

First Year Higher Secondary Examination – 2011- 2012

Time: 2 Hours

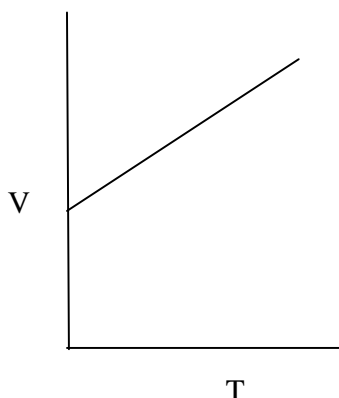
Cool off Time: 15 Minutes

CHEMISTRY

Max. Score: 60

1. Chemical equations are balanced on the basis of law of conservation of mass
 - a. State law of conservation of mass (1)
 - b. Lime stone reacts with dilute Hydrochloric acid and liberates CO_2 .
Write the balanced equation? (1)
 - c. Calculate the mass of CaCO_3 required to liberate 10 litres of CO_2 at STP (2)
2. A large number of orbitals are possible in an atom and they are precisely distinguished by quantum numbers
 - a. What is the significance of subsidiary quantum number (1)
 - b. Draw the shapes of orbitals with $n = 2$ and $l = 1$ (2)

"An orbital can accommodate a maximum of only two electrons". Which principle is behind this statement? Also state the principle (2)
3. Modern periodic table is based on modern periodic law which states that the properties of elements are the periodic functions of their atomic numbers
 - a. Arrange the halogens in the increasing order of electron gain enthalpy (1)
 - b. How electron gain enthalpy is different from electronegativity? (2)
 - c. Predict the formula of the compound formed by the following pairs of elements
Aluminium and chlorine
Magnesium and nitrogen (1)
4. According to Molecular orbital theory, molecular orbitals are formed by the combination of atomic orbitals of nearly same energy and proper symmetry
 - a. Out of the following molecular species identify those which are paramagnetic (2)
 C_2 He_2 N_2 B_2 Li_2
 - b. How is bond order related to bond length? (1)
 - c. How many bond pairs and lone pairs are present in Sulphur hexa Fluoride? Also predict the shape of the molecule on the basis of VSEPR theory? (2)
5.
 - a. Analyze the following graph.



Name and state the gas law represented by the above graph (2)

- b. Calculate the temperature in degree Celsius of a car tyre whose air pressure inside is increased from 2.46 bar at 0°C to 2.72 bar? (2)

6. Lattice enthalpies of ionic compounds can be calculated indirectly using Born-Haber cycle

- a. Mention the energy changes involved in the formation of sodium chloride crystal from metallic sodium and chlorine gas? (2)
- b. Construct the enthalpy diagram for the determination of lattice enthalpy of sodium chloride applying Born-Haber cycle? (1)
- c. Name and state the law behind Born-Haber cycle? (1)

7. According to Bronsted-Lowry concept an acid is a proton donor and base is a proton acceptor

- a. Water is an amphoteric substance. Write a conjugate acid of water. Also write a conjugate base of water? (1)
- b. Classify the aqueous solutions of the following salts into acidic, basic and neutral solutions
KCl, NH_4NO_3 , Na_2CO_3 , K_2SO_4 (2)
- c. Human blood is a buffer containing carbonic acid and sodium carbonate.
(i) What is a buffer solution?
(ii) How can we prepare a basic buffer? (2)

8.

- a. In a redox reaction, the reducing agent is oxidized and oxidizing agent is reduced. In the following reaction identify the oxidizing and reducing agent



- b. Analyze the following situation

(i) Zinc rod is dipped in copper nitrate solution

(ii) Copper rod is dipped in silver nitrate solution

Predict the changes in each situation with proper justification (2)

9. About 70% of the total mass of the universe is hydrogen

- a. Write any two similarities of hydrogen with alkali metals. (1)
- b. What are hydrides? Name an electron rich covalent hydride. (2)
- c. Hydrogen peroxide helps in the restoration of old lead paintings.
Explain the chemistry behind it. (1)

10.

- a. Fill in the blanks

i. The metal present in bones and teeth is -----

ii. The radioactive elements in alkaline earth metal is -----

iii. The molecular formula of milk of lime is -----

iv. A sodium compound used for softening water is -----

(2)

b. Briefly sketch the observations when a piece of sodium is immersed in liquid ammonia

(2)

11. Match the following

A	B	C
Fullerenes	Dimer	Electrical Insulator
Silicones	Inorganic Benzene	Lewis acid
Aluminum Chloride	Polymer	$B_3N_3H_6$
Borazole	Carbon	Bucky balls

(4)

12.

a. Write the structure for the following

i. 1,2 – Propandiol

ii. 5- oxo hexanoic acid

iii. cyclo hex – 2 – en – 1 – ol

(3)

b. How is nitrogen and sulphur in organic compound detected?

(3)

13.

a. Stereo Isomerism is classified into Geometrical and Optical Isomerism.

Draw the Geometrical Isomers of 2 – Butene

(2)

b. What happens when Ethene reacts with the following molecules?

i. Ozone (O_3)

ii. Hydrogen (H_2)

(2)

c. Benzene and Toluene are aromatic compounds according to Huckel Rule. State Huckel Rule

(1)

14. Atmospheric Pollution increases the Global Average Temperature and the Phenomenon is called Global warming.

a. What are the major gases which contribute towards global warming?

(1)

b. What can we do to reduce the global warming?

(2)
