Ravi Maths Tuition

Metals and Non-Metals

10th Standard

Science

Multiple Choice Question 77 x 1 = 77

1) Which of the following pairs will give displacement reactions?

(a) NaCl solution and copper metal (b) $MgCl_2$ solution and aluminium metal

(c) $FeSO_4$ solution and silver metal (d) $AgNO_3$ solution and copper metal

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

(a) Applying grease (b) Applying paint (c) Applying a coating of zinc (d) All of the above

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

(a) Calcium (b) Carbon (c) Silicon (d) Iron

4) Food cans are coated with tin and not with zinc because

(a) Zinc is costlier than tin (b) Zinc has a higher melting point than tin

(c) Zinc is more reactive than tin (d) Zinc is less reactive than tin

5) Which of the following properly is generally not shown by metals?

(a) Electrical conduction (b) Sonorous in nature (c) Dullness (d) Ductility

6) The ability of metals to be drawn into thin wire is known as

(a) Ductility (b) malleability (c) Sonorousity (d) conductivity

7) 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)

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

(a) Na (b) Ca (c) Mg (d) Fe

9) 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

10) What happens when calcium 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 calcium.

(a) (i) and (iv) (b) (ii) and (iii) (c) (i) and (ii) (d) (iii) and (iv)

11) 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

12) The composition of aqua-regia is

(a) Dil.HCl : Conc.HNO_3 [3 : 1] (b) Conc.HCl : Dil.HNO_3 [3 : 1] (c) Conc.HCl : Conc.HNO_3 [3 : 1]

(d) Dil.HCl : Dil.HNO_3 [3 : 1]

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13) Which of the following are not ionic compounds?
(i) KCl (ii) HCl (iii) CCl_4 (iv) NaCl

(a) (i) and (ii) (b) (ii) and (iii) (c) (iii) and (iv) (d) (i) and (iii)

14) 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

15) 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)

16) Metals are refined by using different methods. Which of the following metals are refined by electrolytic refining?
(i) Au (ii) Cu (iii) Na (iv) K

(a) (i) and (ii) (b) (i) and (iii) (c) (ii) and (iii) (d) (iii) and (iv)

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

(a) Ag_3N (b) Ag_2O (c) Ag_2S (d) Ag_2S and Ag_3N

18) Galvanisation is a method of protecting iron from rusting by coating with a thin layer of

(a) Gallium (b) Aluminium (c) Zinc (d) Silver

19) 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

20) 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) $CuCO_3$ (c) $Cu(NO_3)_2$ (d) CuO

21) 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) Cr (d) Hg

22) 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)

23) Generally, non-metals are not lustrous. Which of the following nonmetal is lustrous?

(a) Sulphur (b) Oxygen (c) Nitrogen (d) Iodine

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

(a) Mg (b) Ag (c) Zn (d) Cu

25) 2 ml each of concentrated HCl, HNO_3 and a mixture of concentrated HCl and concentrated HNO_3 in the ratio of 3 : 1 were taken in test tubes labelled as A, B and C. A small piece of metal was put in each test tube. No change occured in test tubes A and B but the metal got dissolved in test tube C respectively. The metal could be

(a) Al (b) Au (c) Cu (d) Zn

26) An alloy is

(a) An element (b) A compound (c) A homogeneous mixture (d) A heterogeneous mixture

27) 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)

28) During electrolytic refining of zinc, it gets

(a) Deposited on cathode (b) Deposited on anode (c) Deposited on cathode as well as anode
(d) Remains in the solution

29) 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) P (d) Ca

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

(a) Brass (b) Bronze (c) Amalgam (d) Steel

31) Which among the following statements is incorrect for magnesium metal?

(a) It burns in oxygen with a dazzling white 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.

32) Which among the following alloys contain mercury as one of its constituents?

(a) Stainless steel (b) Alnico (c) Solder (d) Zinc amalgam

33) 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

34) The electronic configurations of three elements X, Y and Z are X - 2, 8; Y - 2, 8, 7 and Z - 2, 8, 2. 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

35) Although metals form basic oxides, which of the following metals form an amphoteric oxide?

(a) Na (b) Ca (c) Al (d) Cu

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

(a) Diamond (b) Graphite (c) Sulphur (d) Fullerene

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

(a) Sulphur (b) Graphite (c) PVC (d) All can be used

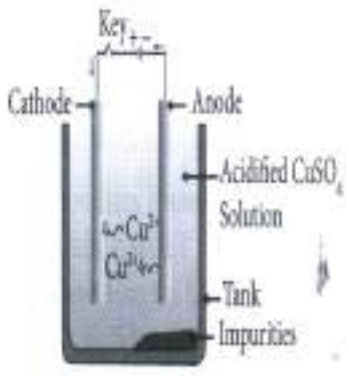
38) Which of the following non-metals is a liquid?

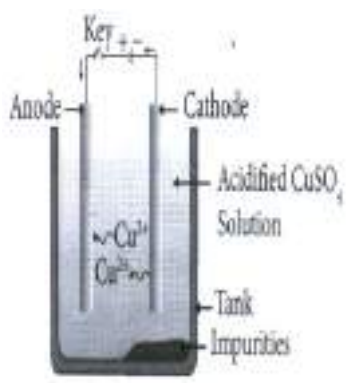
(a) Carbon (b) Bromine (c) Phosphorus (d) Sulphur

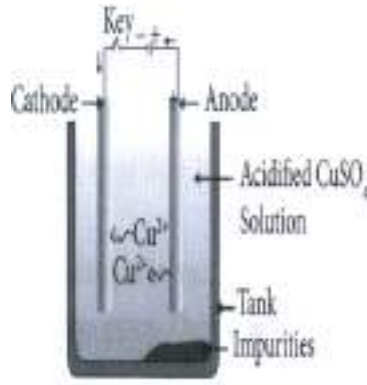
39) Which of the following can undergo a chemical reaction?

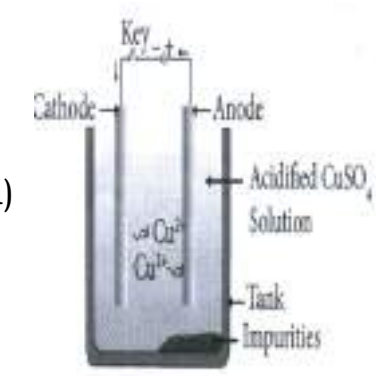
(a) $MgSO_4 + Fe$ (b) $ZnSO_4 + Fe$ (c) $MgSO_4 + Pb$ (d) $CuSO_4 + Fe$

40) Which one of the following figures correctly describes the process of electrolytic refining?

(a) 

(b) 

(c) 

(d) 

41) Which of the following metals is present in the anode mud during the electrolytic refining of copper?

(a) Sodium (b) Aluminium (c) Gold (d) Iron

42) When iron fillings are heated in a stream of dry hydrogen chloride the compound formed is $FeCl_x$ where X is

(a) 1 (b) 2 (c) 3 (d) 4

43) The second most abundant metal in the earth's crust is

(a) oxygen (b) silicon (c) aluminium (d) iron

44) An alloy of Zn and Cu is dissolved in dil. HCl. Hydrogen gas is evolved. In this evolution of gas

(a) only zinc reacts with dil. HCl (b) only copper reacts with dil. HCl

(c) both zinc and copper react with dil. HCI (d) only copper reacts with water

45) A greenish coating develops on copper utensils due to formation of

(a) $CuCO_3$ (b) $Cu(OH)_2$ (c) $Cu(OH)_2.CuCO_3$ (d) CuO

46) Rusting of iron takes place in

(a) ordinary water (b) distilled water (c) both ordinary and' distilled water (d) none of the above

47) Bronze is an alloy

(a) Cu and Zn (b) Zn and Ni (c) Cu and Sn (d) Cu, Zn, Tn

48) During smelting, an additional substance is added which combines with impurities to form a fusible product known as

(a) slag (b) mud (c) gangue (d) flux

49) A student placed an iron nail in copper sulphate solution. He observed the reddish brown coating on the iron nail which is

(a) soft and dull (b) hard and fading (c) smooth and shining (d) rough and granular

50) Which among the following alloys contain non-metal as one of its constituents

(a) Brass (b) Amalgam (c) Gun metal (d) None of these

51) An aluminium strip is kept immersed in freshly prepared ferrous sulphate solution taken in a test tube, the change observed is that

(a) Green solution slowly turns brown (b) Lower end of test tube become slightly warm

(c) A colourless gas with the smell of burning sulphur is observed

(d) Light green solution changes to blue.

52) Which of the following will not evolve CO_2 upon heating?

(a) $CaCO_3$ (b) $MgCO_3$ (c) $ZnCO_3$ (d) Na_2CO_3

53) Which of the following are not ionic compounds?

(a) $CaCl_2$ (b) $MgCl_2$ (c) NaCl (d) CCl_4

54) 5 mL each of cone. HCI, HNO_3 and a mixture of cone. HCl (15 mL) and cone. HNO_3 (5 mL) were taken in test tubes labelled as A, Band C. A small piece of metal was put in each tube. No change occurred in test tube A and B but the metal got dissolved in test tube C. The metal could be

(a) AI (b) Au (c) Cu (d) Na

55) The electronic configuration of three element X, Y and Z are
X - 2,8
Y - 2, 8, 6
Z - 2, 8, 1
Which of the following is correct?

(a) X is a metal (b) Z is a non-metal (c) Y is a metal (d) X and Yare non-metal and Z is a metal

56) The process of coating of Zn over Fe is known as

(a) Cathodic protection (b) Metallurgy (c) Tinning (d) Galvanization

57) The method used for reduction of mercuric oxide to mercury is

(a) Heating (b) Chemical reduction (c) Calcination (d) Electrolytic reduction

58) $Cu + 2Ag(NO_3)_2 \longrightarrow CU(NO_3)_2 + 2Ag$
$Pb + CU(NO_3)_2 \longrightarrow Pb(NO_3)_2 + Cu$
$Zn + Pb(NO_3)_2 \longrightarrow Zn(NO_3)_2 + Pb$
The most reactive metal is

(a) Ag (b) Pb (c) Cu (d) Zn

59) Which of the following oxides, on reduction with carbon gives metal?

(a) $Al_{2}O_3$ (b) ZnO (c) MgO (d) All of these

60) Magnesium dissolves in hot water to form

(a) MgO (b) $Mg(OH)_2$ (c) MgOH (d) $MgO.Mg(OH)_2$

61) Identify an ore containing sulphur in it

(a) Siderite (b) Fluorspar (c) Iron pyrites (d) Calamine

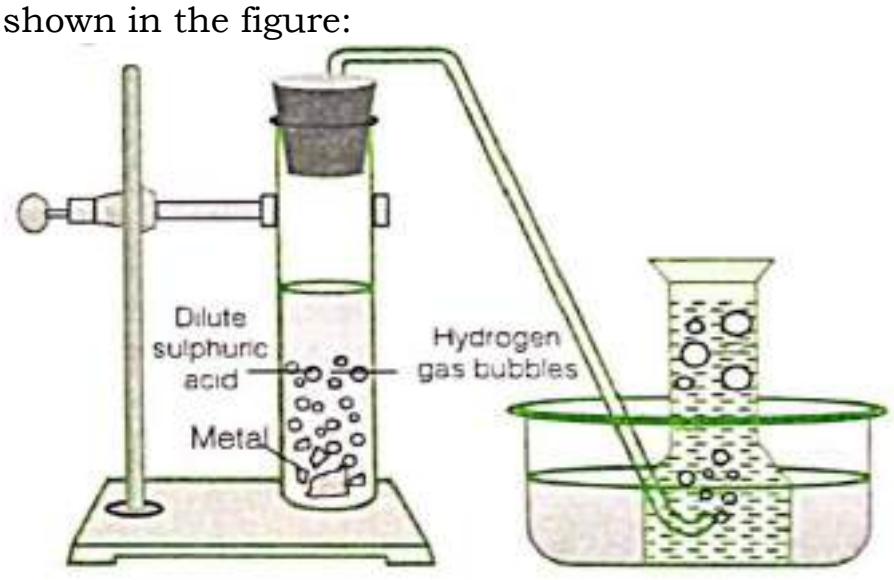
62) Arrange the following metals in the order of their decreasing reactivity: Fe, Cu, Mg, Ca, Zn,Ag

(a) Ca > Zn > Mg > Cu > Ag > Fe (b) Ca > Zn > Cu > Mg > Ag > Fe (c) Ca > Mg > Zn > Fe > Cu > Ag
(d) Ca > Mg > Fe > Zn > Cu > Ag

63) Which of the following reaction shows that the given oxide is amphoteric in nature?

(a) $2Zn + O_2 \xrightarrow{\Delta} 2ZnO$ (b) $ZnO + H_2SO_4 \longrightarrow ZnSO_4 + H_2O(l)$
(c) $ZnO + 2NaOH \longrightarrow Na_2ZnO_2 + H_2O(l)$ (d) (b) and (c) together

64) A reactive metal (M) is treated with H_2SO_4 (dil). The gas is evolved and is collected over the water as shown in the figure:



The correct conclusion drawn is

(a) the gas is oxygen. (b) the gas is lighter than air. (c) the gas is SO_2 and is lighter than air.
(d) the gas is H_2 and is heavier than air.

65) Sodium hydroxide is termed an alkali while ferric hydroxide is not because

(a) sodium hydroxide is a strong base, while ferric hydroxide is a weak base.

(b) sodium hydroxide is a base which is soluble in water while ferric hydroxide is also a base but it is not soluble in water.

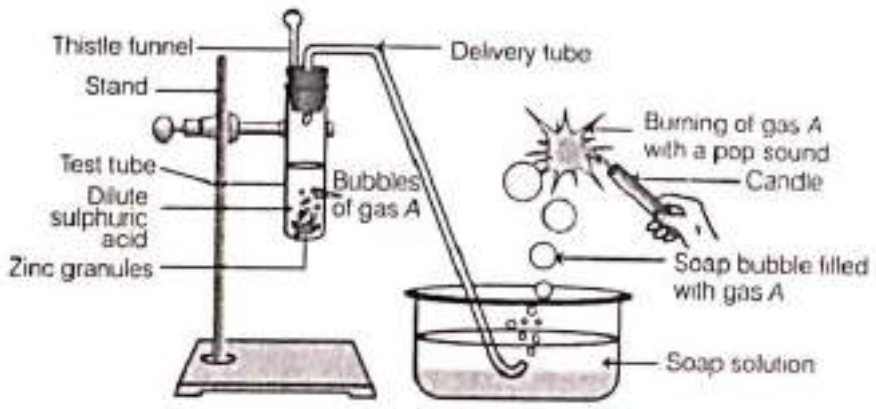
(c) sodium hydroxide is a strong base while ferric hydroxide is a strong acid.

(d) sodium hydroxide and ferric hydroxide both are strong base but the solubility of sodium hydroxide in water is comparatively higher than that of ferric hydroxide.

66) An element 'X' reacts with O_2 to give a compound with a high melting point. This compound is also soluble in water. The element 'X' is likely to be

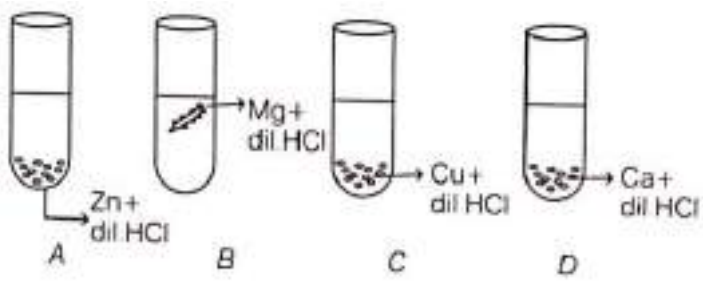
(a) iron (b) calcium (c) carbon (d) silicon

67) Identify gas A in the following experiment.



(a) Nitrogen (b) Hydrogen (c) Oxygen (d) Carbon dioxide

68) The diagram shows the reaction between metal and dil. acid.



What is the reason for different behaviour of Mg in test tube B?

(a) Mg is lighter element than dil HCI

(b) Mg reacts with dil. HCl to produce H_2 gas which helps in floating

(c) Mg reacts with dil HCl to produce N_2, gas which helps in floating

(d) Mg reacts with dil HCl to produce CO_2 gas which helps in floating

69) During the electrolytic refining of copper, what happens at the anode?

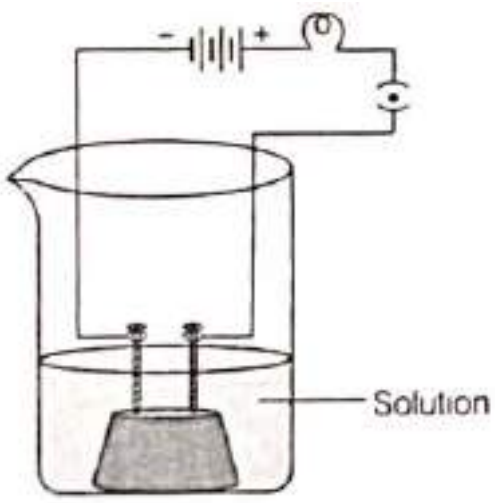
(a) Copper ions gain electrons to become neutral copper atoms.

(b) Neutral copper atoms gain electrons to becomes ions.

(c) Copper ions lose electrons to become neutral atoms.

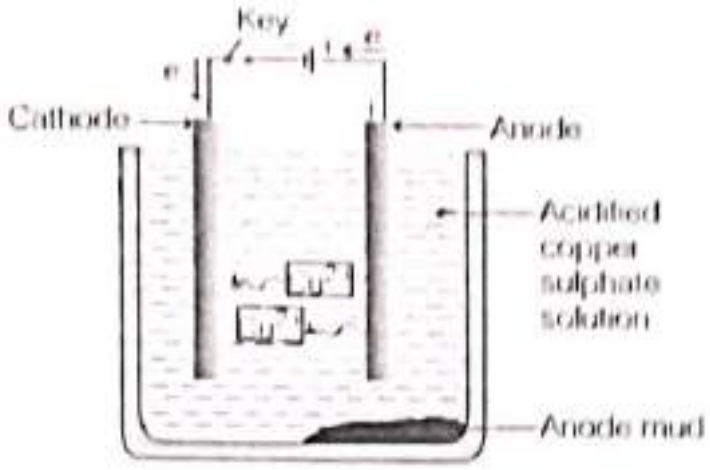
(d) Neutral copper atoms lose electrons to become ions.

70) In the given experimental set-up, if the experiment is carried out separately with each of the following solutions the cases in which the bulb will glow is



(a) dilute hydrochloric acid (b) honey (c) glucose solution (d) alcohol

71) The following diagram shows the electrolytic refining of copper:



Which of the following statements is Incorrect description of the process?

(a) The impure metal from the anode dissolves into the electrolyte.

(b) The pure metal from the electrolyte is deposited on the cathode.

(c) Insoluble impurities settle down at the bottom of the anode.

(d) On passing the current through the electrolyte, the pure metal from the anode dissolves into the electrolyte

72) Which of the following metals, do not corrode in moist air?

(a) Copper (b) Iron (c) Gold (d) Silver

73) A piece of zinc (Zn)-a reactive metal-was dropped into a test tube containing a substance. A zinc salt was formed and hydrogen gas was liberated. This is shown in the equation below.

$Zn^{+} \rightarrow$ Zinc salt + H_2 gas

Which of the following can be the substance that zinc was dropped into?

P. water

Q. hydrochloric acid

R. a solution of a zinc salt

(a) Only P (b) Only Q (c) Only R (d) Either P or R

74) Bronze is an alloy of

(a) copper and zinc (b) aluminum and tin (c) copper, tin and zinc (d) copper and tin

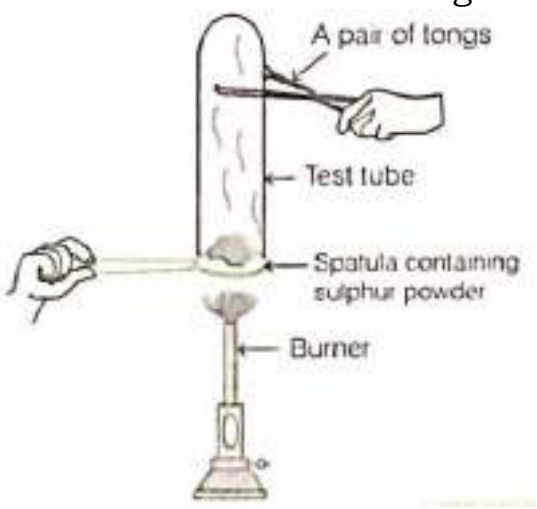
75) Listed here is the reactivity of certain metals.

Metal	**Reaction with air**	**Reaction with water**	**Reaction with dilute acids**
Gold	Does not oxidise or burn	No reaction	No reaction
Sodium	Burns vigorously to form Oxide	Violent reaction	Violent reaction
Zinc	Burns to form oxides	Reacts on heating with water	Reacts to produce hydrogen
Platinum	Does not oxidise or burn	No reaction	No reaction

Which of the above metals are likely to be obtained in their pure states from the Earth's crust?

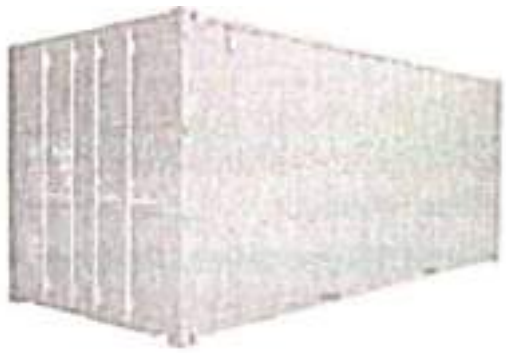
(a) Only gold (b) Only sodium (c) Gold and platinum (d) Zinc and sodium

76) 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. The gas evolved is



(a) O_2 (b) SO_2 (c) CO_2 (d) H_2 and SO_2

77) Shown below is a container that is used in the transportation of goods over long distances.



These containers are made of steel. Which property of steel is mainly used to make these containers?

(a) Its ductility (b) Its malleability (c) Its metallic lustre (d) Its electrical conductivity

Assertion and reason 33 x 1 = 33

78) **Assertion**: A wire of about 2 km length can be drawn from one gram of gold.
Reason: The ability of metals to be drawn into thin wires is called ductility.
Codes
(a) If both assertion and reason are true and the reason is correct explanation of assertion.
(b) If both assertion and reason are true but reason is not a correct explanation of assertion.
(c) If assertion is true and reason is false.
(d) If both assertion and reason are false.

79) **Assertion**: Iron does not bum on heating
Reason: Iron filings bum vigorously when sprinkled in the flame of the burner.
Codes
(a) If both assertion and reason are true and the reason is correct explanation of assertion.
(b) If both assertion and reason are true but reason is not a correct explanation of assertion.
(c) If assertion is true and reason is false.
(d) If both assertion and reason are false.

80) **Assertion**: Anodising is a process of forming a thick oxide layer of aluminium.
Reason: This aluminium oxide coat makes it resistant to further corrosion.
Codes
(a) If both assertion and reason are true and the reason is correct explanation of assertion.
(b) If both assertion and reason are true but reason is not a correct explanation of assertion.
(c) If assertion is true and reason is false.
(d) If both assertion and reason are false.

81) **Assertion**: Hydrogen gas is evolved when a metal reacts with nitric acid.
Reason: All acids release hydrogen gas when reacted with metals.
Codes
(a) If both assertion and reason are true and the reason is correct explanation of assertion.
(b) If both assertion and reason are true but reason is not a correct explanation of assertion.
(c) If assertion is true and reason is false.
(d) If both assertion and reason are false.

82) **Assertion**: Metals do not displace hydrogen gas when reacted with bases
Reason: There are few metals like copper that can displace hydrogen from base.
Codes
(a) If both assertion and reason are true and the reason is correct explanation of assertion.
(b) If both assertion and reason are true but reason is not a correct explanation of assertion.
(c) If assertion is true and reason is false.
(d) If both assertion and reason are false.

83) **Assertion**: Silver articles become black after sometime when exposed to air
Reason: It reacts with nitrogen in the air to form a coating of silver nitride.
Codes
(a) If both assertion and reason are true and the reason is correct explanation of assertion.
(b) If both assertion and reason are true but reason is not a correct explanation of assertion.
(c) If assertion is true and reason is false.
(d) If both assertion and reason are false.

84) **Assertion**: Alloy is made by mixing a metal with either other metal or non metal

Reason: It is prepared by first melting the primary metal and then dissolving the other elements in it in definite proportions.

Codes

(a) If both assertion and reason are true and the reason is correct explanation of assertion.
(b) If both assertion and reason are true but reason is not a correct explanation of assertion.
(c) If assertion is true and reason is false.
(d) If both assertion and reason are false.

85) **Assertion**: Lead is less reactive than copper.

Reason: Copper can displace zinc from its solution.

Codes

(a) If both assertion and reason are true and the reason is correct explanation of assertion.
(b) If both assertion and reason are true but reason is not a correct explanation of assertion.
(c) If assertion is true and reason is false.
(d) If both assertion and reason are false.

86) **Assertion**: Silver is better conductor than copper

Reason: Resistivity of copper is slightly higher than silver

Codes

(a) If both assertion and reason are true and the reason is correct explanation of assertion.
(b) If both assertion and reason are true but reason is not a correct explanation of assertion.
(c) If assertion is true and reason is false.
(d) If both assertion and reason are false.

87) **Assertion**: Metals are malleable

Reason: They can be easily hammered into thin sheets

Codes

(a) If both assertion and reason are true and the reason is correct explanation of assertion.
(b) If both assertion and reason are true but reason is not a correct explanation of assertion.
(c) If assertion is true and reason is false.
(d) If both assertion and reason are false.

88) **Assertion:** Different metals have different reactivities with water and dilute acids.

Reason: Reactivity of a metal depends on its position in the reactivity series.

Codes

(a) Both A and R are true, and R is correct explanation of the assertion.
(b) Both A and R are true, but R is not the correct explanation of the assertion.
(c) A is true, but R is false.
(d) A is false, but R is true.

89) **Assertion:** Iron is the most widely used metal. But it is never used in its pure state.

Reason: Pure iron is very soft and stretches easily when hot.

Codes

(a) Both A and R are true, and R is correct explanation of the assertion.
(b) Both A and R are true, but R is not the correct explanation of the assertion.
(c) A is true, but R is false.
(d) A is false, but R is true.

90) **Assertion:** Gold occurs in native state.

Reason: Gold is a reactive metal.

Codes

(a) Both A and R are true, and R is correct explanation of the assertion.
(b) Both A and R are true, but R is not the correct explanation of the assertion.
(c) A is true, but R is false.
(d) A is false, but R is true.

91) **Assertion:** The property of beating a metal into sheets is called ductility.
Reason: Gold and silver are most malleable metals.
Codes
(a) Both A and R are true, and R is correct explanation of the assertion.
(b) Both A and R are true, but R is not the correct explanation of the assertion.
(c) A is true, but R is false.
(d) A is false, but R is true.

92) **Assertion:** Silver and gold do not react with oxygen even at high temperatures.
Reason: Silver and gold are less active metals.
Codes
(a) Both A and R are true, and R is correct explanation of the assertion.
(b) Both A and R are true, but R is not the correct explanation of the assertion.
(c) A is true, but R is false.
(d) A is false, but R is true.

93) **Assertion:** The oxides of sulphur and phosphorus are acidic in nature.
Reason: Metal oxides are basic in nature.
Codes
(a) Both A and R are true, and R is correct explanation of the assertion.
(b) Both A and R are true, but R is not the correct explanation of the assertion.
(c) A is true, but R is false.
(d) A is false, but R is true.

94) **Assertion:** Bromine cannot displace chlorine from its salt solution.
Reason: Chlorine is more reactive than bromine.
Codes
(a) Both A and R are true, and R is correct explanation of the assertion.
(b) Both A and R are true, but R is not the correct explanation of the assertion.
(c) A is true, but R is false.
(d) A is false, but R is true.

95) **Assertion:** MgO exists in liquid state.
Reason: The electrostatic forces of attraction between Mg^{2+} and 0 2^{-} ions constitute ionic bond.
Codes
(a) Both A and R are true, and R is correct explanation of the assertion.
(b) Both A and R are true, but R is not the correct explanation of the assertion.
(c) A is true, but R is false.
(d) A is false, but R is true.

96) **Assertion:** On reacting with water, calcium starts floating over water.
Reason: Calcium reacts with cold water at room temperature.
Codes
(a) Both A and R are true, and R is correct explanation of the assertion.
(b) Both A and R are true, but R is not the correct explanation of the assertion.
(c) A is true, but R is false.
(d) A is false, but R is true.

97) **Assertion:** The arrangement of metals in order of decreasing reactivities is called reactivity series.
Reason: Metals at the top of series are very reactive and metals at the bottom are least reactive.
Codes
(a) Both A and R are true, and R is correct explanation of the assertion.
(b) Both A and R are true, but R is not the correct explanation of the assertion.
(c) A is true, but R is false.
(d) A is false, but R is true.

98) **Assertion:** Non-metals are electronegative in nature.
Reason: They have tendency to lose electrons.
Codes
(a) Both A and R are true, and R is correct explanation of the assertion.
(b) Both A and R are true, but R is not the correct explanation of the assertion.
(c) A is true, but R is false.
(d) A is false, but R is true.

99) **Assertion:** Ionic compounds have high melting and boiling points.
Reason: A large amount of energy is required to break the strong inter-ionic attraction in ionic compounds
Codes
(a) Both A and R are true, and R is correct explanation of the assertion.
(b) Both A and R are true, but R is not the correct explanation of the assertion.
(c) A is true, but R is false.
(d) A is false, but R is true.

100) **Assertion:** Metals in general have very high melting and boiling points.
Reason: Metals have the strongest chemical bonds which are metallic in nature.
Codes
(a) Both A and R are true, and R is correct explanation of the assertion.
(b) Both A and R are true, but R is not the correct explanation of the assertion.
(c) A is true, but R is false.
(d) A is false, but R is true.

101) **Assertion:** Electrovalency of Na is +1.
Reason: The number of electrons which an atom either loses or gains in the formation of an ionic bond is known as its valency.
Codes
(a) Both A and R are true, and R is correct explanation of the assertion.
(b) Both A and R are true, but R is not the correct explanation of the assertion.
(c) A is true, but R is false.
(d) A is false, but R is true.

102) **Assertion:** Metals generally act as reducing agents.
Reason: The reducing character is expressed in terms of electron releasing tendency.
Codes
(a) Both A and R are true, and R is correct explanation of the assertion.
(b) Both A and R are true, but R is not the correct explanation of the assertion.
(c) A is true, but R is false.
(d) A is false, but R is true.

103) **Assertion:** Magnesium reacts with oxygen upon heating and burns brightly to form magnesium oxide.
Reason: Magnesium oxide is basic in nature.
Codes
(a) Both A and R are true, and R is correct explanation of the assertion.
(b) Both A and R are true, but R is not the correct explanation of the assertion.
(c) A is true, but R is false.
(d) A is false, but R is true.

104) **Assertion:** The reaction of calcium with water is less violent in comparison to that of sodium.
Reason: The heat evolved is not sufficient for the hydrogen to catch fire.
Codes
(a) Both A and R are true, and R is correct explanation of the assertion.
(b) Both A and R are true, but R is not the correct explanation of the assertion.
(c) A is true, but R is false.
(d) A is false, but R is true.

105) **Assertion:** C and N do not react with dil. HCI and dil. H_2 SO_4.

Reason: Metals do not react with dil. HCI and dil. H_2 SO_4.

Codes

(a) Both A and R are true, and R is correct explanation of the assertion.

(b) Both A and R are true, but R is not the correct explanation of the assertion.

(c) A is true, but R is false.

(d) A is false, but R is true.

106) **Assertion:** Copper displaces silver from silver nitrate solution.

Reason: Copper is more reactive than silver.

Codes

(a) Both A and R are true, and R is correct explanation of the assertion.

(b) Both A and R are true, but R is not the correct explanation of the assertion.

(c) A is true, but R is false.

(d) A is false, but R is true.

107) **Assertion:** Aluminum oxide and zinc oxide are acidic in nature.

Reason: Amphoteric nature means that substance have both acidic and basic character.

Codes

(a) Both A and R are true, and R is correct explanation of the assertion.

(b) Both A and R are true, but R is not the correct explanation of the assertion.

(c) A is true, but R is false.

(d) A is false, but R is true.

108) **Assertion (A)** In the following reaction.

$ZnO + C \rightarrow Zn + CO$

ZnO undergoes reduction.

Reason (R) Carbon is a reducing agent that reduces ZnO to Zn.

(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.

(b) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.

(c) Assertion is true, but Reason is false.

(d) Assertion is false, but Reason is true.

109) **Assertion (A)** A piece of zinc metal gets reddish brown coating when kept in copper sulphate solution for some time.

Reason (R) Copper is more reactive metal than zinc.

(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.

(b) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.

(c) Assertion is true, but Reason is false.

(d) Assertion is false, but Reason is true.

110) **Assertion (A)** Oxides of metals show basic characters.

Reason (R) Oxides of metals react with acid to form salt and water.

(a) Both A and R are true and R is the correct explanation of A

(b) Both A and R are, but R is not the correct explanation of A

(c) A is true, but R is false

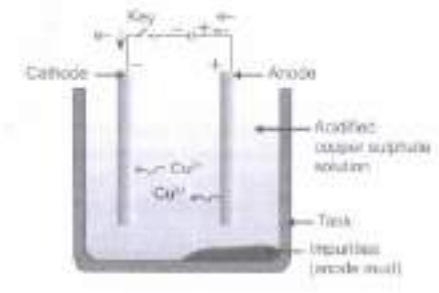
(d) A is false, but R is true

Passage Based Questions 4 x 1 = 4

111) When the statue of liberty was gifted to the US from France in 1885, it was actually shiny copper coloured. But the statue changed from its shiny copper colour to a dull brown, and finally to its blue-green colour of today. This was as a result of reactions between copper and the air - when copper gave up electrons to oxygen. But it was more than one reaction - the colour change is due to about 30 years worth of different reactions. These reactions led to a mixture of greenish mineral that formed on the outside of the statue These reactions involved sulphur, which comes from natural processes such as volcanic eruptions, but also from man-made emissions from cars, boats, airplanes as well as factories.
Answer the following questions based on the above information
(a) Give reactions of extraction of copper from its sulphide ore.
(b) What would be the colour of copper when it reacts with oxygen?
(c) What will give copper a green colour?
(d) Give equation of reaction of copper with oxygen.

112) Mercury is a shiny, liquid metal. It is a transition metal. Its brick red form is the most common ore for refining elemental mercury and is the historic source for the brilliant red or scarlet pigment termed vermilion. It is a poor conductor of heat if compared with other metals but it is a fair conductor of electricity. Mercury occurs in deposits throughout the world as mercuric sulphide. Mercury is used in thermometers, barometers, float valves, etc.
Answer the following questions based on the above information
(a) Name one ore of mercury.
(b) Define roasting.
(c) Give the chemical formula of the ore discussed in paragraph and write one property of mercury which is an exception from other metals.
(d) Name the alloy of mercury which is used in dental filling.

113) Many metals, such as copper, zinc, tin, nickel, silver, gold, etc., are refined electrolytically. In this process, the impure metal is made the anode and a thin strip of pure metal is made the cathode. A solution of the metal salt is used as an electrolyte. The apparatus is set up as shown in figure. On passing the current through the electrolyte, the pure metal from the anode dissolves into the electrolyte. An equivalent amount of pure metal from the electrolyte is deposited on the cathode. The soluble impurities go into the solution whereas, the insoluble impurities settle down at the bottom of the anode and are known as anode mud.



Answer the following questions based on the above information
(a) What is an electrolyte?
(b) What is an anode?
(c) What is a cathode?
(d) What is anode mud ?

114) The rusting of iron can be prevented by painting, oiling, greasing, galvanising, chrome prating, anodising or making alloys. Galvanisation is a method of protecting steel and iron from rusting by coating them with a thin layer of zinc. The galvanised article is protected against rusting even if the zinc coating is broken.

Alloying is a very good method of improving the properties of a metal. We can get the desired properties by this method. For example, iron is the most widely used metal. But it is never used in its pure state. This is because pure iron is very soft and stretches easily when hot. But, if it is mixed with a small amount of carbon (about 0.05 %), it becomes hard and strong. When iron is mixed with nickel and chromium, we get stainless steel, which is hard and does not rust. Thus, if iron is mixed with some other substance, its properties change. In fact, the properties of any metal can be changed if it is mixed with some other substance.

The substance added may be a metal or a non-metal. An alloy is a homogeneous mixture of two or more metals, or a metal and a nonmetal. It is prepared by first melting the primary metal, and then, dissolving the other elements in it in definite proportions. It is then cooled to room temperature.

Answer the following questions based on the above information

(a) Which metals do not corrode easily?

(b) A green layer is gradually formed on a copper plate left exposed to air for a week in bathroom. What could this green substance be?

(c) Can iron be galvanised with copper?

(d) An alloy has low melting point and is therefore used for manufacturing electric fuse. Name the alloy and write its constituents.

Data Based Questions 3 x 1 = 3

115) The following graph shows the volume of hydrogen collected in two different experiments when dil hydrochloric acid was reacted with zinc and copper metal.

Answer the following questions based on the above information

(a) Name the graph that produces hydrogen gas faster.

(b) Name the metal used in experiment that gave the result for graph-2.

(c) Ways to speed up the slow reaction are

(i) heating the reactions

(ii) cooling the reactants

(iii) using more diluted acid

(iv) using more concentrated acid

(d) The amount of zinc metal used for the above reaction is same but the concentration of acid is changed, what would be the effect on the rate of reaction?

(i) no change

(ii) the speed will increase

(iii) the speed will decrease

(iv) the information is incomplete

116)

Conductors	Substances	p(Ω-m)
Metals:	Silver	1.47×10^{-8}
	Copper	1.72×10^{-8}
	Gold	2.44×10^{-8}
	Aluminium	2.75×10^{-8}
	Tungsten	5.25×10^{-8}
	Steel	20×10^{-8}
	Lead	22×10^{-8}
	Mercury	95×10^{-8}
Alloys:	Manganium(Cu 84%, Mn 12%,Ni 4%)	44×10^{-8}
	Constantan (Cu 60%, Ni 40%)	49×10^{-8}
	Nichrome	100×10^{-8}
	Pure carbon (graphite)	3.5×10^{-5}
	Pure germanium	0.60
	Pure silicon	2300
Insulators:	Amber	5×10^{14}
	Glass	10^{10}- 10^{14}
	Lucite	$> 10^{13}$
	Quartz (fused)	10^{15}-10^{16}
	Sulphur	10^{15}
	Teflon	$> 10^{13}$
	Wood	10^{8}-10^{11}

Answer the following questions based on the above information

(a) Mention two reasons why tungsten is used for making filaments of electric lamps.

(b) State the difference between a wire used in the element of electric heater and in fuse wire.

(c) Which among the following is a better conductor?

(i) Copper (ii) Glass (iii) Sulphur (iv) Aluminium

(d) Which among the following is a better insulator?

(i) Teflon (ii) Wood (iii) Quartz (iv) Glass

117) Five students conducted the experiment to show the reaction of Zinc metals with different acids. The volume of acid was same but the type of acid given was different as shown in the table below. The time was recorded to note the completion of reaction when no more bubbles were formed.

Experiment	**Acid**	**Conceration in mol/ dm^3**	**Time/s**
A	Sulphuric acid	1.0	20
B	Propanoic acid	X	230
C	Nitric acid	1.0	40
D	Nitric acid	X	80

Answer the following questions based on the above information

(a) Which reaction is fastest?

(b) Suggest anyone change that would change the speed of these reactions if all the provided conditions are kept constant.

(c) Name the experiment in which the reaction was slowest.

(i) Setup A (iv) Setup B (c) Setup D (d) Setup C

(d) In experiment C and D the acid used is the same, why is the time taken different?

(i) the amount of acid in D is more

(ii) the amount of acid in D is less

(iii) the concentration of acid in D is more

(iv) The concentration of acid in D is less

2 Marks 156 x 2 = 312

118) 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.

119) Explain the meanings of malleable and ductile.

120) Why is sodium kept immersed in kerosene oil?

121) 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.

122) What would you observe when zinc is added to a solution of Iron (II) sulphate? Write the chemical reaction that takes place.

123) Why do ionic compounds have high melting points?

124) Define the following terms:
(i) Mineral
(ii) Ore
(iii) Gangue

125) What chemical process is used for obtaining a metal from its oxide?

126) 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?

127) Which metals do not corrode easily?

128) What are alloys?

129) 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.

130) What are amphoteric oxides? Give two examples of amphoteric oxides.

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

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

133) State two ways to prevent the rusting of iron.

134) What type of oxides are formed when non-metals combine with oxygen?

135) 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 a 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?

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

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

138) Metal sulphides occur mainly in rocks and the metal halides occur mostly in seas and lakes. What could be the reason for this difference in behaviour?

139) A metal is found in liquid state. It is widely used in instrument for measuring blood pressure. In what form does it occur in nature? How can we extract this metal from its ore?

140) Give reason for the following :
(i) Metals conduct electricity.
(ii) Reaction of nitric acid with metals generally does not evolve hydrogen gas.
(iii) For making gold ornaments, 22 carat gold is preferred to 24 carat gold.

141) State two properties of carbon which are not expected from its classification as a non-metal.

142) Iqbal treated a lustrous 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 he will identify the produced gas. Write chemical equations for both the reactions.

143) During extraction of metals, electrolytic refining is used to obtain pure metals.
(a) Which material will be used as anode and cathode for refining of silver metal by this process?
(b) Suggest a suitable electrolyte also.
(c) In this electrolytic cell, where do we get pure silver after passing electric current?

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

145) Generally, when metals are treated with mineral acids, hydrogen gas is liberated but when metals (except Mn and Mg), treated with HNO_3 , hydrogen is not liberated, why?

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

147) When a metal X is treated with cold water, it gives a base 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.

148) A non-metal X exists in two different forms Y and Z, Y is the hardest natural substance, whereas Z is a good conductor of electricity. Identify X, Y and Z.

149) The following reaction takes place when aluminium powder is heated with MNO_2
$3MnO_2 + 4Al(s) \rightarrow 3Mn(l) + 2Al_2O_3 + Heat$
(a) Is aluminium getting reduced?
(b) Is MnO_2 getting oxidised?

150) Name the constituents of solder alloy. Which property of solder makes it suitable for welding electrical wires?

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

152) 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 reaction involved.

153) Give the formulae of the stable binary compounds that would be formed by the combination of following pairs of elements.
(a) Mg and N_2
(b) Li and O_2
(c) Al and Cl_2
(d) K and O_2

154) What happens when
(a) $ZnCO_3$ is heated in the absence of oxygen?
(b) a mixture of Cu_2O and Cu_2S is heated?

155) 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?

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

157) Name one metal and one non-metal that exist in liquid state at room temperature. Also name two metals having melting point less than 310 K (37^oC)

158) 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.

159) An alkali metal A gives a compound B (molecular mass = 40) 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 reaction involved.

160) Give the reaction involved during extraction of zinc from its ore by
(a) Roasting of zinc ore
(b) Calcination of zinc ore

161) A metal M does not liberate hydrogen from acids but reacts with oxygen to give a black colour product and also explain the reaction of M with oxygen.

162) An element forms an oxide A_2O_3 which is acidic in nature. Identify A as a metal are non-metal.

163) A solution of $CuSO_4$ 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.

164) What is the purpose of quenching steel?

165) State a reaction in which SO_2 acts as an oxidising agent.

166) Name a non-metal which is in liquid state and a metal which is found in liquid state.

167) Name two metals which do not react with oxygen.

168) What are two types of reducing agents used to reduce metal oxide?

169) What seems to happen when a piece of sodium metal is dropped into water?

170) What are ionic bonds?

171) Name two alloys of copper.

172) What is concentration of ore?

173) Name the catalyst used in the manufacture of ammonia by Haber's Process.

174) What makes silver turn black and copper turn green when kept exposed for few days?

175) Name two allotropes of carbon.

176) Name three common types of ores where metal exists in nature.

177) Name two metals both of which are very ductile as well as very malleable.

178) Name the ores of mercury.

179) Name two metals which are stored by keeping them immersed in kerosene.

180) What is amalgam?

181) Name a reducing agent that may be used to obtain manganese from manganese dioxide.

182) Name two metals with very low melting point.

183) Define metals.

184) What is solder?

185) Name one metal and non-metal which exists in liquid state at room temperature?

186) Give an example of a metal which is the best conductor of heat.

187) State two physical properties of gold which are of extreme use to jewellers.

188) Name the metal which has very low melting point and can melt with heat of your palm?

189) An element X forms an oxide which turns red litmus blue. Identify whether X is a metal or non-metal

190) Name a non-metal which is lustrous and a metal which is non-lustrous.

191) Make a distinction between metals and nonmetals with respect to the nature of their oxide.

192) Which gas is liberated when a metal reacts with an acid? How will you test the presence of this gas?

193) Name the metal which reacts with a very dilute HNO_3 to evolve hydrogen gas.

194) Why do silver articles become black after sometime when exposed to air?

195) Name two solid metals and two solid non-metals along with their symbols.

196) Name two metals that start floating after sometime when immersed in water and explain why they do so.

197) Explain why calcium metal after reacting With water starts floating on its surface. Write the chemical equation for the reaction.

198) Give reasons for the following:
(i) Metals are good conductors of electricity whereas non-metals are not.
(ii) Ionic compounds have usually high melting and boiling points.

199) Give reason:
(i) Sodium metal is stored under kerosene oil.
(ii) Inspite of being highly reactive, aluminium is still used for making utensils.

200) Give reasons for the following:
(i) School bells are made up of metals.
(ii) Electrical wires are made up of copper.

201) Mercury is the only metal found in the liquid state. It is largely used in thermometers to measure the temperature. But mercury is a very dangerous metal as its density is very high. What two precautions you would take while handling the equipment containing mercury?

202) A metal 'X' combines with a non-metal 'Y' by the transfer of electrons to form a compound Z.
(i) State the type of bond in compound Z.
(ii) What can you say about the melting point and boiling point of compound Z?
(iii) Will this compound dissolve in kerosene or petrol?
(iv) Will this compound be a good conductor of electricity?

203) Write two observations that you will make when an iron nail is kept in an aqueous solution of copper sulphate. Write the chemical equation for this reaction.

204) Out of the two metals P·and Q, P is less reactive than Q. Suggest an activity to arrange these metals in the order of their decreasing reactivity. Support your answer with a suitable chemical equation.

205) Why are aluminium and copper metals used for making cooking vessels?

206) Show the electronic transfers in the formation of $MgCl_2$ from its elements.

207) Mention the names of the metals for the following:
(i) Two metals which are alloyed with iron to make stainless steel.
(ii) Two metals which are used to make jewellary.

208) Write one example of each of
(i) a metal which is so soft that, it can be cut with knife and a non-metal which is the hardest substance.
(ii) a metal and a non-metal which exist as liquid at room temperature.

209) Explain why
(a) iron articles are frequently painted.
(b) iron sheets are coated with zinc layer

210) Write chemical equations that shows aluminium oxide reacts with acid as well as base.

211) Which of the following metals will melt at body temperature (37°C) ? gallium, magnesium, caesium, aluminium.

212) Give reasons for the following:
(a) Gold and silver are used to make jewellery.
(b) Carbonate and sulphide ores are usually converted into oxides prior to reduction during the process of extraction.

213) Give reasons for the following:
(a) Aluminium oxide is considered as an amphoteric oxide.
(b) Ionic compounds conduct electricity in molten state.

214) $X + YSO_4 \longrightarrow XSO_4 + Y$
$Y + XSO_4 \longrightarrow$ No reaction
Out of the two elements, 'X' and 'Y', which is more reactive and why?

215) Give electron dot structure of chlorine and oxygen.

216) Explain why the surface of some metals acquire dull appearance when exposed to air for long time

217) Define alloy. Give two advantages of making alloy

218) Why jewellery made of 24 carat gold is not preferred?

219) What is thermite reaction? Give its one use.

220) How can you obtain pure metal from ores of metals of high reactivity?

221) Metals when react with nitric acid does not release hydrogen gas. Explain.

222) Show the following reactions with balanced equations:
(a) Calcium + Water
(b) Aluminium + Water

223) Name the property of metal used in the following cases:
(a) Aluminium foil
(b) Metal jewellery.
(c) Cable wires
(d) Bells

224) Why are metals good conductors of electricity?

225) Why is aluminium extracted from alumina (Al_2O_3) by electrolytic reduction and not by reducing with carbon?

226) Ionic salts do not conduct electricity in solid state but conducts electricity in molten state

227) The use of iron metal is causing lot of economical loss. Justify this statement

228) Give three points of difference between metals and non-metals based on physical properties.

229) Give reasons:
(i) Aluminium oxide is amphoteric oxide.
(ii) Non-metals do not conduct electricity.
(iii) Metals displace hydrogen gas from acids.

230) Why does calcium float on water?

231) A green layer is gradually formed on a copper plate left exposed to air for a week in a bathroom. What could this green substance be?

232) Name a metal which can be cut with knife

233) What type of oxides are formed when metals combine with oxygen.

234) Name two meta Is which are best conductors of heat.

235) Name two metals which are poor conductors of heat

236) Non-metals are non-lustrous, except one. Name the non-metal that is lustrous.

237) What are such metals called, which are soft, can be cut with knife, low densities and low melting point?

238) Name two metal oxides which are soluble in water

239) why is it that sodium when react with water form sodium hydroxide whereas aluminium forms only aluminium oxid

240) Magnesium when reacts with hot water starts floating. Explain.

241) Name two metals which are ductile and malleable

242) Which ores are converted into metal oxides by calcination?

243) What is gangue?

244) During electrolytic refining of a metal, what type of electrolyte should one take?

245) What is anode mud?

246) What is rust ?

247) Give one use of anhydrous calcium chloride

248) Name two alloys of iron

249) Name two heavy metals

250) Name two sources of heavy metal pollution.

251) Name the solution used to dissolve gold in it.

252) What is aqua-regia?

253) Three metals looks similar in the lab and they are zinc, magnesium and aluminium. A student wants to confirm the identity of each metal. How can he use the reactivity test to do so?

254) The lab attendant made three solutions of zinc sulphate, magnesium sulphate and aluminium sulphate. He forgot to label the reagent bottles. Explain how you can label these bottles by using the metal reactivity studies.

255) While performing an experiment, a student kept the spatula in the test tube containing copper sulphate. Record his observation next day.

256) Name any three metal salts which are white in colour.

257) How will you identify the copper sulphate, iron sulphate and barium sulphate salts in the lab?

258) State the safety precautions for handling metals like sodium or potassium in the lab.

259) Give three safety measures one should take while performing the reactivity series experiment in the lab.

260) What is galvanization?

261) Name the ore of mercury

262) Which property of metal is used in the following case-cable wires, jewellery?

263) Give reasons :
(a) Aluminium oxide is amphoteric oxide.
(b) Metals displace hydrogen gas from acids.

264) Differentiate between calcination and roasting.

265) What is an alloy? State the constituents of solder. Which property of solder makes it suitable for welding electrical wires?

266) (i) Arrange the following metals in the decreasing order of reactivity Na, K, Cu and Ag.
(ii) Although, metals form basic oxides, name one metal which forms an amphoteric oxide.

267) (i) Name one metal which reacts neither with cold water, nor with hot water, but reacts with steam to produce hydrogen gas.
(ii) Show the electron transfer in the formation of $MgCl_2$ from its elements.

268) (i) A piece of granulated zinc was dropped into copper sulphate solution. After sometime, the colour of the solution changed from blue to colourless. Why?
(ii) Arrange the following metals in decreasing order of their reactivity.
Fe, Zn, Na, cu, Ag

269) (i) Name two metals that are obtained by electrolysis of their chlorides in molten form. (ii) Name an alloy that contains a non-metal as one of its constituents.

270) (i) A metal oxide on being heated with carbon does not produce carbon dioxide. Give a possible explanation for this behaviour of the metal oxide.
(ii) A metalic element M, has the following properties.
- floats on water
- can be cut with a knife
- occurs naturally as its chloride, of formula, MCI_2
- its oxide dissolves in water to form the hydroxide.
(a) State the method of manufacture of the metal M.
(b) Name the major byproduct obtained in the process.

271) Zn is more reactive than Fe. Therefore, it should get corroded faster than Fe. But it does not happen, instead, it is used to galvanise iron. Explain why does it happen so?

272) Carbon cannot reduce the oxides of sodium, magnesium and aluminium to their respective metals. Why? Where are these metals placed in the reactivity series. How are these metals obtained from their ores?

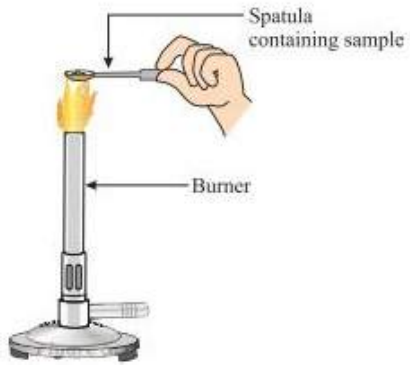
273) When a few drops of barium chloride solution are added to an aqueous solution of sodium sulphate, a white precipitate is obtained.
(a) Write balanced chemical equation for the reaction involved.
(b) What is the other name of this precipitation reaction? Why is it called so?

Activity Based Questions 15 x 2 = 30

274) 1.Take samples of sodium chloride, potassium iodide, barium chloride or any other salt from the science laboratory.

2.What is the physical state of these salts?

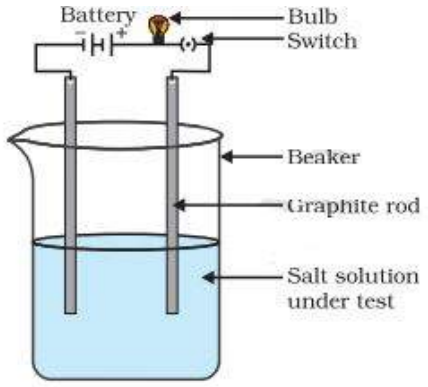
3.Take a small amount of a sample on a metal spatula and heat directly on the flame (Fig) Repeat with other samples.



4.What did you observe? Did the samples impart any colour to the flame? Do these compounds melt?

5.Try to dissolve the samples in water, petrol and kerosene. Are they soluble?

6.Make a circuit as shown in Fig. and insert the electrodes into a solution of one salt. What did you observe? Test the other salt samples too in this manner.



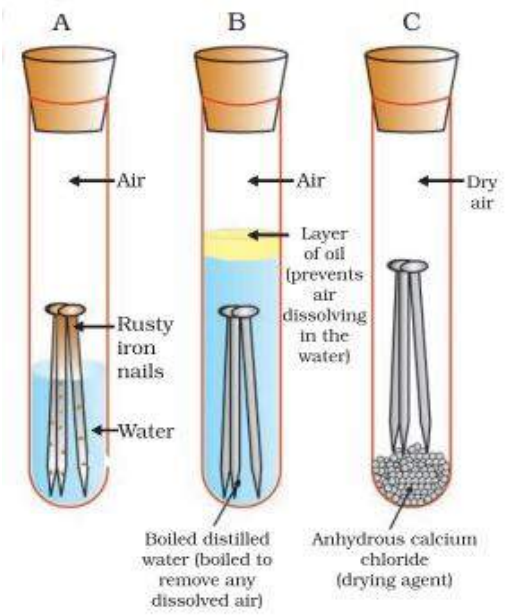
7.What is your inference about the nature of these compounds?

275) 1.Take three test tubes and place clean iron nails in each of them.

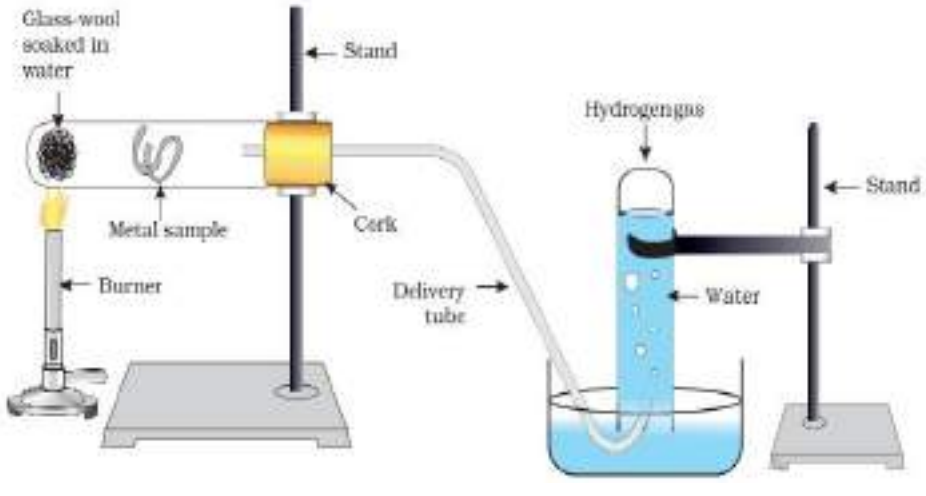
2. Label these test tubes A, B and C. Pour some water in test tube A and cork it.

3. Pour boiled distilled water in test tube B, add about 1 mL of oil and cork it. The oil will float on water and prevent the air from dissolving in the water.

4. Put some anhydrous calcium chloride in test tube C and cork it. Anhydrous calcium chloride will absorb the moisture, if any from the air. Leave these test tubes for a few days and then observe Fig



276) 1. Put small pieces of the samples separately in beakers half-filled with cold water.
2. Which metals reacted with cold water? Arrange them in the increasing order of their reactivity with cold water.
3. Did any metal produce fire on water?
4. Does any metal start floating after some time?
5. Put the metals that did not react with cold water in beakers half-filled with hot water.
6. For the metals that did not react with hot water, arrange the apparatus as shown in (Fig) and observe their reaction with steam.



7. Which metals did not react even with steam?
8. Arrange the metals in the decreasing order of reactivity with water.

277) 1. Collect all the metal samples except sodium and potassium again. If the samples are tarnished, rub them clean with sand paper.

CAUTION:

Do not take sodium and potassium as they react vigorously even with cold water.
2. Put the samples separately in test tubes containing dilute hydrochloric acid.
3. Suspend thermometers in the test tubes, so that their bulbs are dipped in the acid.
4. Observe the rate of formation of bubbles carefully.
5. Which metals reacted vigorously with dilute hydrochloric acid?
6. With which metal did you record the highest temperature?
7. Arrange the metals in the decreasing order of reactivity with dilute acids.

278) 1. Take small pieces of iron, copper, aluminium, and magnesium.
2. Try to cut these metals with a sharp knife and note your observations.
3. Hold a piece of sodium metal with a pair of tongs.

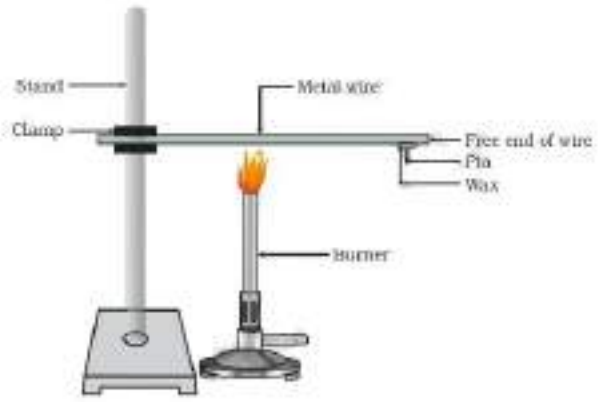
CAUTION:

Always handle sodium metal with care. Dry it by pressing between the folds of a filter paper.
4. Put it on a watch-glass and try to cut it with a knife.
5. What do you observe?

279) 1. Take samples of iron, copper, aluminium and magnesium. Note the appearance of each sample.
2. Clean the surface of each sample by rubbing them with sand paper and note their appearance again.

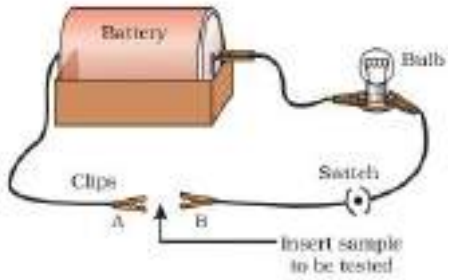
280) 1. Take pieces of iron, zinc, lead and copper.
2. Place any one metal on a block of iron and strike it four or five times with a hammer. What do you observe?
3. Repeat with other metals.
4. Record the change in the shape of these metals.

281) 1. Take an aluminium or copper wire. Clamp this wire on a stand, as shown in (Fig)



2. Fix a pin to the free end of the wire using wax.
3. Heat the wire with a spirit lamp, candle or a burner near the place where it is clamped.
4. What do you observe after some time?
5. Note your observations. Does the metal wire melt ?

282) 1. Set up an electric circuit as shown in (Fig)
2. Place the metal to be tested in the circuit between terminals A and B as shown.
3. Does the bulb glow? What does this indicate?

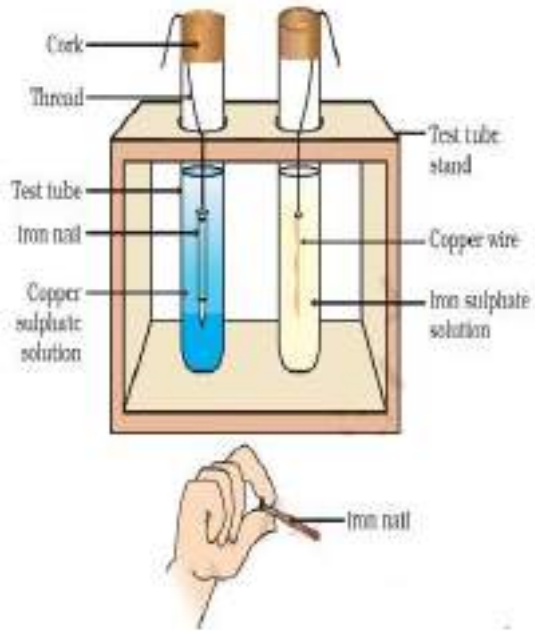


283) Collect samples of carbon (coal or graphite), sulphur and iodine.

284) 1.Take a magnesium ribbon and some sulphur powder.
2. Burn the magnesium ribbon. Collect the ashes formed and dissolve them in water.
3. Test the resultant solution with both red and blue litmus paper.
4. Is the product formed on burning magnesium acidic or basic?
5. Now burn sulphur powder. Place a test tube over the burning sulphur to collect the fumes produced.
6. Add some water to the above test tube and shake.
7. Test this solution with blue and red litmus paper.
8. Is the product formed on burning sulphur acidic or basic?
9. Can you write equations for these reactions?

285) **CAUTION**: The following activity needs the teacher's assistance. It would be better if students wear eye protection
1. Hold any of the samples taken above with a pair of tongs and try burning over a flame. Repeat with the other metal samples.
2. Collect the product if formed.
3. Let the products and the metal surface cool down.
4. Which metals burn easily?
5. What flame colour did you observe when the metal burnt?
6. How does the metal surface appear after burning?
7. Arrange the metals in the decreasing order of their reactivity towards oxygen.
8. Are the products soluble in water?

286) 1. Take a clean wire of copper and an iron nail.
2. Put the copper wire in a solution of iron sulphate and the iron nail in a solution of copper sulphate taken in test tubes (Fig).



3. Record your observations after 20 minutes.
4. In which test tube did you find that a reaction has occurred?
5. On what basis can you say that a reaction has actually taken place?
6. Write a balanced chemical equation for the reaction that has taken place.
7. Name the type of reaction.

287) List the metals whose wires you have seen in daily life.

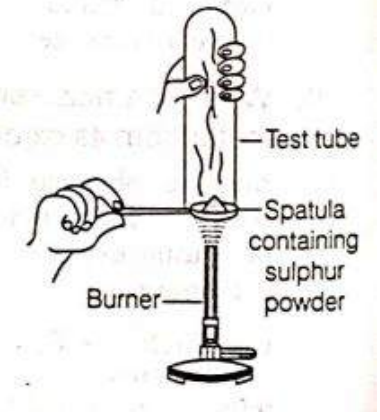
288) 1. Consider some metals such as iron, copper, aluminium, lead, etc.
2. Which of the above metals are also available in the form of wires?

3 Marks 60 x 3 = 180

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

290) Differentiate between metals and non-metals on the basis of their chemical properties.

291) 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 the 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.



292) Describe with a labelled diagram, the froth Floatation Process used to separate the gangue from a Sulphide ore.

293) On adding dilute HCl acid to copper oxide powder, the solution formed is blue-green. Predict the new compound formed which imparts a blue-green colour to the solution.

294) Name a major ore from which iron is extracted. Write chemical equations for the reactions that take place in the blast furnace for the extraction of iron from this ore.

295) (a) Name the chief ore of iron. Write its formula.
(b) How is an iron ore concentrated? Describe it briefly.
(c) Draw a labelled diagram of the blast furnace used in the extraction of iron from its concentrated ore.

296) (i) Name an important oxide ore of iron.
(ii) Describe the extraction of iron from those ore under the following heads:
(a) Reduction of the concentrated ore
(b) Diagram of the furnace used
(c) Chemical equations for the reactions involved

297) Give reasons for the following :
(i) Metals are regarded as electro-positive elements
(ii) When a piece of copper metal is added to a solution of zinc sulphate, no change takes place, but the blue colour of copper sulphate fades away when a piece of zinc is placed in its solution.
(iii) Articles made of alimunium do not corrode even though aluminium is an active metal.

298) (a) What are amphoteric oxides? Choose the amphoteric oxides from amongst the following oxides?
Na_2O, ZnO, Al_2O_3, CO_2, H_2O.
(b) Why is it that non-metals do not displace hydrogen from dilute acids?

299) From amongst the metals sodium, calcium, aluminium, copper and magnesium, name the metal.
(i) which reacts with water only on boiling and
(ii) another which does not react even with steam.

300) Give reasons for the following:
(a) Metals can be given different shapes according to our needs.
(B) Hydrogen is not evolved when a metal reacts with nitric acid.

301) Why do ionic compounds conduct electricity?

302) Name two metals which react violently with cold water. Write any three observation you would make when such a metal is dropped into water. How would you identify the gas evolved, if any during the reaction?

303) Why do covalent compounds have low melting point?

304) What are 'mineral' and 'ore'?

305) State five points of differences between ionic compound and covalent compound.

306) Point out any 3 differences between calcination and roasting.

307) List three properties of sodium in which it differs from the general physical properties of most metals.

308) (a) Compare the properties of typical metal and non-metal on the basis of the following:
(i) Nature of the oxide formed by them
(ii) Conductivity.
(b) Name a non-metal which is lustrous and a metal which is liquid at the room temperature.

309) Write one example of each of the following:
(i) Most malleable metal and most ductile metal.
(ii) The best conductor of heat and the poorest conductor of heat.
(iii) A metal with highest melting point and a metal with lowest melting point.

310) (i) A non-metal X exists in two different forms Y and Z. Y is the hardest natural substance whereas Z is a good conductor of electricity. Identity X, Y, Z.
(ii) A element, X, on reaction with oxygen forms an oxide XO_2. The oxide when dissolved in water turns blue litmus red. State whether element X is a metal or a non-metal.
(iii) Name the metal which is alloyed with copper to make bronze.

311) Write three differences between metals and non-metals on the basis of chemical properties.

312) State reason for the following:
(i) Non-metals cannot displace hydrogen from the acids.
(ii) Hydrogen is not a metal, yet it is placed in the activity series of metals.
(iii) Aluminium is more reactive than iron, yet its corrosion is less than that of iron

313) Give reasons for the following:
(i) Metals conduct electricity.
(ii) Reaction of nitric acid with metals generally does not evolve hydrogen gas.
(iii) For making gold ornaments, 22 carat gold is preferred to 24 carat gold.

314) Give reasons for the following:
(i) Aluminium is a reactive metal but is still used for packing food articles.
(ii) Calcium starts floating when water is added to it.

315) (a) Arrange the following metals in the order of their decreasing activities: Aluminium, Gold, Sodium, Copper
(b) Give chemical equation for the reaction of aluminium powder with manganese dioxide on heating.

316) Write the balanced chemical equation for the following reactions:
(i) When copper is heated in air.
(ii) When aluminum is heated in air.
(iii) Aluminium oxide reacts with sodium hydroxide.

317) Describe an activity to show that the rusting of iron occurs in the presence of air and moisture.

318) You are given samples of three metals: Sodium, magnesium and copper. Suggest any two activities to arrange them in order to their decreasing reactivity

319) (a) Show the formation of NaCI from sodium and chlorine atoms by the transfer of electrons?
(b) Why sodium chloride has a high melting point?
(c) Name the anode and the cathode used in electrolytic refining of impure copper metal.

320) (a) Show the formation of Na_2O by the transfer of electrons between the combining atoms.
(b) Why are ionic compounds usually hard?
(c) How is it that ionic compounds in the solid state do not conduct electricity but they do so when in molten state?

321) (a) Show on a diagram the transfer of electrons between the atoms in the formation of MgO.
(b) Name the solvent in which ionic compounds are generally soluble.
(c) Why are aqueous solutions of ionic compounds able to conduct electricity?

322) (a) Name a metal for each case
(i) it does not react with cold as well as hot water but reacts with steam.
(ii) it does not react with any physical state of water.
(b) When calcium metal is added to water the gas evolved does not catch fire, on adding sodium metal to water catches fire. Why is it so?

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

324) Using the electronic configurations, explain how magnesium atom combines with oxygen atom to form magnesium oxide by transfer of electrons.

325) 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 a poor conductor of heat

326) (a) Explain the formation of ionic compound CaO with electron dot structure. Atomic number of calcium and oxygen are 20 and 8 respectively.
(b) Name the constituent metals of bronze.

327) 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.
(ii) Name and write chemical formula of the green coating formed on the metal.
(iii) List two important methods to prevent the process.

328) Write balanced equations for the reaction of:
(i) aluminium when heated in air. Write the name of the product.
(ii) iron with steam. Name the product obtained.
(iii) calcium with water. Why does calcium start floating in water?

329) Write balanced chemical equations for the following reactions:
(a) Dilute sulphuric acid reacts with aluminium powder.
(b) Dilute hydrochloric acid reacts with sodium carbonate.
(c) Carbon dioxide is passed through lime water.

330) Suggest a method of reduction for the following metals during their metallurgical processes:
(i) metal 'A ' which is one of the last, second or third position in the reactivity.
(ii) metal 'B' which gives vigorous reaction even with water and air.
(iii) metal 'C' which is kept in the middle of activity series.

331) (a) Define activity series of metals. Arrange the metals gold, copper, iron and magnesium in order of their increase in reactivity.
(b) What will you observe when:
(i) Some zinc pieces are put in copper sulphate solution.
(ii) Some silver pieces are put into green coloured ferrous sulphate solution.

332) You are given samples of three metals. Sodium, magnesium and copper. Suggest any two activities to arrange them in order of decreasing activity.

333) State three reasons for the following facts
(i) Sulphur is a non-metal
(ii) Magnesium is a metal
One of the reasons must be supported with a chemical equation

334) What is cinnabar? How is metal extracted from cinnabar? Explain briefly.

335) (a) Write the electron dot structures for potassium and chlorine.
(b) Show the formation of KCI by the transfer of electrons.
(c) Name the ions present in the compound KCl.

336) (a) State the electron-dot structures for calcium and sulphur.
(b) Show the formation of CaS by the transfer of electrons.
(c) Name the ions present in this compound CaS. Atomic number of Ca = 20, O = 16.

337) A reddish brown metal used in electrical wires when powdered and heated strongly turns black. When hydrogen gas is passed over this black substance, it regains its original colour. Based on this lnformation answer the following questions.
(i) Name the metal and the black substance formed.
(ii) Write balanced chemical equations for the two reactions involved in the above information.

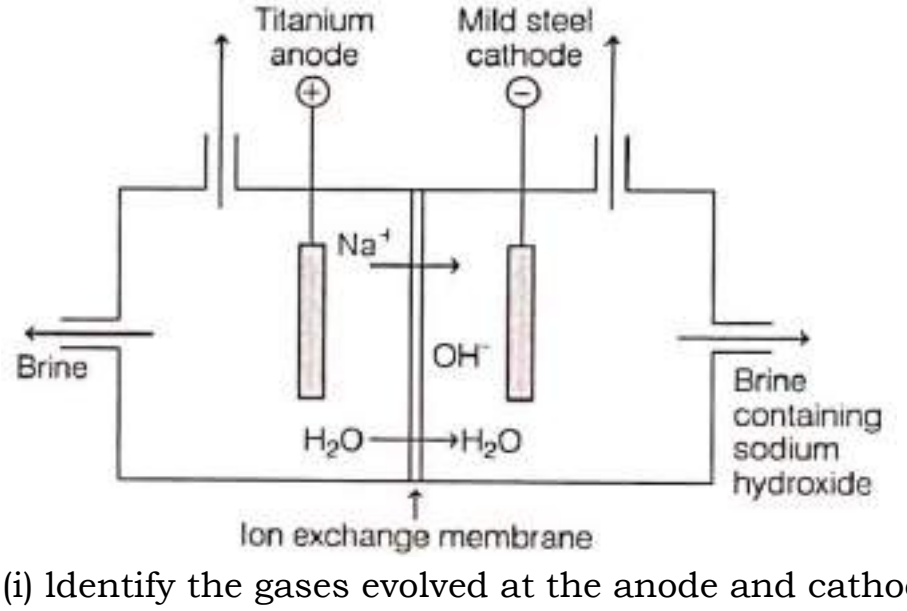
338) State reasons for the following.
(i) Zinc oxide is an amphoteric oxide.
(ii) Sodium metal is stored in bottle filled with metals, generally hydrogen gas is not evolved.
(iii) In the reactions of nitric acid with metals generally hydrogen gas is not evolved.

339) (i) By the transfer of electrons, Illustrate the formation of bond in magnesium chloride and Identify the ions present in this compound.
(ii) lonic compounds are solids. Give reason.
(iii) With the help of a labelled diagram show the experimental Set up of action of steam on a metal.

340) State giving reason the reduction process to obtain the following metals from their compounds:
(i) Mercury
(ii) Copper and
(iii) Sodium

341) State giving reason for the change in appearance observed when each of the following metal is exposed to atmospheric air for some time:
(i) Silver,
(ii) Copper and
(iii) Iron

342) Consider the following diagram.



(i) ldentify the gases evolved at the anode and cathode in the above experimental set up.
(ii) Name the process that occurs. Why is it called so?
(iii) Illustrate the reaction of the process with the help of a chemical equation.

343) How is the method of extraction of metals high up in the reactivity series different from that for metals in the middle? Why can be same process not be applied for them? Name the process used for the extraction of these metals.

344) A metal X, which is used in thermite process, when heated with oxygen gives an oxide Y which is amphoteric in nature. Identify X and Y. Write balanced chemical equations of the reactions of oxide Y with hydrochloric acid and sodium hydroxide.

345) Write electronic configuration of sodium (at. no. 11) and oxygen (at. no. 8) and show the formation of the ionic compound obtained when these two elements combine. Name anion and cation present in the compound.

346) Explain the process of electrolytic refining for copper with the help of a labelled diagram.

347) The thermite process is used for repairing cracks in railway tracks on site.
(i) Write the equation for the reaction taking place in the process, mentioning the physical state of the reactants and products.
(ii) What information in the chemical equation indicates that the reaction is exothermic?

348) Write the constituents of solder alloy. Which property of solder makes it suitable for welding electrical wires?

Case Study Questions 13 x 4 = 52

349) The chemical reactivity of an element depends upon its electronic configuration. All elements having less than eight electrons in the outermost shell show chemical reactivity. During chemical reactions, atoms of all elements tend to achieve a completely filled valence shell. Metals are electropositive in nature. They have tendency to lose one or more electrons present in the valence shell of their atoms to form cations and achieve nearest noble gas configuration. The compounds formed by the transfer of electrons from one element to other are known as ionic or electrovalent compounds.

(i) The electronic configurations of three elements X, Y and Z are:

X : 2 Y: 2, 8, 7 Z : 2, 8, 2

Which of the following is correct regarding these elements?

(a) X is a metal. **(b) Y is a metal.**

(c) Z is a non-metal **(d)Yis a non-metal and Z is a metal**

(ii) Element X reacts with element Y to form a compound Z. During the formation of compound Z, atoms of X lose one electron each whereas atoms of Y gain one electron each. Which of the following properties is not shown by compound Z?

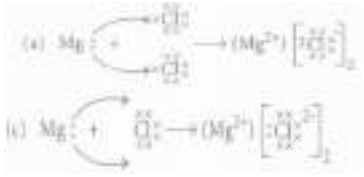
(a) High melting point

(b) Low melting point

(c) Occurrence as solid

(d) Conduction of electricity in molten state

(iii) Which of the following is correct representation of formation of magnesium chloride?



(d) None of these

(iv) The electronic configuration of sodium ion is

(a) 2,8,8 **(b) 2,8,2.** **(c) 2,6** **(d) 2,8.**

(v)Which of the following represents an electropositive element?

(a) 2,8,6 **(b) 2,8,8** **(c) 2,8,8,1** **(d) 2, 7**

350) The arrangement of metals in a vertical column in the decreasing order of their reactivities is called the reactivity series or activity series of metals. The most reactive metal is at the top position of the reactivity series. The least reactive metal is at the bottom of the reactivity series.

Hydrogen, though a non-metal, has been included in the activity series of metals only for comparison. Apart from it, the hydrogen atom also has tendency to lose its valence electron and form cation which behaves like metal.

$H \rightarrow H^+ + e^-$

(i) Which metal can be displaced by copper from its salt solution?

(a) Zinc **(b) Silver** **(c) Iron** **(d) Lead**

(ii) An element 'X after reacting with acids liberates hydrogen gas and can displace lead and mercury from their salt solutions. The metal 'X is

(a) copper **(b) gold** **(c) calcium** **(d) hydrogen.**

(iii) the most reactive metal is

(a) potassium **(b) barium** **(c) zinc** **(d) calcium**

(iv) The metal which does not liberate hydrogen gas after reacting with acid is

(a) zinc **(b) lead** **(c) iron** **(d) gold**

(v) Which of the following metals does not react with water at all?

(I) Sodium

(II) Copper

(III) Aluminium

(IV) Lead

(a) I and III only **(b) IV only** **(c) II and IV only** **(d) I, II, III and IV**

351) Metals as we know, are very useful in all fields, industries in particular. Non-metals are no less in any way. Oxygen present in air is essential for breathing as well as for combustion. Non-metals form a large number of compounds which are extremely useful, e.g., ammonia, nitric acid, sulphuric acid, etc. Non-metals are found to exist in three states of matter. Only solid non-metals are expected to be hard however, they have low density and are brittle. They usually have low melting and boiling points and are poor conductors of electricity.

(i)_____ is a non-metal but is lustrous

(a) Phosphorus (b) Sulphur (c) Bromine (d) Iodine

(ii) Which of the following is known as 'King of chemicals'?

(a) Urea (b) Ammonia X (c) Sulphuric acid (d) Nitric acid

(iii) Which of the following non-metals is a liquid?

(a) Carbon (b) Bromine (c) Iodine (d) Sulphur

(iv) Hydrogen is used

(a) for the synthesis of ammonia (b) for the synthesis of methyl alcohol

(c) in welding torches (d) all of these

(v) Generally, non-metals are bad conductors of electricity but 'X' which is a form of carbon is a good conductor of electricity and is an exceptional non-metal. 'X'is

(a) diamond (b) graphite (c) coal (d) coke.

352) Ionic compound is a chemical compound in which ions are held together by ionic bonds. An ionic bond is the type of chemical bond in which two oppositely charged ions are held through electrostatic forces. We know that, metal atoms have loosely bound valence electrons in their valence shell and non-metal atoms need electrons in their valence shell to attain noble gas configuration. The metal atom loses the valence electrons while non-metal atom accepts these electrons. By losing electrons, metal atoms change to cations and by accepting electrons, non-metals form anions. Ionic compounds are generally solid and exist in the form of crystal. They have high melting and boiling points.

(i) Which of the following can change to a cation?

(a) Fluorine (b) Oxygen (c) Potassium (d) Neon

(ii) Which of the following can change to an anion?

(a) Iodine (b) Magnesium (c) Calcium (d) Xenon

(iii) Ionic compounds are soluble in _____.

(a) Kerosene (b) Petrol (c) Water (d) None of these

(iv) Which of the following statements is correct about ionic compounds?

I. They conduct electricity in solid state.

II. They conduct electricity in solutions.

III. They conduct electricity in molten state.

(a) I only (b) II only (c) III only (d) II and III only

(v) Select the incorrect statement.

(a) Ionic compounds are generally brittle

(b) Ions are the fundamental units of ionic compounds

(c) Formation of ionic bonds involve sharing of electrons

(d) NaCl is an ionic compound.

353) An element is a pure substance made up of same kind of atoms. At present, nearly 118 elements are known but all of them do not occur free in nature, some of them have been synthesized by artificial methods. Based on their properties, they are mainly classified as metals and non-metals. Metals are those elements which lose electrons and form positive ions i.e., they are electropositive in nature. They are generally hard, good conductors of heat and electricity, malleable, ductile and have striking lustre. They have a significant role to play in our daily life.

(i) Metals which are of vital importance to the national defence, energy and industry sector are called strategic metals. Which of the following is a strategic metal?

(a) Titanium **(b) Zirconium** **(c) Manganese** **(d) All of these**

(ii) Which metal is the best conductor of electricity?

(a) Silver **(b) Platinum** **(c) Nickel** **(d) Iron**

(iii) Which of the following metals is not a coinage metal?

(a) Copper **(b) Silver** **(c) Iron** **(d) Gold**

(iv) Which of the following are the most malleable metals?

(I) Sodium

(II) Gold

(III) Potassium

(IV) Silver

(a) (I) and (IV) **(b) (II) and (III)** **(c) (III) and (IV)** **(d) (II) and (IV)**

Identify the correct statement(s).

(I) The wires that carry current in our homes have a coating of PVC or a rubber like material.

(II) School bells are made of metals.

(III) Metals do not conduct electricity.

(IV) Metals which produce a sound on striking a hard surface are said to be non-sonorous.

(a) (I) and (III) **(b) (I) and (II)** **(c) (III) and (IV)** **(d) Only (II)**

354) The chemical properties of metals are mostly linked with the electron releasing tendency of their atoms. Greater the tendency, more will be the reactivity of the metal. They react with oxygen, water, hydrogen, acids, etc. Since they can lose electrons, they act as reducing agents. Some reactions of metals are given as :

Metal + Oxygen $\longrightarrow$ Metal oxide

Metal + Water $\longrightarrow$7 Metal hydroxide + Hydrogen ..

Metal + $Acid_{(dilute)} \longrightarrow$7 Metal salt + Hydrogen

Metal X + Salt solution of metal Y $\longrightarrow$7 Salt solution of X + Y (Displacement reaction).

(i) Metals such as _____ and _____ react so vigorously that they catch fire if kept in the open. Hence, to protect them and to prevent accidental fires, they are kept immersed in _____.

(a) phosphorus, magnesium, water **(b) sodium, potassium, kerosene oil**

(c) sodium, potassium, water **(d) tin, lead, alcohol**

(ii) Which of the following pairs will give displacement reaction?

(a) NaCl solution and copper metal **(b) $MgCl_2$ solution and aluminium metal**

(c) $FeSO_4$ solution and silver metal **(d) $AgNO_3$ solution and copper metal**

(iii) There are four metals K, L, M and N. Identify them by using the hints given below.

K forms basic oxide.

L forms amphoteric oxide.

Oxide of M dissolves in water to form alkali.

N does not react with water at all.

$(a) K \rightarrow \mathrm{Zn}, L \rightarrow \mathrm{Al}, M \rightarrow \mathrm{Na}, N \rightarrow \mathrm{Fe} (b) K \rightarrow \mathrm{Fe}, L \rightarrow \mathrm{Na}, M \rightarrow \mathrm{K}, N \rightarrow \mathrm{Zn}$

$(c) K \rightarrow \mathrm{K}, L \rightarrow \mathrm{Cu}, M \rightarrow \mathrm{Pb}, N \rightarrow \mathrm{Na} (d) K \rightarrow \mathrm{Cu}, L \rightarrow \mathrm{Zn}, M \rightarrow \mathrm{K}, N \rightarrow \mathrm{Pb}$

(iv) Which metal does not react with dilute hydrochloric acid?

(a) Iron (b) Sodium (c) Zinc (d) Copper

(v) Food cans are coated with tin and not with zinc because

(a) zinc is costlier than tin **(b) zinc has a higher melting point than tin**

(c) zinc is more reactive than tin **(d) zinc is less reactive than tin.**

355) On the basis of reactivity of different metals with oxygen, water and acids as well as displacement reactions, the metals have been arranged in the decreasing order of their reactivities. This arrangement is known as activity series or reactivity series of metals.

The basis of reactivity is the tendency of metals to lose electrons. If a metal can lose electrons easily to form positive ions, it will react readily with other substances. Therefore, it will be a reactive metal. On the other hand, if a meal loses electrons less rapidly to form a positive ion, it will react slowly with other substances. Therefore, such a metal will be less reactive.

(i) Which of the following metals is less reactive than hydrogen?

(a) Copper (b) Zinc (c) Magnesium (d) Lead

(ii) Which of the following metals is more reactive than hydrogen?

(a) Mercury (b) Platinum (c) Iron (d) Gold

(iii) Which of the following metals reacts vigorously with oxygen?

(a) Zinc (b) Magnesium (c) Sodium (d) Copper

(iv) Which of the following represents the correct order of reactivity for the given metals?

$(a) \mathrm{Na} > \mathrm{Mg} > \mathrm{Al} > \mathrm{Cu} (b) \mathrm{Mg} > \mathrm{Na} > \mathrm{Al} > \mathrm{Cu} (c) \mathrm{Na} > \mathrm{Mg} > \mathrm{Cu} > \mathrm{Al} (d) \mathrm{Mg} > \mathrm{Al} > \mathrm{Na} > \mathrm{Cu}$

(v) Hydrogen gas is not evolved when a metal reacts with nitric acid. It is because HNO_3 is a strong oxidising agent. It oxidises the H_2 produced to water and itself gets reduced to any of the nitrogen oxides (N_2O, NO, NO_2). But _____ and _____ react with very dilute HNO_3 to evolve H_2 gas.

(a) Pb, Cu (b) Na, K (c) Mg, Mn (d) AI, Zn

356) Non-metals are highly electronegative in nature. They have a tendency to gain electrons in their valence shell to achieve nearest noble gas configuration. Thus, they form anions and act as good oxidising agents.

$X \quad + ne^- \longrightarrow X^{n-}$

(non-metal atom) (anion)

They react with air or oxygen on heating to form oxides which react with water to form acids. Thus, nonmetal oxides are acidic in nature. Non-metals do not react with dilute acids at all. This is because they are electronegative and therefore, cannot displace hydrogen from acids but they form covalent hydrides when heated with hydrogen.

(i) The acid formed when sulphur trioxide reacts with water is

(a) sulphurous acid **(b) sulphuric acid** **(c) both (a) and (b)** **(d) none of these**

(ii) An element 'X' forms an oxide XO_2 , which is a very useful gas used in the process of photosynthesis. The element 'X' is

(a) sulphur **(b) nitrogen** **(c) carbon** **(d) phosphorus**

(iii) Non-metals generally act as

(a) oxidising agents **(b) reducing agents** **(c) both (a) and (b)** **(d) none of these**

(iv) Which of the following elements produces basic oxide on reacting with oxygen?

(a) Chlorine **(b) Sulphur** **(c) Phosphorus** **(d) Magnesium**

(v) Which of the following is a covalent hydride?

(a) CH_4 **(b) NH_3** **(c) H_2S** **(d) All of these**

357) Although there is no sharp line of distinction between metals and non-metals yet there are some distinctive differences. The main points of differences are:

Property	Metals	Non-metals
Electronic structure	They have 1 to 3 electrons in the outermost shell of their atoms	They have 4 to 8 electrons in the outermost shell of their atoms.
State of existence	They are mostly solid at room temperature except mercury and gallium which are liquid.	They are either solids or gases at room temperature (except bromine which is a liquid).
Density	They have high density.	They have low density.
Nature of ions	They are electropositive elements and hence, lose one or more electrons to form positive ions.	They are electronegative elements and hence, gain one or more electrons to form negative ions.
Nature of chlorides	They generally combine with chlorine to form solid ionic chlorides which conduct electricity in the aqueous solution or in the molten state.	They combine with chlorine to form covalen chlorides. These are either gases or liquids. Non-metal chlorides do not contain ions, therefore, they do not conduct electricity.
Nature of oxides	They form basic oxides, though some oxides are amphoteric also.	They form acidic or neutral oxides.
Displacement of hydrogen from acids	Metals which lie above hydrogen in the reactivity series displace hydrogen from acids.	They do not displace hydrogen from acids.

(i) Match column-I with column-Il and select the correct option using the given code

Column-I	Column-II
P. A metal that forms amphoteric oxides	(I) Ga
Q. A metal which melts when keep on our palm	(II) Au
R. A metal that has highest density	(III) Al
S. A metal which cannot displace hydrogen from acids	(IV) Os

(a) P-(II), Q-(I), R-(lII), S-(lV) **(b) P-(III), Q-(I), R-(IV), S-(II)**

(c) P-(lV), Q-(II), R-(III), S-(I) **(d) P-(lII), Q-(II), R-(I), S-(lV)**

(ii) State True (T) or False (F) for the following statements.

(I) Non-metals react with acids to give a salt and hydrogen gas.

(II) Zinc oxide is amphoteric in nature.

(III) Copper oxide is basic in nature.

(IV) Hydrogen gas is evolved when a metal reacts with dilute acid.

(V) Copper reacts vigorously with dilute HCl.

	(I)	(II)	(III)	(IV)	(V)
(a)	**F**	**F**	**F**	**T**	**T**
(b)	**T**	**F**	**T**	**F**	**F**
(c)	**F**	**T**	**F**	**F**	**T**
(d)	**F**	**T**	**T**	**T**	**F**

(iii) Tick **(✓)** the correct statements and cross (x) the incorrect statements.

(I) Non-metals are either solids or gases except mercury which is a liquid.

(II) Sodium is a metal and can lose its electrons easily.

(III) Most non-metals produce acidic oxides when dissolved in water. Most metals produce basic oxides on reaction with water.

(IV) Graphite is a conductor of electricity.

	(I)	**(II)**	**(III)**	**(IV)**
(a)	✓	✗	✓	✗
(b)	✗	✓	✗	✓
(c)	✗	✓	✓	✓
(d)	✗	✓	✓	✗

(iv) An element X (atomic number 12) reacts with another element Y (atomic number 17) to form a compound Z. Which of the following statements are true regarding this compound?

I. Molecular formula of Z is XY_2

II. It is soluble in water.

III. X and Yare joined by sharing of electrons.

IV. It would conduct electricity in the molten state.

(a) II and III only **(b) I and II only** **(c) I, III and IV only** **(d) I, II and IV only**

(v) Which of the following metals form an amphoteric oxide?

(a) Zn **(b) Ca** **(c) Na** **(d) Cu**

358) Sample pieces of five metals P, Q, R, S and T are added to the tabulated solutions separately. The results observed are shown in the table given below:

Metal	**Solutions**			
	$CuSO_4$	**$ZnSO_4$**	**$FeSO_4$**	**$AgNO_3$**
P	No change	No change	No change	A coating on metal
Q	Brown coating	—	Grey deposit	A coating on metal
R	No change	No change	No change	No change
S	—	No change	No change	Brown deposit
T	Brown deposit	New coating	New coating	New coating

Based on the observations recorded in the table answer the following questions:

(i) Which is the most reactive metal?

(a) Q **(b) R** **(c) S** **(d) T**

(ii) Which is the least reactive metal?

(a) P **(b) R** **(c) T** **(d) Q**

(iii) Activity series of elements is

(a) the arrangement of elements in increasing order of reactivity.

(b) the arrangement of elements in decreasing order of reactivity.

(c) the arrangement of oxides of elements in increasing order of reactivity

(d) none of these.

(iv) Which of the following metal is least reactive?

(a) Zn **(b) Cu** **(c) Ag** **(d) Fe**

(v) Decreasing order of reactivity is

(a) P > Q > R > S > T **(b) Q > T > R > S > P**

(c) T > Q > S > P > R **(d) S > R > Q > T > P**

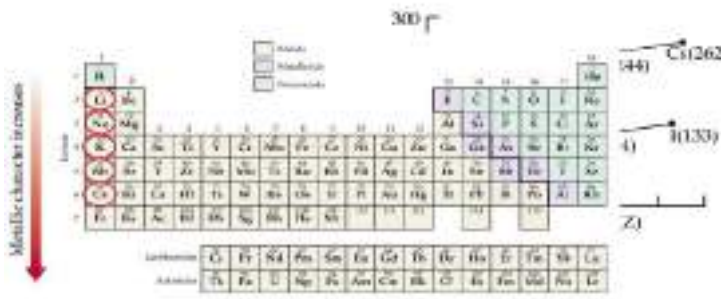
359) Metallic Character

The ability of an atom to donate electrons and form positive ion (cation) is known as electropositivity or metallic character. Down the group, metallic character increases due to increase in atomic size and across the period, from left to right electropositivity decreases due to decrease in atomic size.

Non-Metallic Character

The ability of an atom to accept electrons to form a negative ion (anion) is called non- metallic character or electronegativity. The elements having high electro-negativity have a higher tendency to gain electrons and form anion. Down the group, electronegativity decreases due to increase in atomic size and across the period, from left to right electronegativity increases due to decrease in atomic size.

(i) Which of the following correctly represents the decreasing order of metallic character of Alkali metals plotted in the graph?



(a) Cs > Rb > Li > Na > K (b) K > Rb > Li > Na > Cs

(c) Cs > Rb > K > Na > Li (d) Cs > K > Rb > Na > Li

(ii) Hydrogen is placed along with Alkali metals in the modern periodic table though it shows non-metallic character

(a) as Hydrogen has one electron & readily loses electron to form negative ion

(b) as Hydrogen can easily lose one electron like alkali metals to form positive ion

(c) as Hydrogen can gain one electron easily like Halogens to form negative ion

(d) as Hydrogen shows the properties of non-metals

(iii) Which of the following has highest electronegativity?

(a) F (b) C (c) Br (d) I

(iv) Identify the reason for the gradual change in electronegativity in halogens down group.

(a)Electronegativity increases down the group due to decrease in atomic size

(b)Electronegativity decreases down the group due to decrease in tendency to lose lectrons

(c)Electronegativity decreases down the group due to increase in atomic radius/ tendency to gain electron decreases

(d)Electronegativity increases down the group due to increase in forces of attractions between nucleus & valence electrons

(v) Which of the following reason correctly justifies that "Fluorine (72pm) has smaller atomic radius than Lithium (152pm)"?

(a) F and Li are in the same group. Atomic size increases down the group

(b) F and Li are in the same period. Atomic size increases across the period due to increase in number of shells

(c) F and Li are in the same group. Atomic size decreases down the group

(d) F and Li are in the same period and across the period atomic size/radius decreases from left to right.

360) The melting points and boiling points of some ionic compounds are given below:

Compound	Melting point (K)	Boiling point (K)
NaCl	1074	1686
LiCl	887	1600
$CaCl_2$	1045	1900
CaP	2850	3120
$MgCl_2$	981	1685

These compounds are termed ionic because they are formed by the transfer of electrons from a metal to a non-metal. The electron transfer in such compounds is controlled by the electronic configuration of the elements involved. Every element tends to attain a completely filled valence shell of its nearest noble gas or a stable octet.

(i) Show the electron transfer in the formation of magnesium chloride.

(ii) List two properties of ionic compounds other than their high melting and boiling points.

(iii) While forming an ionic compound say sodium chloride how does sodium atom attain its stable configuration?

Or

(i) Why do ionic compounds in the solid state not conduct electricity?

(ii) What happens at the cathode when electricity is passed through an aqueous solution of sodium chloride?

361) Two students decided to investigate the effect of water and air on iron object under identical experimental conditions. They measured the mass of each object before placing it partially immersed in 10 ml of water. After a few days, the object were removed, dried and their masses were measured. The table shows their results.

Student	Object	Mass of object before rusting in g	Mass of the coated object in g
A	Nail	3.0	3.15
B	Thin plate	6.0	6.33

(i) What might be the reason for the varied observations of the two students?

(ii) In another set up the students coated iron nails with zinc metal and noted that, iron nails coated with zinc prevents rusting. They also observed that zinc initially acts as a physical barrier, but an extra advantage of using zinc is that it continues to prevent rusting even, if the layer of zinc is damaged. Name this process of rust prevention and give any two other methods to prevent rusting.

(iii) In which of the following applications of Iron, rusting will occur most? Support your answer with valid reason.

A. Iron bucket electroplated with zinc.

B. Electricity cables having iron wires covered with aluminium.

C. Iron hinges on a gate.

D. Painted iron fence.

Or

(iii) How is pure iron used for making different alloys?

5 Marks 57 x 5 = 285

362) Samples of four metals A, B, C and D were taken and added to the following solution one by one. The result obtained have been tabulated as follows :

Metals	Iron (II) Sulphate	Copper (II) Sulphate	Zinc Sulphate	Silver Nitrate
A	No reaction	Displacement	-	-
B	Displacement	-	No reaction	-
C	No reaction	No reaction	No reaction	Displacement
D	No reaction	No reaction	No reaction	No reaction

Use the given table above to answer the following questions about metals A, B, C and D

(i) Which is the most reactive metal?

(ii) What would you observed if B is added to a solution of copper (II) sulphate?

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

363) (i) Write the Electron dot structures for sodium, oxygen and magnesium.

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

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

364) Write equations for the reactions of :
(i) iron with steam
(ii) calcium and potassium with water

365) 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 oxide during the process of extraction.

366) A non-metal A which is the largest costituent of air, when heated with H_2 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 periodic table does this non - metal belong?

367) Explain the following
(a) Reactivity of Al decreases if it is dipped in HNO_3.
(b) Carbon cannot reduce the oxides of Na or Mg
(c) NaCl 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.

368) 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.

369) 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.

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

371) 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?

372) What is an alloy? How is an alloy made? List two purpose of making alloys. Mention the constituents and two properties of each of the following alloys.
(i) Stainless steel
(ii) Brass

373) (i) Why Sulphuric acid is called the 'king of chemicals'?
(ii) Name the gas evolved when :
(a) Concentrated Sulphuric acid acts on Sulphur.
(b) Dilute Sulphuric acid acts on Sodium carbonate.
(iii) State the colour change you would observe on adding concentrated sulphuric acid to :
(a) Blue Copper sulphate crystals.
(b) Colourless cane-sugar crystals.

374) (a) Write chemical equations for the reactions involved in obtaining pure alumina from the mineral bauxite which has impurities of iron oxide and silica.
(b) Draw a labelled diagram of the electrolytic tank cell used for the extraction of aluminium from alumina.

375) (a) What is corrosion of metals? Name one metal which does not corrode and one which corrodes on being kept in atmosphere.
(b) How will you show that the rusting of iron needs oxygen and moisture at the same time?

376) (a) What is an '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.

377) (a) Name one main ore of Aluminium. Write its formula. Which two main impurities are associated with this ore?

(b) Describe with chemical equations, the method employed for the enrichment of the above named ore.

378) There are 115 elements known till today. Some of them are metals and some are non-metals. Metals are usually hard, malleable and ductile and have metallic lustre. Non-metals are usually soft, do not possess lustre and are not malleable and ductile. But iodine is a non-metal which has metallic lustre. Iodine is also important for us also. Non-metals are bad conductors of heat and electricity.

(i) Why iodine is important for us?

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

(iii) As a student, what initiative you will take to comment on the statement that "Iodised salt is good for health." Give any two suggestions.

379) Compose an activity to arrange Ca, Mg and Fe metals in the decreasing order of reactivity with water, Write suitable balanced chemical equation and draw diagrams.

380) How is the method of extraction of metals high up in the reactivity series different from that for metals in the middle? Why the same process cannot be applied for them? Explain giving equations, the extraction of sodium.

381) A man went door to door posing to be 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.

(i) Can you play the detective to find out the nature of the solution he had used?

(ii) What is 24 carat gold?

382) Sample pieces of 5 metals A, B, C, D and E are added to the tabulated solutions separately. The results observed are shown in the table.

Metal	Solutions				
	$FeSO_4$	$CuSO_4$	$ZnSO_4$	$AgNO_3$	$Al2(SO_4)_3$
A	No change	X	X	a coating on metal	No change
B	Grey deposit	Brown coating	No change	coating on metal	No change
C	No change	No change	No change	No change	No change
D	No change	-	No change	coating on metal	No change
E	-	Brown coating	New coating	No change	No change

Based on the observations recorded in the table, answer the following?

(i) Which is the most reactive metal?

(ii) Which is the least reactive metal?

(iii) What would be observed if metal D were added to a solution of copper (II) sulphate?

(iv) What would be observed if metal E were added to a solution of iron (II) sulphate?

(v) Arrange the metals A, B, C, D and E in order of decreasing reactivity.

383) (a) With a labelled diagram, describe an activity to show that metals are good conductors of electricity.

(b) Account for the following:

(i) Hydrogen gas is not evolved when a metal reacts with nitric acid.

(ii) For storing, sodium metal is kept immersed in kerosene.

(iii) The reaction of iron (III) oxide, Fe_2O_3 with aluminium is used to join cracked iron parts of machines.

384) (a) Describe an activity to find out which metal is more reactive-iron or copper?
(b) Arrange the following metals in decreasing order of their reactivity. Fe, Zn, Na, Cu, Ag
(c) Why do ionic compounds have high melting points?
(d) Show the formation of NaCl from Na and Cl atoms by the transfer of electrons.

385) (a) Give an example of a metal which
(i) can be easily cut with a knife.