ICSE Board
Class X Chemistry
Science Paper – II
Semester 1 Examination
Board Paper – 2021

Time: 1hour **Maximum Marks: 40**

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Time allowed: one hour
You will not be allowed to write during the first 10 minutes.
This time is to be spent in reading the question paper.
ALL QUESTIONS ARE COMPULSORY
The intended marks for questions or parts of questions are given in brackets [].

Select the correct option for each of the following questions.

Question 1
In the periodic Table, elements of period 3 are arranged in the increasing order of ionization potential as: [1]
(a) B, N, Cl, Ar
(b) Mg, Si, S, Ar
(c) Ar, Si, S, Mg
(d) Si, Ar, Cl, Mg

Question 2
If Relative Molecular Mass of Butane (C_4H_{10}) is 58 then its vapour density will be:[1]
(a) 58
(b) 29
(c) 32
(d) 16

Question 3
Identify one statement that holds true for electrolysis of molten lead bromide: [1]
(a) Silver grey metal deposits at the anode
(b) Temperature is not maintained during the electrolysis
(c) Brown vapours of bromine are obtained at the anode.
(d) Electrolyte contains H^+ ions along with Pb^{2+} ions

Question 4
The tendency of an atom to attract shared pair of electrons to itself when forming a chemical bond is known as: [1]
(a) Electron affinity
(b) Electronegativity
(c) Ionization potential
(d) Nuclear charge

Question 5

Solid sodium chloride **does not** conduct electricity as: [1]

(a) The strength of the bond is weak
(b) It contains free ions
(c) It does not contain any free ions
(d) It contains free ions as well as molecules

Question 6

Elements A and B have electronic configurations 8 and 13 respectively. The chemical formula formed between A and B will be: [1]

(a) AB
(b) B_3A_3
(c) A_2B_3
(d) B_2A_3

Question 7

The percentage of hydrogen present in NaOH is: (Relative Molecular Mass of NaOH = 40) (At. Wt. of H = 1) [1]

(a) 2.5
(b) 25
(c) 0.25
(d) 0.025

Question 8

A salt formed by incomplete neutralization of an acid by a base: [1]

(a) Basic salt
(b) Acid salt
(c) Normal salt
(d) Complex salt

Question 9

The colour of the precipitate formed after the addition of a small amount of sodium hydroxide solution to an aqueous solution of ferric chloride is: [1]

(a) gelatinous white
(b) pale blue
(c) reddish brown
(d) dirty green

Question 10

Alkaline earth metals have the same: [1]

(a) number of valence electrons
(b) number of shells
(c) metallic property
(d) ionization potential

Question 11

Which of the following compounds neither dissociate not ionise in water? [1]

(a) Hydrochloric acid
(b) Sodium hydroxide
(c) Potassium Nitrate
(d) Carbon tetrachloride

Question 12

The table shows the electronic configuration of four elements. [1]

element	electronic configuration
W	2, 6
X	2, 8
Y	2, 8, 1
Z	2, 8, 7

Which pair of atoms will form a covalent compound?

(a) two atoms of W
(b) two atoms of X
(c) an atom of W and an atom of X
(d) an atom of Y and an atom of Z

Question 13

Element with an atomic number 19 will: [1]

(a) accept an electron and get oxidized
(b) accept an electron and get reduced
(c) lose an electron and get oxidized
(d) lose an electron and get reduced

Question 14

Which of the following has two sets of lone pair of electrons in them? [1]

(a) Ammonia
(b) Methane
(c) Water
(d) Ammonium ion

Question 15

If the empirical mass of the formula PQ_2 is 10 and the Relative Molecular Mass is 30, then the molecular formula will be: [1]

(a) PQ_2
(b) P_3Q_2
(c) P_6Q_2
(d) P_3Q_6

Question 16

Which of the following is a tribasic acid? [1]

(a) H_2SO_4

(b) $Al(OH)_3$

(c) H_3PO_4

(d) $Ca(OH)_2$

Question 17

If a solution of an electrolyte mixture has calcium ions, cupric ions, zinc ions and magnesium ions, which of these ions would you see preferentially discharged at the cathode? [1]

(a) Calcium ions

(b) Zinc ions

(c) Cupric ions

(d) Magnesium ions

Question 18

Which of the following ions will readily discharge at the anode during the electrolysis of acidulated water? [1]

(a) OH

(b) SO_4^{2-}

(c) Cl^-

(d) H^+

Question 19

If the imperial formula of a compound is CH and its vapour density is 13, then its molecular formula will be: [1]

(At. Wt. C=12, H=1)

(a) CH

(b) C_2H_2

(c) C_4H_4

(d) C_3H_3

Question 20

Aqueous solution of Cupric chloride forms a deep blue solution on addition of: [1]

(a) dropwise sodium hydroxide

(b) excess sodium hydroxide

(c) dropwise ammonium hydroxide

(d) excess ammonium hydroxide

Question 21

Which statement about conduction of electricity is correct? [1]

(a) Electricity is conducted in aqueous solution by electrons

(b) Electricity is conducted in a metal wire by ions

(c) Electricity is conducted in a molten electrolyte by electrons

(d) Electricity is conducted in an acid solution by ions

Question 22

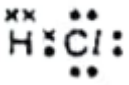
If an element has low ionization potential, then it is likely to be a: [1]

(a) metal
(b) metalloid
(c) non metal
(d) inert gas

Question 23

Which electron arrangement for the outer shell electrons in a covalent compound is correct? [1]

(a)



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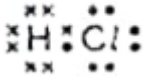

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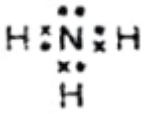

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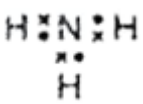


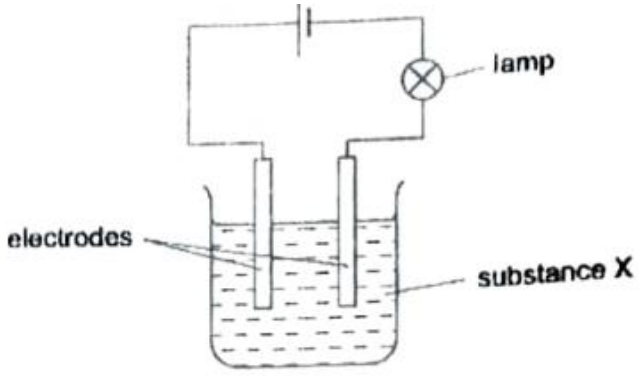
Question 24

The products formed when an acid reacts with a base is: [1]

(a) salt and hydrogen
(b) salt and oxygen
(c) salt and water
(d) salt and carbon dioxide

Question 25

In the circuit below, the lamp lights up. [1]



What could X be?

(a) a solution of alcohol in water
(b) a solution of sodium chloride in water
(c) sugar solution
(d) solid potassium chloride

Question 26

Which one of the following is a non-metallic cation? [1]

(a) K^+
(b) NH_4^+
(c) Cu^{2+}
(d) Na^+

Question 27

Type of bonding present in hydrogen chloride: [1]

(a) metallic
(b) ionic
(c) covalent
(d) coordinate

Question 28

The non-metallic properties of elements from left to right in a Periodic Table: [1]

(a) increases
(b) decreases
(c) remains same
(d) first increases and then decreases

Question 29

The aqueous solution that contains both ions and molecules: [1]

(a) sulphuric acid
(b) nitric acid
(c) acetic acid
(d) hydrochloric acid

Question 30

The basic oxide which is an alkali: [1]

(a) Copper oxide
(b) Sodium oxide
(c) Ferric oxide
(d) Zinc oxide

Question 31

If the pH of a solution is '2', then solution is a: [1]

(a) strong acid
(b) strong alkali
(c) weak acid
(d) weak alkali

Question 32

The acidity of aluminium hydroxide is: [1]

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

Question 33

Hydracids are those acids which contain: [1]

(a) Hydrogen with any metal
(b) Hydrogen, a non-metal and oxygen
(c) Hydrogen and a non-metal other than oxygen
(d) Hydrogen and oxygen only

Question 34

The oxidation reaction among the following is: [1]

(a) $Fe^{3+} + 3e^- \rightarrow Fe$
(b) $Fe^{2+} - Ie^- \rightarrow Fe^{3+}$
(c) $Cl_2 + 2e^- \rightarrow 2Cl^{1-}$
(d) $Cu^{2+} + 2e^- \rightarrow Cu$

Question 35

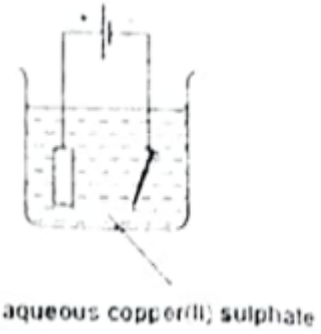
A student added excess of sodium hydroxide solution to each of the salt solution. An insoluble precipitate formed was observed in: [1]

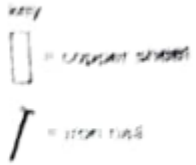
(a) Calcium nitrate
(b) Zinc nitrate
(c) Lead nitrate
(d) Sodium nitrate

Question 36

Which apparatus could be used to electroplate an iron nail with copper? [1]

(a)





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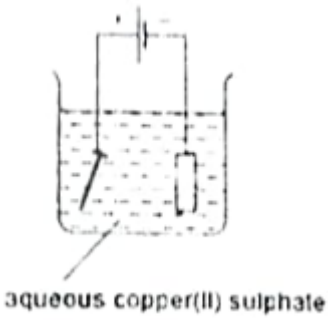

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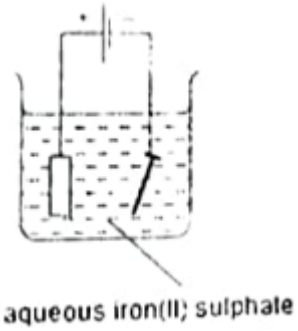

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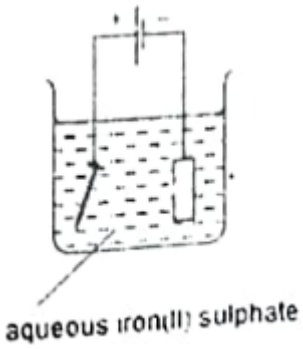


Question 37

The table below shows the electronic arrangements of six atoms, A to F.

atom	A	B	C	D	E	F
electronic configuration	2, 5	2	2, 6	2, 8, 6	2, 8, 8	2, 8, 3

With respect to the table select the following:

(i) Two atoms from the same group of the periodic table: [1]

(a) D and E
(b) C and D
(c) E and F
(d) C and E

(ii) Two noble gases: [1]

(a) A and B
(b) E and F
(c) B and E
(d) D and E

(iii) The atom which is the most electronegative: [1]

(a) A
(b) B
(c) C
(d) F

(iv) The atom which has the highest ionization potential: [1]

(a) A
(b) B
(c) E
(d) F

Solution

Solution 1-(b) Ionization potential increases from left to right in a periodic table.

Solution 2-(b) $\text{Vapour Density} = \frac{\text{Molar Mass}}{2} = \frac{58}{2} = 29$

Solution 3-(c) In electrolysis of molten lead bromide, brown vapours of bromine are obtained at anode.

Solution 4-(b) The tendency of an atom to attract shared pair of electrons to itself when forming a chemical bond is known as electronegativity.

Solution 5-(c) Solid NaCl does not contain electricity it does not contain electricity.

Solution 6-(d) Electronic configuration of A- 2, 6
Electronic configuration of B- 2, 8, 3
A required to gain 2 electrons to complete its octet so valency of A=-2
B required to donate 3 electrons to complete its octet so valency of B=+3
B is cation and A is anion so by using crisscross method in ionic compounds.
Chemical formula will be B_2A_3.

Solution 7-(a)

$$\%\text{of H} = \frac{\text{Atomic mass of H}}{\text{Molar mass of NaOH}} = \frac{1}{23+16+1} \times 100 = \frac{100}{40} = 2.5\%$$

Solution 8-(b) A salt that is formed by incomplete neutralization of acid is acidic salt.

Solution 9-(c) $Fe(OH)_3$ precipitate formed after the addition of a small amount of sodium hydroxide solution to an aqueous solution of ferric chloride. $Fe(OH)_3$ is brown in colour.

Solution 10-(a) Alkaine earth metals are present in same group so they have same number of valence electrons.

Solution 11-(d) Carbon tetrachloride is covalent compound. So it neither dissociate nor ionise in water

Solution 12-(a) Two atoms of W will share 2-2 electrons to form covalent compound and become stable.

Solution 13-(C) After loosing one electron, it will have electronic configuration of inert gas. So it will loose one electron and loosing electron is oxidation process.

Solution 14-(c) Water molecule is having two lone pairs in molecule.

Solution 15-(d)

$$\text{Molecular Formula} = \text{Empirical formula} \times \text{n}$$

$$\text{n} = \frac{\text{Molecular mass}}{\text{Empirical formula mass}}$$

$$\text{n} = \frac{30}{10} = 3$$

$$\text{Molecular formula} = 3 \times (PQ_2) = P_3Q_6$$

Solution 16-(c) H_3PO_4 is tribasic acid because it can donate 3 H^+ ions.

Solution 17-(C) Cupric ion preferentially discharged at the cathode due to its high mobility.

Solution 18-(a) OH ions will readily discharge at the anode during the electrolysis of acidulated water.

Solution 19-(b)

$$\text{Molar mass} = \text{Vapour denisty} \times 2$$

$$= 13 \times 2 = 26$$

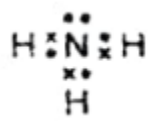
$$\text{Molar mass of } C_2H_2 \text{ is } 26.$$

Solution 20-(d) Aqueous solution of Cupric chloride forms a deep blue solution on addition of excess ammonium hydroxide

Solution 21-(d) Electricity is conducted in an acid solution by ions

Solution 22-(a) Metals have low ionization potential.

Solution 23-(c) Following structure is following octet and duplet rule.



Solution 24-(c) When acid reacts with base, Salt and water is formed.

Solution 25-(b)
In the circuit below, the lamp lights up than X should be an Ionic compound.

Solution 26-(b) Ammonium ion is non-metallic.

Solution 27-(c) Bonding present in non-metal and non-metal is covalent.

Solution 28-(a) The non-metallic properties of elements from left to right in a Periodic Table increases.

Solution 29-(c) Acetic acid contains both ions and solution because it is a weak electrolyte.

Solution 30-(b) Metallic oxides are alkaline in nature.

Solution 31-(a) pH=2, that means solution is strong acid.

Solution 32-(a) Aluminium hydroxide can donate 3 OH ions s, acidity is 3.

Solution 33-(c) Hydracids are those acids which contain Hydrogen and a non-metal other than oxygen.

Solution 34-(b) Loss of electrons is oxidation.

Solution 35-(a) An insoluble precipitate formed was observed in Calcium nitrate because it forms $Ca(OH)_2$.

Solution 36-(a) First apparatus is having correct combination of anode-cathode with battery.

Solution 37

(i) (b) Elements which have same number of outermost electrons are present in same group.
(ii) (c) Element which have complete duplet or octet are inert gases.
(iii) (c) Valency of C is -2. (It can accept 2 electrons to complete its octet).
(iv) (b) B is He which is inert gas so it will have highest ionization potential.