted the colour change in all four beakers correctly?

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3. A group of students looked at different metals and metal sulphate solutions given in a tabular form. From the data answer the following :

(i) Which metal reacted with all other metal sulphate solutions ?

(ii) Which metal did not react with any other metal sulphate solution ?

(iii) Put the metals in decreasing order of reactivity.

(iv) Iron is slightly more reactive than cobalt. With which other metal sulphate solution, will it react ?

Metal	Metal sulphate solution	Colour
Chromium	Chromium sulphate	green
Cobalt	Cobalt sulphate	pink
Copper	Copper sulphate	blue
Magnesium	Magnesium sulphate	Colourless

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4. (i) Choose one metal from the reactivity series which will not react with stream.

(ii) Choose one metal from the reactivity series which will safely react with dilute sulphuric acid.

(iii) Name the salt formed when your chosen metal in (ii) reacts with sulphuric acid.

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5. From the options given along the side of each statement, select the most appropriate.

(i) A metal that gets covered with a protective film of its oxide : Al, Cu, Ag

(ii) A metal which burns in air will golden flame : Zn, K, Na

(iii) A metal which can displace hydrogen from boiling water as well as steam : K, Zn, Fe

(iv) A metal that does not react with air at room temperature. : Na, Mg, Ca

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6. (a) in the formation of compound between two atoms A and B, loses two electrons and B gains one electron.

(i) What is the nature of bond between A and B ?

(ii) Suggest the formula of the compound formed between A and B.

(b) On similar lines explain the formation of $MgCl_2$ molecule.

(c) Common salt conducts electricity only in the molten state. Why ?

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NCERT

1. Give an example of a metal which

(i) is a liquid at room temperature.

(ii) can be easily cut with a knife.

(iii) is the best conductor of heat.

(iv) is a poor conductor of heat

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2. Explain the meanings of malleable and ductile.

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3. Why is sodium kept immersed in kerosene oil?

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4. Write equations for the reactions of

(i) iron with steam

(ii) calcium and potassium with water

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5. Samples of four metals A, B, C and D were taken and were added to the following solutions one by one.

The results obtained have been tabulated as follows :

Metal	Solution to which metal is added		
	Iron(II) sulphate	Copper(II) sulphate	Zince sulphat
A	No reaction	Displacement	—
B	Displacement	—	No reaction
C	No reaction	No reaction	No reaction
D	No reaction	No reaction	No reaction

Use the table given above to answer the following questions :

(a) Which is the most reactive metal ?

(b) What would you observe when B is added to solution of copper(II) sulphate ?

(c) Arrange the metals A, B, C and D in order of increasing reactivity.

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6. Which gas is produced when dilute hydrochloric acid is added to a reactive metal? Write the chemical reaction when iron reacts with dilute H_2SO_4.

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7. What would you observe when zinc is added to a solution of iron (II) sulphate?

Write the chemical reaction that takes place.

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8. (i) Write the electron-dot structures for sodium, oxygen and magnesium.

(ii) Show the formation of Na_2O and M_gO by the transfer of electrons.

(iii) What are the ions present in these compounds?

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9. Why do ionic compounds have high melting points?

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10. Define the following terms.

(i) Mineral

(ii) Ore

(iii) Gangue

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11. Name two metals which are found in nature in the free state.

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

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13. Metallic oxides of zinc, magnesium and copper were heated with the following metals.

Metal	Zinc	Magnesium	Copper
Zinc oxide			
Magnesium oxide			
Copper oxide			

In which cases will you find displacement reactions taking place?

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14. Which metals do not corrode easily?

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15. What are alloys?

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16. Which of the following pairs will give displacement reactions?

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17. Which of the following methods is suitable for preventing an iron frying pan from rusting?

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18. An element reacts with oxygen to give a compound with a high melting point. This compound is also soluble in water. The element is likely to be

(a)

(b)

(c)

(d)

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19. Food cans are coated with tin and not with zinc because

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20. You are given a hammer, a battery, a bulb, wires and a switch.

(a) How could you use them to distinguish between samples of metals and non-metals?

(b) Assess the usefulness of these tests in distinguishing between metals and non – metals.

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21. What are amphoteric oxides? Give two examples of amphoteric oxides.

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22. Name two metals which will displace hydrogen from dilute acids, and two metals which will not.

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23. In the electrolytic refining of a metal M, what would you take as the anode, the cathode and the electrolyte?

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24. Pratyush took sulphur powder on a spatula and heated it. He collected the gas evolved by inverting a test tube over it, as shown in figure below.

(a) What will be the action of gas on

(i) dry litmus paper?

(ii) moist litmus paper?

(b) Write a balanced chemical equation for the reaction taking place.

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25. State two ways to prevent the rusting of iron.

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26. What type of oxides is formed when non-metals combine with oxygen?

Watch Video Solution

27. Give reasons

(a) Platinum, gold and silver are used to make jewellery.

(b) Sodium, potassium and lithium are stored under oil.

(c) Aluminium is a highly reactive metal, yet it is used to make utensils for cooking.

(d) Carbonate and sulphide ores are usually converted into oxides during the process of extraction.

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28. You must have seen tarnished copper vessels being cleaned with lemon or tamarind juice. Explain why these sour substances are effective in cleaning the vessels.

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29. A man went door to door posing as a goldsmith. He promised to bring back the glitter of old and dull gold ornaments. An unsuspecting lady gave a set of gold bangles to him which he dipped in a particular solution. The bangles sparkled like new but their weight was reduced drastically. The lady was upset but after a futile argument the man beat a

hasty retreat. Can you play the detective to find out the nature of the solution he had used?

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30. Give reasons why copper is used to make hot water tanks and not steel (an alloy of iron).

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31. Differentiate between metal and non-metal on the basis of their chemical properties.

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Very Short Answer Questions

1. (a) Name the most abundant metal in the earth's crust.

(b). Name the most abundant non-metal in the earth's crust.

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2. Giving examples differentiate between roasting and calcination.

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3. Write the chemical formula of rust.

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4. Name the process used for the enrichment of sulphide ore.

Watch Video Solution

5. Out of zinc and iron, which evolves hydrogen more readily on reacting with dilute HCl ?

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6. How do alloys brass and bronze differ in composition ?

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7. Does german silver contain silver in it ?

Watch Video Solution

8. Write the chemical formulae of the main ores of iron and aluminium.

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9. Name the non-metal which can conduct electricity.

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10. Write the names of two neutral oxides.

Watch Video Solution

11. Name the chemical formula of zinc blende and galena.

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12. Write one example each of :

(i) a metal having low melting point and a metal having high melting point.

(ii) a metal which is a poor conductor of electricity and a non-metal which is a good conductor of electricity.

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13. Which acts as anode in the electro-refining of metals ?

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14. Which is the name of the bond formed when a metal atom combines with the atom of a non-metal ?

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15. How will you account for the high melting points of salts ?

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16. Name two metals which exist in the native or free state.

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17. What reaction takes place when manganese dioxide is heated with aluminium powder ?

Watch Video Solution

18. Can rusting of iron nail occur in distilled water ?

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19. Which metal is the best conductor of electricity ?

Watch Video Solution

20. Which metal is used in amalgams ?

Watch Video Solution

21. Why are metals good conductors of electricity while non-metals are not ?

Watch Video Solution

22. Why do metals generally appear to be dull ?

Watch Video Solution

23. Name two non-metals which exist in the solid state the two non-metals which exist in the gaseous state.

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24. Name metal whose foils are used for the packing of food materials.

A. Silver

B. Copper

C. Aluminium

D. gold

Answer: C

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25. The electronic configuration of an elements 'E' (Z = 16) is 2, 8, 6. Will it lose six electrons or gain two electrons easily ?

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26. Alloys are used in electrically heating devices rather that pure metals. Give one reason.

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27. A shining metal 'X' on heating gives copper (II) oxide or cupric oxide. The metal 'X' is

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28. Why do silver articles become black after some time ?

Watch Video Solution

29. Name a metal other than aluminium that is covered with a layer of oxide film.

Watch Video Solution

30. What is the common feature in the electronic configuration of metal atoms ?

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31. Name one metal and one non-metal which exist in liquid state at room temperature ?

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32. What changes do you observe in the iron nails and colour of copper sulphate solution if the nails are dipped in $CuSO_4$ solution for 15 minutes ?

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33. What are amphoteric oxides? Give two examples of amphoteric oxides.

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34. Name a non-metal which is lustrous and a metal which is non-lustrous.

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35. Give the electronic configuration of an element having atomic number 11.

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36. 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 and Z.

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37. Aluminium occurs in the combined state while gold does not. Why ?

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38. If copper metal is heated over a flame, it develops a coating. What is the colour and composition of this coating ?

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39. Why does not stainless steel get rusted easily ?

Watch Video Solution

40. Why can we use gold and platinum in jewellery ?

Watch Video Solution

41. Give chemical names of the two salts belonging to sodium family.

Watch Video Solution

42. Name any one alloy made from (i) a metal and a non-metal (ii) two metals.

Watch Video Solution

43. Why do we apply paint on iron articles?

Watch Video Solution

44. Explain why calcium metal after reacting with water starts floating on its surface. Write the chemical equation for the reaction.

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45. Name two metals which can be used to reduce to metal oxides to metals.

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46. The wires carrying current in homes have a coating of PVC. Why ?

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47. Name the following :

(a) A metal which is preserved in kerosene (b) A lustrous coloured non-metal

(c) A metal which can melt while kept on palm (d) A metal which is poor conductor of heat.

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48. 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 and Z.

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49. Name a non-metal which reacts with very dilute nitric acid to evolve hydrogen.

Watch Video Solution

50. If copper metal is heated over a flame, it develops a coating. What is the colour and composition of this coating ?

Watch Video Solution

51. Why does not stainless steel get rusted easily ?

Watch Video Solution

52. Why can we use gold and platinum in jewellery ?

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56. Write the balanced chemical equation for the chemical reaction between manganese dioxide and aluminium power. What happens if manganese powder is heated with aluminium oxide ?

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Watch Video Solution

57. Ionic solids conduct electricity in the molten state and not in the solid state. Explain.

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58. In one method of rust prevention, the iron is not coated with anything.which is this method?

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59. The wires carrying current in homes have a coating of PVC. Why ?

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60. Aluminium oxide and zinc oxide react with both acids are bases to produce salt and water. What are these oxides called ? Write chemical

equation in each case.

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61. Name the constituents elements of the alloys (i) Brass (ii) Bronze (iii) Solder. Mention one use of each alloy.

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62. Out of silver and copper metals, which is more reactive and why ?

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63. Explain why the surfaces of some metals become dull when exposed to air for sometime.

Watch Video Solution

64. why are metals called electropositive elements whereas non-metals are called electronegative elements?

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65. What happens when a piece of sodium metal is dropped in water taken in a beaker ?

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66. A copper coin is kept immersed in a solution of silver nitrate for some time. What will happen to the coin and the colour of the solution?

Watch Video Solution

67. Which allotrope of carbon is used for making electrodes?

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Short Answer Questions

1. Which important properties of aluminium are responsible for its great demand in industry ?

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2. Name an alloy of

(i) Aluminium used in construction of air crafts.

(ii) Lead in joining metals for electric welding.

(iii) Copper used in household vessels.

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3. Why is titanium called a strategic metal ? Mention two of its properties which make it so special.

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4. A copper plate was dipped into a solution of $AgNO_3$. After sometime, a black layer was deposited on the copper plate. State the reason for it. Write the chemical equation for the reaction involved.

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5. On placing a piece of zinc metal in a solution of mercuric chloride, it acquires a silvery surface but when it is placed in a solution of magnesium sulphate, no change is observed. State the reason for the behaviour of zinc metal.

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6. Which method of concentration of ore is preferred in the following cases and why ?

(i) The ore has higher density particles mixed with a large bulk of low

density impurities.

(ii) The ore consists of copper sulphide intermixed with clay particles. Give an example of amalgam.

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7. Name an ore of zinc other than zinc oxide. By which process can this ore be converted into zinc oxide ?

Watch Video Solution

8. Give reasons for the following :

Metals replace hydrogen from dilute acids whereas non-metals do not.

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9. (a) Are all pure liquids bad conductors of electricity ?

(b) Name a liquid which is a good conductor of electricity but does not

undergo electrolysis on passing electric current.

(c) If pure water is used, no electrolysis takes place. Why ?

(d) Name one practical application based on the phenomenon of electrolysis.

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10. What is the main ore of mercury ? How is mercury obtained from this ore ?

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11. The way metals like sodium, magnesium and iron react with air and water, is an indication of their relative positions in the 'activity series'. Is this statement true ? Justify your answer with examples.

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12. Name the chemical compounds formed on the surface of silver, copper and iron metals when exposed for sometime to atmosphere.

Watch Video Solution

13. A copper coin is kept immersed in a solution of silver nitrate for some time. What will happen to the coin and the colour of the solution?

Watch Video Solution

14. Why do metals not evolve hydrogen gas with nitric acid?

Watch Video Solution

15. (a) Why are metals not generally found in their free state ?

(b) If a strip of aluminium with scratched surface is dipped in an aqueous solution of copper sulphate for little time, the surface of the strip

becomes brownish. What is the reason for this ? Write the balanced chemical equation for the reaction.

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16. Write the balanced chemical equation for the chemical reaction between manganese dioxide and aluminium power. What happens if manganese powder is heated with aluminium oxide ?

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17. Ionic solids conduct electricity in the molten state and not in the solid state. Explain.

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18. What is an alloy ? What is the advantage of making an alloy ?

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19. Write balanced chemical equation for the reactions taking place when

(i) Zinc carbonate is calcinated.

(ii) Zinc sulphide is roasted or heated in air.

(iii) Zinc oxide is reduced to zinc.

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20. Explain why calcium metal after reacting with water starts floating on its surface. Write the chemical equation for the reaction.

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21. An element 'X' burns in oxygen to form an electrovalent compound XO. State the compounds you expect it will form if the element X is made to combine with (i) chlorine and (ii) sulphur. Mention the chemical formula and nature of bond present in each case.

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22. A metal E is stored under kerosene. When a small piece of it is left open in air, it catches fire. When the product formed is dissolved in water, it turns red litmus to blue :

(i) Name the metal E.

(ii) Write the chemical equation for the reaction when it is exposed to air and when the product is dissolved in water.

(iii) Explain the process by which the metal E is obtained from its molten chloride

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23. A reddish brown coloured metal is used in electrical wires. When powdered and heated strongly in an open china dish, its colour turns black. When hydrogen gas is passed over this black substance, it regains its original colour. Based on the above information, answer the following question.

(i) Name the metal and the black coloured substance formed.

(ii) Write balanced chemical equations for both the reactions.

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24. Write the names and symbols of two most reactive metals. Explain by drawing electronic structure how any one of the two metals reacts with a halogen. State any four physical properties of the compound formed.

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25. A metal 'X' acquires a green colour coating on its surface on exposure to air.

(i) Identify the metal 'X' and name the process responsible for this change.

(iii) List two important methods to prevent the process.

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26. Give reason for the following

(i) Iron grills are frequently painted.

(ii) Gold ornaments retain their lustre even after several years of use.

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27. In one method of rust prevention, the iron is not coated with anything.which is this method?

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28. Compound X and aluminium are used to join railway tracks. (a) Idemjfy the compound X (b) Name the reaction (c) Write down its reaction.

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29. An ore on treatment with dilute hydrochloric acid produces brisk effervescence. What type of ore is this ? What steps will be required to

obtain metal from the enriched ore ?

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30. State the property utilized in the following :

(i) Graphite in making electrodes.

(ii) Electric wires are coated with polyvinyl chloride (PVC) or a rubber like material.

(iii) Metal alloys are used for making bells and strings of musical instruments.

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31. (i) Carbonate and sulphide ores are usually converted into oxides during the process of extraction of metals.

(ii) Ionic compounds have generally high melting points.

(iii) Hydrogen is not a metal but is has been assigned a place in the reactivity series of metals.

(iv) The galvanised iron article is protected against rusting even if the zinc layer is broken.

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32. The reaction of metal 'X' with Fe_2O_3 is highly exothermic and is used to join railway tracks. Identify the metal 'X'. Write the chemical equation for the reaction.

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33. Aluminium oxide and zinc oxide react with both acids are bases to produce salt and water. What are these oxides called ? Write chemical equation in each case.

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34. Describe an activity to show that metals are good conductors of electricity.

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35. (a) In the electrorefining of impure copper metal, what are used as cathode and anode ?

(b) Show the formation of $MgCl_2$ from magnesium and chlorine atoms.

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36. (a) What is an alloy ? How is it prepared ? Give two examples of alloys.

(b) Iron is not used in pure state. Give reason.

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37. Write one example each of the following metals :

(a) Most malleable and most ductile.

(b) Best conductor of heat and the poorest conductor of heat

(c) A metal with highest melting point and a metal with lowest melting point.

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38. A metal 'P' when exposed to moist air for longer period of times, loses its shining brown surface and gains green coating, what has happened ? Identify the metal, write the name and chemical formula of green coloured compound. List two ways to prevent this process.

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39. Name the constituents elements of the alloys (i) Brass (ii) Bronze (iii) Solder. Mention one use of each alloy.

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40. Hydrogen gas is not evolved when most metals react with nitric acid. State reason to justify this statement.

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41. (a) Why are metals not generally found in their free state ?

(b) If a strip of aluminium with scratched surface is dipped in an aqueous solution of copper sulphate for little time, the surface of the strip becomes brownish. What is the reason for this ? Write the balanced chemical equation for the reaction.

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42. Write balanced chemical equation for the reactions taking place when

(i) Zinc carbonate is calcinated.

(ii) Zinc sulphide is roasted or heated in air.

(iii) Zinc oxide is reduced to zinc.

Watch Video Solution

43. An element 'X' burns in oxygen to form an electrovalent compound XO. State the compounds you expect it will form if the element X is made to combine with (i) chlorine and (ii) sulphur. Mention the chemical formula and nature of bond present in each case.

Watch Video Solution

44. A metal E is stored under kerosene. When a small piece of it is left open in air, it catches fire. When the product formed is dissolved in water, it turns red litmus to blue :

(i) Name the metal E.

(ii) Write the chemical equation for the reaction when it is exposed to air and when the product is dissolved in water.

(iii) Explain the process by which the metal E is obtained from its molten chloride.

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45. Write the names and symbols of two most reactive metals. Explain by drawing electronic structure how any one of the two metals reacts with a halogen. State any four physical properties of the compound formed.

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Long Answer Questions

1. (a) All ores are minerals but all minerals are not ores. Justify.

(b) An iron knife kept in blue copper sulphate solution turns the blue solution into light green. Explain.

(c) An athlete won a bronze medal in a race competition. After some days, he found that the medal had lost its lustre due to the formation of

a greenish layer on it. Name the metals present in the medal. What is the reason for the formation of a greenish layer on its surface ?

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2. (a) What is the activity series of metals ? Arrange the metals Zn, Mg, Al, Cu and Fe in a decreasing order of reactivity.

(b) What would you observe when you put

(i) some zinc pieces into blue copper sulphate solution ?

(ii) some copper pieces into green ferrous sulphate solution ?

(c) Name a metal which combines with hydrogen gas. Name the compound formed.

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3. (a) Which of the following metals would give hydrogen when added to dilute hydrochloride acid (i) iron (ii) copper (iii) magnesium ?

(b) Explain why do surfaces of some metals acquire a dull appearance when exposed to air for a long time.

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4. How will your demonstrate that the ionic compounds do not conduct electricity in the solid state and can do so in solution.

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5. With a suitable activity show that sulphur burns in air to form a compound which is acidic in nature.

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6. (a) Define corrosion, what is the nature given to corrosion of iron ?

(b) Name the colour of coating formed on silver and copper when exposed to air.

(c) List two damages caused by corrosion and suggest, how these can be prevented.

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7. Give reasons for the following :

(i) Zinc can displace copper from copper sulphate solution.

(ii) Silver articles become black after sometime when exposed to air.

(iii) A metal sulphide is converted to its oxide to extract the metal from sulphide ore.

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8. (a) Distinguish between 'roasting' and 'calcination'. Which of the two is used for sulphide ores and why ?

(b) Write a chemical equation to illustrate the use of aluminium for joining craked railway lines.

(c) Name the anode, the cathode and the electrolyte used in the electrolytic refining of impure copper.

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9. Give an example of a metal which

(i) is a liquid at room temperature.

(ii) is kept immersed in kerosene for storing.

(iii) is both malleable and ductile.

(iv) is the best conductor of heat.

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10. (a) Write the balanced chemical equations for the extraction of copper metal from its ore. What is the reducing agent used ?

(b) Which reducing agent can be used in the extraction of metals placed at the top of the reactivity series ? Give the name of the process also.

(c) What is the chemical substance formed as green coating when copper reacts with atmospheric gases in moist conditions ?

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11. (a) Write method will you use to reduce the following ? Explain by giving a suitable example.

(i) Oxides of less reactive metals

(ii) Oxides of moderately reactive metals

(iii) Oxides of highly reactive metals.

(b) The reaction between metal 'X' and Fe_2O_3 is highly exothermic and is used to join railway tracks.

(i) Identify metal 'X' and name the reaction.

(ii) Write the chemical equation of its reaction with Fe_2O_3.

View Text Solution

12. (a) Why are ionic compounds usually hard crystalline solids ?

(b) Give two methods to prevent rusting of iron.

(c) Name the ores of the metals (i) mercury (ii) zinc.

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13. (a) Write the balanced chemical equations for the extraction of copper metal from its ore. What is the reducing agent used ?

(b) Which reducing agent can be used in the extraction of metals placed at the top of the reactivity series ? Give the name of the process also.

(c) What is the chemical substance formed as green coating when copper reacts with atmospheric gases in moist condition ?

(d) What is galvanisation ?

View Text Solution

14. (A) Name the components of the alloy steel and stainless steel.

(b) Why is gold alloyed with copper ?

(c) Name a metal which

(i) will react vigorously with cold water (ii) will react with only hot water

(iii) will react with only steam (iv) will not react even with steam.

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15. A metal M found in nature as sulphide ore (M_2S) is one of the good conductors of heat and electricity and is used in making electric wires .Identify the metal M.

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16. State the reason why

(i) carbon is not used to reduce the oxides of sodium or aluminium.

(ii) an iron strip dipped in a blue copper sulphate solution turns the blue solution to pale green.

(iii) calcium does not occur in free state in nature.

(iv) zinc is used in the galvanisation of iron and not copper.

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17. (a) Write the chemical reactions taking place when :

(i) Manganese dioxide is heated with aluminium powder

(ii) Steam is passed over red hot iron

(c) Magnesium reacts with hot water.

(b) The oxide X_2O_3 is unaffacted by water. Name a method by which metal X can be obtained from its ore. Give one reason as to why have you chosen this method.

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18. (a) White the steps involved in the extraction of pure metals in the middle of the activity series from their carbonate ores.

(b) How is copper extracted from its sulphuric ore ?Explain the variour steps supported by chemical equations. Draw labelled diagram from the electrolytic refining of copper.

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19. A metal 'X' acquires a green colour coating on its surface on exposure to air.

(i) Identify the metal 'X' and name the process responsible for this

change.

(iii) List two important methods to prevent the process.

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20. Give reasons for the following :

Ionic compounds have high melting points and boiling points.

(ii) Ionic compounds conduct electricity in molten state.

(iii) Ionic compounds are solids at room temperature and are somewhat hard.

(iv) Ionic grills are frequently painted.

(v) Gold ornaments retains their lustre even after several years of use.

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21. (a) Why are ionic compouds usually hard crystalline solids ?

(b) Give two methods to prevent rusting of iron.

(c) Name the ores of the metals (i) mercury (ii) zinc.

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22. (A) Name the components of the alloy steel and stainless steel.

(b) Why is gold alloyed with copper ?

(c) Name a metal which

(i) will react vigorously with cold water (ii) will react with only hot water

(iii) will react with only steam (iv) will not react even with steam.

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23. State the reason why

(i) carbon is not used to reduce the oxides of sodium or aluminium.

(ii) an iron strip dipped in a blue copper sulphate solution turns the blue solution to pale green.

(iii) calcium does not occur free in nature.

(iv) zinc is used in the galvanisation of iron and not copper.

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Hots

1. When the powder of a common metal is heated in an open china dish, colour turns black. However, when hydrogen gas is passed over the hot black substance formed, it regains its original colour. Based on this information, answer the following questions :

(i) What type of chemical reaction takes place in each of the two given steps ?

(ii) Name the metal initially taken in the powder form. Write balanced chemical equations for both these reactions.

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2. When a metal X is treated with cold water, it gives a basic salt Y With molecular formula XOH (molecular mass =40) and liberates a gas Z which easily catches fire. Identify X , Y and Z and also write the reaction involved.

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3. A student has been collecting silver coins and copper coins. One day she observed a black coating on silver coins and a green coating on copper coins. Which chemical phenomenon is responsible for these coatings ? Write the chemical names of black and green coatings ?

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4. You are provided with three metals : Sodium, magnesium and copper. Using only water as the reactant, how will you identify them ?

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5. An element reacts with oxygen to form an oxide which dissolves in dilute hydrochloric acid. The oxide formed also turns a solution of red litmus blue. Is the element a metal or a non-metal? Explain your answer.

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6. An element E combines with oxygen to form an oxide E_2O which is a good conductor of electricity. Give the following information:

(i) How many electrons will be present in the valence shell of the element E ?

(ii) Write the formula of the compound formed when the element E combines with chlorine.

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7. An element A burns with golden flame in air. It reacts with another element B, atomic number 17 to give a product C. An aqueous solution of product C on electrolysis gives a compound D and liberates hydrogen. Identify A, B, C and D. Also write down the equations for the reactions involved.

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Mcq

1. Which of the following property is generally not shown by metals?

A. Electrical conduction

B. Sonorous nature

C. Dullnes

D. Ductility.

Answer: C

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2. The ability of metals to be drawn into thin sheets is known as

A. ductility

B. malleability

C. sonorosity

D. conductivity

Answer: B

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3. Aluminium is used for making cooking utensils. Which of the following properties of aluminium are responsible for the same ?

(i) Good thermal conductivity

(ii) Good electrical conductivity

(iii) Ductility

(iv) High melting point

A. (i) and (ii)

B. (i) and (iii)

C. (ii) and (iii)

D. (i) and (iv)

Answer: D

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4. Which one of the following metals do not react with cold as well as hot water ?

A. K

B. Ca

C. Mg

D. Fe.

Answer: D

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5. Which of the following oxide(s) of iron would be obtained on prolonged reaction of iron with steam?

A. FeO

B. Fe_2O_3

C. Fe_3O_4

D. Fe_2O_3 and Fe_3O_4

Answer: C

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6. What happens when magnesium is treated with water ?

(i) It does not react with water

(ii) It reacts violently with water

(iii) It reacts less violently with water

(iv) Bubbles of hydrogen gas formed stick to the surface of the metal

A. (i) and (iv)

B. (ii) and (iii)

C. (i) and (ii)

D. (iii) and (iv)

Answer: D

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7. Generally metals react with acids to give salt and hydrogen gas. Which of the following acids does not give hydrogen gas on reacting with metals (except Mn and Mg)?

A. H_2SO_4

B. HCl

C. HNO_3

D. All of these.

Answer: C

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8. The composition of aqua-regia is

A. Dil HCl (3) : Dil HNO_3 (1)

B. Conc HCl (3) : Dil HNO_3 (1)

C. Conc HCl (3) : Conc HNO_3 (1)

D. Dil HCl (3) : Dil HNO_3 (1)

Answer: C

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9. Which of the following are not ionic compounds ?

(i) $CaCl_2$ (ii) HCl

(ii) CCl_4 (iv) $NaCl$

A. (i) and (ii)

B. (ii) and (iii)

C. (iii) and (iv)

D. (i) and (iii)

Answer: B

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10. Which one of the following properties is not generally exhibited by ionic compounds?

A. Solubility in water

B. Electrical conductivity in solid state

C. High melting and boiling points

D. Electrical conductivity in molten state.

Answer: B

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11. Which of the following metals exist in their native state in nature ?

(i) Cu (ii) Au

(iii) Zn (iv) Ag

A. (i) and (ii)

B. (ii) and (iii)

C. (ii) and (iv)

D. (iii) and (iv)

Answer: C

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12. Metals are refined by using different methods. Which of the following metals are refined by electrolytic refining?

(i) Ag (ii) Cu

(iii) Na (iv) Mg

A. (i) and (ii)

B. (i) and (iii)

C. (ii) and (iii)

D. (iii) and (iv)

Answer: A

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13. Silver articles become black on prolonged exposure to air. This is due to the formation of

A. $AgCN$

B. Ag_2O

C. Ag_2S

D. Ag_2S and $AgCN$

Answer: C

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14. Galvanisation is a method of protecting iron from rusting by coating it with a thin layer of

A. Chromium

B. Copper

C. Zinc

D. Tin

Answer: C

Watch Video Solution

15. Stainless steel is very useful material for our life. In stainless steel,iron is mixed with

A. Ni and Cr

B. Cu and Cr

C. Ni and Cu

D. Cu and Au.

Answer: A

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16. If copper is kept open in air, it slowly loses its shining brown surface and gains a green coating. It is due to the formation of

A. $CuSO_4$

B. $CuCO_3$ and $Cu(OH)_2$

C. $Cu(NO_3)_2$

D. CuO.

Answer: B

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17. Generally, metals are solid in nature. Which one of the following metals is found in liquid state at room temperature?

A. Na

B. Fe

C. Al

D. Hg

Answer: D

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18. Which of the following metals are obtained by electrolysis of their chlorides in molten state ?

(i) Na (ii) Ca

(iii) Fe (iv) Cu

A. (i) and (iv)

B. (iii) and (iv)

C. (i) and (iii)

D. (i) and (ii)

Answer: D

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19. Generally, non-metals are not lustrous. Which of the following non-metals is lustrous?

A. Sulphur

B. Phosphorus

C. Nitrogen

D. Iodine.

Answer: D

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20. Which one of the following four metals would be displaced from the solution of its salts by other three metals?

A. Mg

B. Cu

C. Zn

D. Fe.

Answer: B

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21. 5 mL each of concentrated HCl, HNO_3 and a mixture of concentrated HNO_3 (5 mL) were taken in test tubes labelled as A, B and C. A small piece of metal was put in each test tube. No change occurred in test tubes A and B but the metal got dissolved in test tube. The metal could be

A. Al

B. Au

C. Cu

D. Ag

Answer: B

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22. An alloy is

A. An element

B. a compound

C. a homogeneous mixture

D. a heterogeneous mixture

Answer: C

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23. An electrolytic cell consists of

(i) positively charged cathode

(ii) negatively charged anode

(iii) positively charged anode

(iv) negatively charged cathode

A. (i) and (ii)

B. (iii) and (iv)

C. (i) and (iii)

D. (ii) and (iv)

Answer: B

Watch Video Solution

24. During electrolytic refining of copper, it gets

A. deposited on cathode

B. deposited on anode

C. deposited on cathode as well as anode

D. remains in the solution.

Answer: A

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25. An element A is soft and can be cut with a knife. This is very reactive to air and cannot be kept open in air. It reacts vigorously with water. Identify the element from the following.

A. Mg

B. Na

C. S

D. Mg

Answer: B

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26. Alloys are homogeneous mixtures of a metal with a metal or non-metal. Which among the following alloys contain non-metal as one of its constituents ?

A. Brass

B. Gun metal

C. Amalgam

D. Steel

Answer: D

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27. Which among the following statements is incorrect for magnesium metal?

A. It burns in oxygen with dazzling flame

B. It reacts with cold water to form magnesium oxide and evolves hydrogen gas

C. It reacts with hot water to form magnesium hydroxide and evolves hydrogen gas

D. It reacts with steam to form magnesium hydroxide and evolves hydrogen gas.

Answer: B

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28. Which among the following alloys contain mercury as one of its constituents?

A. Stainless steel

B. German silver

C. Solder

D. Zinc amalgam.

Answer: D

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29. Reaction' between X and Y, forms compound Z. X loses electron and Y gains electron. Which of the following properties is not shown by Z?

A. Has high melting point

B. Has low melting point

C. Conducts electricity in molten state

D. Occurs as solid

Answer: B

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30. The electronic configuration of three elements X, Y and Z are X - 2, 8, Y - 2, 8, 6 and Z - 2, 8, 1. Which of the following is correct ?

A. X is a metal

B. Y is a metal

C. Z is a non-metal

D. Y is a non-metal and Z is a metal.

Answer: D

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31. Although metals form basic oxides, which of the following metals forms an amphoteric oxide ?

A. Na

B. Ca

C. Zn

D. Cu.

Answer: C

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32. Generally, non-metals are not conductors of electricity. Which of the following is a good conductor of electricity?

A. Diamond

B. Graphite

C. Phosphorus

D. Iodine.

Answer: B

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33. Electrical wires have a coating of an insulating material. The material, generally used is

A. Lead

B. Graphite

C. PVC

D. All can be used.

Answer: C

Watch Video Solution

34. Which of the following non-metals is a liquid?

A. Carbon

B. Bromine

C. Iodine

D. Sulphur

Answer: B

Watch Video Solution

35. Which of the following can undergo a chemical reaction ?

A. $MgSO_4 + Zn$

B. $ZnSO_4 + Fe$

C. $CaSO_4 + Pb$

D. $CuSO_4 + Al$

Answer: D

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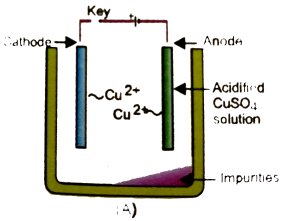
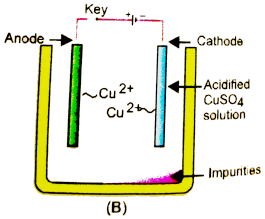
36. Which one of the following Figures correctly describes the process of electrolytic refining?

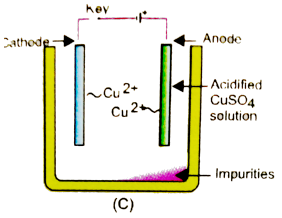
A.



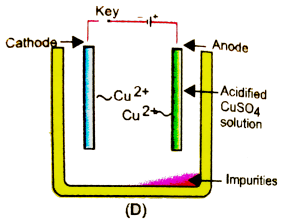
B.



C.



D.



Answer: C

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37. Iqbal treated a lustrous, divalent element M with sodium hydroxide. He observed the formation ,of bubbles in reaction mixture. He made the same observations when this element was treated with hydrochloric acid. Suggest how can he identify the produced gas. Write chemical equations for both the reactions.

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38. During extraction of metals, electrolytic refining is used to obtain pure metals. (a) Suggest a suitable electrolyte also. (c) In this electrolytic cell, where do we get pure copper after passing electric current ?

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39. Why should the metal sulphides and carbonates be converted to metal oxides in the process of extraction of metal from them?

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40. 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 ?

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41. Compound X and aluminium are used to join railway tracks. (a) Idemjfy the compound X (b) Name the reaction (c) Write down its reaction.

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42. When a metal 'X' is treated with cold water, it gives a basic salt 'Y' with molecular formula XOH (Molecular mass = 56) and liberates a gas 'Z' which easily catches fire. Identify X, Y and Z and also write the reaction involved.

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43. 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 and Z.

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44. The following reaction takes place when aluminium powder is heated with MnO_2

$3MnO_2(s) + 4Al(s) \rightarrow 3Mn(l) + 2Al_2O_3(l) + \text{Heat}$

(a) Is aluminium gettuing reduced ?

(b) zIs MnO_2 getting oxidised ?

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45. What are the constituents of solder alloy? Which property of soldev makes it suitable for welding electrical wires?

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46. A metal 'M', which is used in thermite process, when heated with oxygen gives an oxide, which is amphoteric in nature. Identify 'M' and its oxide. Write down the reactions of oxide with HCl and NaOH.

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47. A metal that exists as a liquid at room temperature is obtained by heating its sulphide in the presence of air. Identify the metal and its ore and give the reactions involved.

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48. Give the formulae of the stable binary compounds that would be formed by the combination of following pairs of elements.

(a) Ca and N_2 (b) Li and O_2 (c) Ca and Cl_2 (d) K and O_2

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49. What happens when

(a) $ZnCO_3$ is heated in the absence of oxygen?

(b) a mixture of Cu_2O and Cu_2S is heated?

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50. A non-metal A is an important constituent of our food and forms two oxides B and C. Oxide B is toxic whereas C causes global warming.

(a) Identify A, B and C.

(b) To which group of periodic table does A belong?

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51. Give two examples each of the metals that are good conductors and comparatively poor conductors of heat respectively.

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52. Name one metal and one non-met-al that exist in liquid state at room temperature. Also name two metals having melting point less than 310 K ($37^{\circ} C$).

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53. An element A reacts with water to form a compound B which is used in white washing. The compound B on heating forms an oxide C which on treatment with water gives back B. Identify A, B and C and give the reactions involved.

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54. An alkali metal 'A' gives a compound B (molecular mass = 56) on reacting with water. The compound 'B' gives a soluble compound 'C' on treatment with aluminium oxide. Identify A, B and C and give the reactions involved.

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55. Give the reaction involved during extraction of zinc from its ore by

(a) roasting of zinc ore. (b) calcination of zinc ore.

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56. A metal M does not liberate hydrogen from acids but reacts with oxygen Q 5 to give a black colour product. Identify M and black coloured produCt and also explain the reaction of M with oxygen.

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57. An element forms an oxide A_2O_3 which is acidic in nature. Identify A as a metal or non-metal.

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58. A solution of CuSO4 was kept in an iron pot. After few days the iron pot was found to have a number of holes in it. Explain the reason in terms of reactivity. Write the equation of the reaction involved.

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59. A non-metal A which is the largest constituent of air, when heated with H2 in 1 : 3 ratio in the presence of catalyst (Fe) gives a gas B. On heating with O_2 it gives an oxide C. If this oxide is passed into water in the presence of air, it gives an acid D which acts as a strong oxidising agent.

(a) Identify A, B, C and D.

(b) To which group of the periodic table does this non-metal belongs?

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60. Give the steps involved in the extraction of metals of low and medium reactivity from their respective sulphide ores.

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61. Explain the following (a) Reactivity of At decreases if it is dipped in HNO_3.

(b) Carbon cannot reduce the oxides of Na or Mg.

(c) mm is not a conductor of electricity in solid state whereas it does conduct electricity in aqueous solution as well as in molten state.

(d) Iron articles are galvanised.

(e) Metals like Na, K. Ca and Mg are never found in their free state in nature.

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62. Given below are the steps for extraction of copper from its ore. Write the reaction involved.

(i) Roasting of copper (I) sulphide.

(ii) Reduction of copper (I) oxide with copper (I) sulphide.

(iii) Electrolytic refining

(b) Draw a neat and well labelled diagram for electrolytic refining of copper.

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63. of the three metals X, Y and Z, X reacts with cold water, Y with hot water and Z with steam only. Identify X, Y and Z and also arrange them in order of increasing reactivity.

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64. Two ores A and B were taken. On heating, ore A gives CO_2 whereas, ore B gives SO_2. What steps will you take to convert them into metals ?

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