STANDARD X QEPR

Quality Education Pupil's Right

Orukkam 2017

An Intensive Learning Material

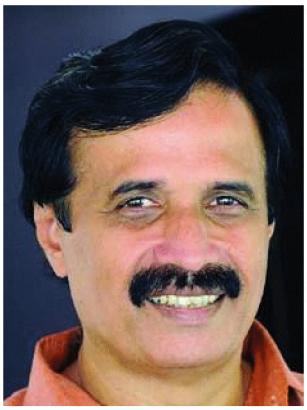
Chemistry

Department of General Education , Kerala

Orukkam Activities - Guidelines

Orukkam 2017, which is an intensive learning material, is an examination aid for Standard X students. It aims at achieving best results to all students in the SSLC Examination through a systematic process. Each unit is analysed, answers explained and on the basis of these the students may undergo a process on the discourses. During the process of the activities, students may self-assess their answers and analyse them based on the process mentioned in this book. Teachers may share the problems that arise during the process and help the students to overcome such problems. The activities in this book is to be completed time bound and should help the students to inculcate the process. Heads, teachers, students and parents should come cooperate and associate on the implementation of this process and assure the best result in their schools. Hope all of you will do the best.

All heads of institutions should ensure that the programme of this learning material has started in the school from January 11, 2017.
Convene a meeting of SRG in the first week of January and plan the activities.
PTA, MPTA, SMC, meetings should be held in the school to ensure their support.
Provide food for students.
Each teacher should explain how the material can be effectively imparted in the classroom.
Programmes similar to this can be held in class 8 and 9.
Let's work together to achieve the goal of Excellence.



PROF. C. RAVEENDRANATH
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സന്ദേശം

കേരളത്തിലെ സ്കൂൾ വിദ്യാഭ്യാസം നേരിടുന്ന പ്രശ്നങ്ങൾ പഠിച്ച് അവ പരിഹരിക്കുന്നതിനുള്ള ക്രിയാത്മക പ്രവർത്തനങ്ങൾ നടപ്പിലാക്കുക എന്ന ലക്ഷ്യത്തോടെ 2006ൽ ആരംഭിച്ച **ഗുണമേന്മയുള്ള വിദ്യാഭ്യാസം കുട്ടികളുടെ അവകാശം** (Quality Education Pupil's Right - QEPR) എന്ന പദ്ധതി പത്തുവർഷം പൂർത്തിയാക്കുകയാണ്. സ്കൂളുകളിലെ ലാബ്, ലൈബ്രറി സൗകര്യങ്ങളുടെ മെച്ചപ്പെടുത്തൽ, പോഷകസമൃദ്ധമായ ഉച്ചഭക്ഷണം, കൃത്യമായി ആസൂത്രണം ചെയ്ത് നടപ്പിലാക്കുന്ന പഠനപ്രവർത്തനങ്ങൾ, ഫലപ്രദമായ മോണിറ്ററിംഗ് എന്നിവയിലൂടെ പിന്നോക്കം നിന്നിരുന്ന വിദ്യാലയങ്ങൾ ശ്രദ്ധേയമായ പുരോഗതി കൈവരിച്ചു കഴിഞ്ഞു. കൂട്ടായ പരിശ്രമങ്ങളിലൂടെ ലഭിച്ച നേട്ടങ്ങളെ സ്ഥായിയായി നിലനിർത്തുകയും ആധുനിക സാങ്കേതികവിദ്യയുടെ സാധ്യതകൾ കൂടി ഉപയോഗിച്ചു സ്കൂളുകളുടെ നിലവാരം കൂടുതൽ മികവുറ്റതാക്കി അന്താരാഷ്ട്ര നിലവാരത്തിലേക്ക് ഈ പൊതു വിദ്യാലയങ്ങളെ എത്തിക്കുകയും ചെയ്യേണ്ടിയിരിക്കുന്നു. ഈ ഉദ്ദേശ്യത്തോടെ ഒട്ടേറെ പ്രവർത്തനങ്ങൾ ഇപ്പോൾ ആരംഭിച്ചുകഴിഞ്ഞിട്ടുണ്ട്. സ്കൂളുകളുടെ ഭൗതീകസൗകര്യങ്ങളോടൊപ്പം അക്കാദമിക നിലവാരവും ഉയർത്തുന്നതിനുള്ള ശ്രമത്തിന്റെ ഭാഗമാണ് **ഒരുക്കം** എന്ന ഈ കൈപുസ്തകം. കുട്ടികൾക്ക് ഈ പഠനസഹായി ഏറെ സഹായകരമാകുമെന്ന് പ്രതീക്ഷിക്കുന്നു. ഈ ഉദ്യമത്തിന് എല്ലാ ഭാവുകങ്ങളും നേരുന്നു.

സി.രവീന്ദ്രനാഥ്

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ആമുഖം

കേരളത്തിലെ സ്കൂളുകൾ മികച്ച വിജയത്തിലേക്ക്

തെരഞ്ഞെടുക്കപ്പെട്ട വിദ്യാലയങ്ങളിൽ 2006ൽ ആരംഭിച്ച **ഗുണമേന്മയുള്ള വിദ്യാഭ്യാസം കുട്ടികളുടെ അവകാശം (QEPR)** പദ്ധതി അതിന്റെ ലക്ഷ്യം നേടി മുന്നേറുകയാണ്. അക്കാദമികവും ഭൗതികവുമായ തലങ്ങളിൽ നിരവധി മുന്നേറ്റങ്ങൾ കൈവരിക്കുവാൻ ഈ പദ്ധതിയിലുൾപ്പെട്ട വിദ്യാലയങ്ങൾക്ക് കഴിഞ്ഞിട്ടുണ്ട്. കേവല വിജയമല്ല മറിച്ച് മുഴുവൻ വിദ്യാർത്ഥികളെയും മികച്ച ഗ്രേഡിന് ഉടമകളാക്കുക എന്ന ലക്ഷ്യമാണ് നമ്മൾ ആഗ്രഹിക്കുന്നത്. ഈ ലക്ഷ്യം മുന്നിൽ കണ്ടുകൊണ്ട് ഒട്ടേറെ പ്രവർത്തനങ്ങൾ ആവിഷ്കരിച്ചു നടപ്പാക്കി വരുകയാണ്.

മികച്ച വിജയം ലക്ഷ്യമാക്കി 2017 ജനുവരി 11 മുതൽ എല്ലാ ക്യൂ.ഇ.പി.ആർ വിദ്യാലയങ്ങളിലും പ്രത്യേക പഠനപാക്കേജുകൾ നടത്തുവാൻ തീരുമാനിച്ചിട്ടുണ്ട്. ഈ പരിപാടിയുടെ കാര്യക്ഷമമായ നടത്തിപ്പിന് വേണ്ടിയാണ് **ഒരുക്കം** എന്ന പഠനസഹായി തയ്യാറാക്കിയിട്ടുള്ളത്. മാറിയ പാഠപുസ്തകം കുട്ടികളിലുണ്ടാകാവുന്ന മാനസിക പിരിമുറുക്കങ്ങളിൽ നിന്ന് കുട്ടികളെ മോചിപ്പിക്കുന്നതിനും അവരിൽ ആത്മവിശ്വാസം ഉണ്ടാക്കുന്നതിനും സർഗ്ഗാത്മകമായ പുനരനുഭവപ്രവർത്തനങ്ങൾ, മൂല്യനിർണയ പ്രവർത്തനങ്ങൾ, അവയുടെ വിശകലനങ്ങൾ എന്നിവ ഉൾക്കൊള്ളുന്ന **ഒരുക്കം** പ്രയോജനപ്പെടും എന്നതിൽ സംശയമില്ല.

വിദ്യാർത്ഥികൾ, രക്ഷിതാക്കൾ, പ്രാദേശിക ഭരണകൂടങ്ങൾ, വിദ്യാഭ്യാസ പ്രവർത്തകർ തുടങ്ങിയവരുടെ കൂട്ടായ പരിശ്രമത്തിലൂടെ ഗുണനിലവാരത്തോടെ മികച്ച വിജയം നേടിയെടുക്കാനുള്ള വർഷമായി 2017 മാറട്ടെ എന്നും ഈ ലക്ഷ്യം നേടാൻ എല്ലാ വിദ്യാലയങ്ങൾക്കും കഴിയട്ടെ എന്നും ആശംസിച്ചുകൊണ്ട്

വിജയാശംസകളോടെ

കെ. വി. മോഹൻ കുമാർ ഐ.എ.എസ്
പൊതു വിദ്യാഭ്യാസ ഡയറക്ടർ

INDEX

Topic

Chapter 1

Periodic table and Electronic Configuration

Main Concepts

- Periodic table is divided into four blocks‹ s, p ,d,f
- S- block elements‹ Last electron added in S subshell
- p - block elements‹ Last electron added in p subshell
- d - block elements‹ Last electron added in d subshell
- f - block elements‹ Last electron added in f subshell
- Electron filling in sub shell is in accordance with increasing in energy
- 1s<2s<2<p3s<3p<4s<3d<4p<5s..... is the order
- In $1S^2$, one represents the shell number, S represents the subshell and two represents the number of electrons in that subshell
- Number of electrons for complete filling of s p d f subshell is 2,6,1,12, respectively
- Atomic number Œ No of subshell electrons in an atom
- Subshell electronic configuration helps us for finding Atomic numbers, block, period of a particular element

ACTIVITY 1

Complete the table of details about Shells and Subshells.

Shell	K 1		L 2		M 3		N 4	
subshell								
No of electrons								

- No of electrons in K L M N shell
- No of electrons in each shell

Subshell	s	p	d	f
No of Electron				

- Which subshell is common to all subshells?
- Write names of subshells in accordance with increasing energy level.

- Identify the correct subshell electronic configuration.

  - $1S^3$

  - $1S^22p^6$

  - $1S^22S^22p^6$

  - $1S^2\,2S^2\,2P^6\,3S^2\,3P^2$

ACTIVITY 2

Find out Atomic number, group, period using subshell electronic configuration and then complete the table.

Subshell electronic configuration	Atomic Number	Group Block	Period
$1S^2\,2S^2\,2p^6$			
$1S^2\,2S^2\,2p^6\,3S^1$			
$1S^2\,2S^2\,2p^6\,3S2\,3p^63D^54S^1$			
	25		
	28		
	26		

ACTIVITY 3

Atomic number of iron is 26. It exhibits Fe^{2+}, Fe^{3+} oxidation state. Write the subshell electronic configuration.

	Subshell electronic configuration
Fe Fe^{2+} Fe^{3+}	

ACTIVITY 4

Manganese a d -block elements exhibits different oxidation state why?

- Include chemical formulae of more compounds of manganese in the table; write their oxidation state and subshell electronic configuration.

Compounds	Oxydation State	Subshell electronic configuration
$Mncl_2$ MnO_2 $KMnO_4$		

- Write the oxydation number and subshell electronic configuration K, Cl and oxygen

ACTIVITY 5

- Write down the characteristics of sdpf block elements

S-block	p -block	d-block

More Activities

1. Write down subshell electronic configuration of Cu^{1+} and Cu^{2+}

2. How many 'S' subshell electrons are in $1S^2$, $2S^2$, $2p^6$, $3S^2$,$3p^2$

3. 11,17,1O are the atomic number of elements x,y and z

   a) Write down subshell electronic configuration group, block, period

   b) Write the molecular formulae of the compound formed when any two of the above elements combined

   c) Write down the oxidation numbers of the elements in that compound. Write the subshell electronic configuration of both ions.

4. 'x' element 'x' is having atomic number 28, it gives two electrons to element 'y' .

   a) Write down the electronic configuration of 'x' and its ion

   b) In which block 'x' belongs?

   c) Write down the characteristics of that block

5. Sc - [Ar] $3d^1 4s^2$

   Ca - [Ar] $4S^2$

   Mg - [Ne] $3S^2$

   Co - [Ar] $3d7^4S^2$

- Write down the group and period of each element
- What are the uses for writing electronic configuration i their fashion?

6. $_{24}Cr$ -[Ar]$3d^5 4S^1$

   $_{24}Cr$ -[Ar]$3d^{10} 4S^1$

- Why chromium and copper exhibits such electronic configuration.

Chapter 2

MOLE CONCEP TS

MAIN IDEAS

- GAM - Atomic man expressed in Grams
- GMM - Molicular man expressed in Grams
- Mole - The amount of any substance (atom,ion,molecule.....) containing $6.O22x1O^{23}$ articles is called one mole
- Avogadro number (N_A) - Number that represent one mole of a substance (atoms, ion, molecules, i.e. equal to $6.O22x1O^{23}$)
- In one GMM on GAM of any article contains $6.O22x1O^{23}$ particles
- Molar volume - Volume of one mole of any gas in ST P
- Volume of one mole of any gas in ST P = 22.4L
- 273K and 1 atm pressure is equal to 1ST P
- In ST P, 22.4L of any gas contains $6.O22x1O^{23}$ Atoms on molicules or ions
- Molar solution - Amount of solute dissolved a solution is known as Molarity. In one litre of a solvent, 1 mole solute dissolved, is known as Molar solution.
- In every reactions reactents are combined in a particular ratio
- For expressing mass of atoms, ions, etc relative mass is used. Mass of an atom is compared with the mass of another atom. Which shows how many times it is heavier than the other atom.
- The atomic mass of an element is expressed by considering $\frac{1}{2}$ the mass of an atom of C- 12 this is known as Unified mass (u)

EQUATIONS

$$\text{No of Gram Atoms} = \frac{\text{mass in gram}}{\text{GAM of atom}}$$

$$\text{No of Gram Molicules} = \frac{\text{mass in gram}}{\text{GMM of molecule}}$$

$$\text{No of moles} = \frac{\text{No of Particles}}{\text{Avogadros Number}}$$

$$\text{No of moles of atoms} = \frac{\text{mass in gram}}{\text{GAM}}$$

$$\text{No of moles of molecule} = \frac{\text{mass in gram}}{\text{GMM}}$$

No of particles = No of moles xNa

Mass of given Atom = No of moles x GAM

Mass of given Molicule = No of moles x GAM

$$\text{Mass of one atom} = \frac{\text{GAM}}{\text{NA}}$$

$$\text{Mass of one Molicule} = \frac{\text{GMM}}{\text{NA}}$$

$$\text{No of moles of gas in STP} = \frac{\text{Volume in STP}}{22.4}$$

ACTIVITY - 1

- Complete the table based on the data given in the box

Br, N_2, N, Cl, Cl_2, Br_2

H, O_2, H_2, P_4, C, Na

Atom	Atomic weight	Molicular	Weight

- Exress Atomic weight and molecular weight in grams. How many mole is this? Find out the number of Atoms ? molicules in it.

Atom	Atomic weight	Atomic weight in gms	Mole	No of Atoms NA	Molicule	M.M	MM in grams	Moles	No of Molicules N A

NB = Atomic weight Expressed in grams is G A M and Molicules weight Expressed in grams is GMM. Both contains one Mole of articles and having $6.O22x1O^{23}$ numbers.

ACTIVITY - 2

Complete the table based on the molicules given in the first column and then answer the question given below.

Compounds	M.M	Molicules mass in grams	No of Moles	NA
H_2O Nacl Mgo $NaNO_3$ Cao H_2SO_4 Al_2O_3				

- 10 Mole of water = ... g ..... Molicules
- 5 mole of CaO = ... g ..... Molicules
- 2 Mole of H_2SO_4 = ... g ..... Molicules
- $\frac{1}{2}$ Mole of Al_2O_3 = ... g ..... Molicules

(Make more questions yourself and then find answers for them)

(Find molicules mass of each compounds with the help of periodic table)

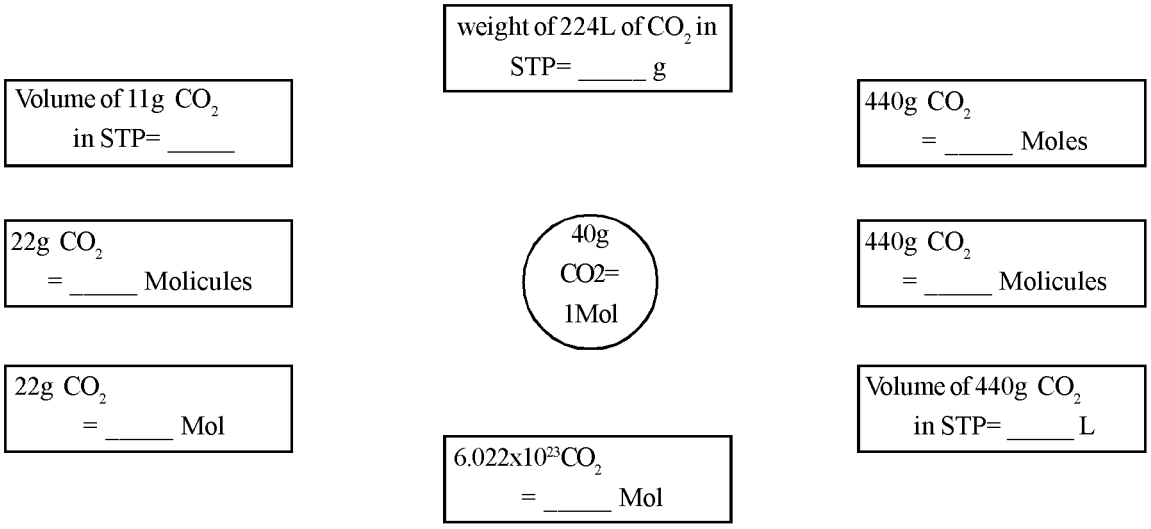
ACTIVITY - 3

Complete the table

Molicule atom	Atomic weight Molicular weight	Given weight	Mole	NA
H	-	-	2O	-
H_2O	-	36Og	-	-
Cl	35.5	-	5	-
Ca	4O	-	-	$2.5x6.O22x1O^{23}$
Hcl	36.5	-	2	
CO_2	-	-	2O	

ACTIVITY - 4

Complete the data



ACTIVITY - 5

- Prepare a write up for conducting an experiment on. "If any one of the reacter is completely reacted, what will happened."

Materials given for conducting this experiment are dil HCl, Mg ribbon, litmus paper, Test tube

a) Is their any reactant remaining unreacted?

b) How can we convert all reactents into products.

- What precautions are to be taken to convert all the Hydrogen and Chlorine into Hydrogen chloride
- $H_2+Cl_2 \rightarrow 2Hcl$

  $2H_2+2Cl_2 \rightarrow 4HCl$

  $10H_2+8Cl_2 \rightarrow$ _____
- Complete the reaction.
- Is there any ratio between reactant Molicules
- Is there any chance for unreacted reactants remaining in a particular reaction? When?

ACTIVITY - 6

Based on the reaction given below, write the answers for the questions.

$$N_2+3H_2 \rightarrow 2NH_3$$

- Write the ratio of reactant molicules and product molecule
- How many moles of Ammonia forms when we take 2 moles of Nitrogen and six moles of Hydrogen
- Two moles of Nitrogen and three moles of Hydrogen are taken in a jar. Are they react together?

- How many moles of Nitrogen and Hydrogen is needed for rearing 2O moles of Ammonia

ACTIVITY - 7

Balance the given equation and then write down the answers for the questions given below

$CH_4+O_2 \rightarrow CO_2+H_2O$

- How many moles of CO2 formed when 2O moles of Methane burn in air
- $2C_2H_6+7O_2 \rightarrow 4CO_2+6H_2O$

Based on the equation above, How many moles of CO2 formed when 1 moles of Ethane burned in air

ACTIVITY - 8

Based on the given equation write down the answers

$2H_2+O_2 \rightarrow H_2O$

- How much Oxygen and Hydrogen is needed for making 18OOg of water vapour?
- How many moles of oxygen is needed for the reaction with one mole of Hydrogen?

MORE QUESTIONS

1. Find out the number of moles of Hydrogen and Oxygen atoms present in 1O mole of HCl
2. Find out the mass of Hydrogen atom and chlorine atom in 1 moles of HCl.
3. Find out the mass of one mole of $CaCO_3$. How many moles of calcium present in 1OOOg $CaCO_3$?

   How mnay moles of Oxygen present in 1OOOgms of $CaCO_3$.
4. Find out the number of moles of water formed when 4gms of Hydrogen and 32 gms of Oxygen combined together. What is the result when 5gms of Hydrogen and 32gms of Oxygen combined together?
5. How much grams of NaCl is needed for making 2 molar solution of ? (NaCl-58.5). amount of water needed for this?

   How will you change a two molar solution of Sodium Chloride into 5 molar.
6. How many moles of Cl_2 Present in 11.2L of same in STP? Find out the mass of this?
7. Find out the mass of oxygen atom in 44.8L of CO_2 in STP.
8. Find out the amount of CO_2 formed when the burning of one mole of Ethane.
9. Why Atomic mass of some elements are in fractions.

Chapter - 3

RATE OF CHEMICAL REACTION

AND

CHEMICAL EQUILIBRIUM

MAIN CONCEPT

- Factors effecting rate of a reactions
- Surface area

  Temparature

  Nature of the reactants

  Pressure

  Light

  catalysts
- collision theory - Reactions takes lace when two molicules collide together effectively.
- a fixed amount of Kinetic Energy is needed to each molecule for a reaction.
- Rate of reaction of solid particle can be increased by powdering, stirring.
- When concentration increases, molicules came closer, chance of collision increases there ton rate also increases.
- When temperature increases, Kinetic energy of each molicule increases, rate increases.
- When pressure increases, volume decreases, concentration increases, Rate of reaction increases.
- Catalysts reduce the Amount of energy required to form a product by creating an alternative path
- Le chattier principle
- Catalysts changes the rate of reaction without any change of it.
- A catalyst that increases the speed is known as positive catalyst.
- A catalyst that decreases the speed is known as negative catalyst.
- In the dissuation of H_2O_2, Manganese dioxide act as positive catalyst and phosphoric acid act as negative catalyst.
- In the manufacturing of H_2SO_4, vanadium pentoxide (V_2O_5), in the large scale manufacturing of Ammonia. Iron also act as positive Catalyst.
- In a reaction, reactant turned into product but product never turned into reactant are known as irreversible reaction.

- In a reaction forward and backward reactions taken place simultaneously is known as reversible reaction
- When reactent turned into product is known as forward reaction
- When product turned into reactent is known as backward reaction
- When rate of forward and backward reactions are equal is known as chemical equation

ACTIVITY -1

Find out the relation between concentration and rate of a reaction by conducting an experiments. Prepare a write u for conducting the Experiments. Materials required for the experiment are given below

Test tube, Mg ribbon, ConcHCl, dil HCl, cork, injection syringe

Hint

$$\text{Rate of reaction} = \frac{\text{Amount of any one used reactent}}{\text{time taken for the completion of that reactent}}$$

$$\text{Rate of reaction} = \frac{\text{Amount of any one product formed}}{\text{time taken for the formation of that product}}$$

ACTIVITY -2

Find out the relation between Surface Area and rate of a reaction?

Test tube	Test tube
Marble piece	Mg ribbon
dil HCl	dil HCl

- Take any one group of materials from the list above
  - Prepare a write up of the reaction
  - How you increase the surface area of the reactent?
  - What is the effect, when you increase the surface area
  - How can we increase the rate of a solid substance

ACTIVITY -3

Find out the relation between Temarature and rate of reaction?

Select the materials from the list above

Sodium thio Sulphate, Test tube, dil HCl, Cu, Mg ribbon, Beaker, Water, Spirit lamp

- Prepare a write u for finding the relation between temperature and rate of a reaction?
- Why rate of a reaction increases when Temerature increases.

ACTIVITY -4

Some chemical reactions are given below

a) $Zn+2HCl \rightarrow ZnCl_2 H_2$

b) $2Mg+O_2 \rightarrow 2MgO$

c) NH_4Cl $NH_3 +HCl$

- What are the peculiarities of first two reactions
- Conduct an experiment for viewing the dissociation and anociation taking place in the third equation
- In the three reactions Reactents turned into product and products are converted into reactents, is it true?
- What type of reactions are they all represents?
- Write down the characteristic of the reaction.

ACTIVITY -5

$Fe\ (NO_3)_3+3KCNS \rightarrow Fe(CNS)_3\ 3KNO_3$

This balanced chemical equation is wrote on the black board, when the teacher is going to conduct an experiment on Chemical Equilibrium

- In the above reaction, which chemical has red colour.
- $Fe\ (NO_3)_3$, KCNS combined together, put it on the test tube stand, is there any colour change? Is the colour is diminishing while it kept in test tube stand?
- Convert the solution reared into four beakers. Dilute each with equal amount of water.

In the first beaker add Fe (NO3)3 , in the second one KCNS, in the third KNO3 likewise. Compare the colour change with the fourth beaker.

Find out the reason

- point out the characteristics of equilibrium based on the experiment done
- In minute level chemical equilibrium is Kinetic energy why?
- How and when a reversible reaction attain chemical equilibrium
- In the graph given below, when the reactent and product attain the level A? What are the characteristics of the point A?

SCAN

ACTIVITY -6

$N_2+3H_2 \rightleftharpoons 2NH_3$

$H_2+I_2 \rightleftharpoons 2HI$

$N2O_4(g) \rightleftharpoons 2NO_2$

$2SO_2+O_2 \rightleftharpoons 2SO_3$

Write down in detail how amount of the products increases in the above reactions (based on Le chatliers principle)

[Hints - reference must be given on each of the following, concentration, pressure, temperature, catalyst]

Reactivity series and Electro Chemistry

Main concepts

- Reaction rate of every metals are different
- Reactivity series - in this metals are arranged in accordance with the decreasing order of their rate of reaction
- Hydrogen a non metal included in this series for the comparison of reactivity
- Substitution reaction - it is a type of reaction in which more reactive metals substitute less reactive metals in their metal solutions
- A Galvanic cell or voltaic cell converts chemical energy into Electrical energy by Redox reactions taking place in the cell.
- Anode is an electrode where oxidation taking place
- In cathode reduction takes lace
- Oxidation is loss of Electron
- Reduction is gaining of Electron
- Electron flow in a galvanic cell is always from Anode to cathode
- When oxidation and reduction takes place simultaneously, i.e. type of reaction is known as Redox reaction
- Flow of electron in a cell is due to the redox reaction in it
- Electrolysis - the process of chemical change takes lace to the Electrolyte, when electricity asses through it
- In molten state on in solution, those substance conducting electricity is known as Electrolyte
- Uses of Electrolysis
  - Manufacturing of metals and non metals
  - Reparation of chemicals
  - Purification of metals
  - Electro plating
  - For plating Ag, Cu, Cr, Au

ACTIVITY -1

Take cold water and Hot water in two test tubes. Add one or two drops of phenolph thaline in it. Drop equally sized Mg ribbon in it.

- In which test tube pink colour occurred sharply?
- Why pink colour appeared in that test tube so early.
- Which gas evolved out from both test tube
- Write balanced equation for the above mentioned reaction.

ACTIVITY -2

Cut a small sodium metal piece into two, watch it

- What change occurred on the surface of sodium metal
- Write one word for the process of this type of decomposition
- Write down the Equation for this

[Refer text book after writing equation]

ACTIVITY -3

Take equal quantities of dil HCl in five test tubes. Drop Mg, Zn, Fe, Cu in each test tube. Watch carefully

- Arrange metals in decreasing order of reactivity
- Write balanced equations for each reaction

ACTIVITY -4

Some metals and metallic compounds are given in the table. If the metal substitute the metal in the compound, put a tick mark in the corresponding column and otherwise a cross mark in the column. Write down correct answer based on the table given below

Metal/solution	Mg	Cu	Zn	Ag	Fe
$CuSO_4$ solution		x		x	
$ZnSO_4$ solution		x	x	x	x
$Ag NO_3$ Solution				x	
$MgSO_4$ Solution	x	x	x	x	x

- Correct the table if necessary
- Is the metals with true sign in the column are more reactive than the metal in the corresponding metal solution
- Is it possible to substitute lower positioned metals by Top positioned metals in the reactivity series.
- What type of reaction is this?
- Write down balanced equations for all the true sign given in the table

ACTIVITY -5

Draw maximum number of Galvanic cell using substance given in the table

SALT BRIDGE, ZINC ROCK, COPPER ROD, VOLT METER, ALUMINIUM CHLORIDE, COPPER SULPHATE, ZINC SULPHATE, SILVER NITRATE, SILVER ROD, CALCIUM CHLORIDE

- Complete the table based on the figures you drawn

Galvanic cell	Electrode Gives Electron	Electrode Gain Electron

- Write down the general names used for an electrode which gives electrons
- Metals in that electrode in the reactivity series is ..... (in the Top, Bottom)
- General name of the Electrode which accepts electron
- Process of giving electron is.....
- Process of Accepting electron is.....
- Direction of the flow of Electron .....
- Write down the balanced equation taking place in both electrods

Galvanic cell	Electrode which gives Electron	Electrode which accepts Electron

ACTIVITY -6

Take Cupric chloride ($CuCl_2$) solution in a beaker. Di two graphite rod in it. Pass 5v electricity through it

- Why electricity passes through cupric chloride solution
- Which gas evolved out through positive electrode? How you identified that gas?
- Which product formed in negative electrode?
- In which electrode oxidation and reduction takes place?
- Write one word for the process of chemical change happening in an Electrolyte while passing Electricity?

ACTIVITY -7

Take 25 ml water in a beaker and the pass electricity through it. Then add little sulphuric acid in it.

- Why electricity didn't pass through pure water
- Why electricity didn't pass through water when add some H_2SO_4
- Which type of ion formed more when sulphuric acid is added in water
- Complete the equation of the Ionization of H_2SO_4

  $H_2SO_4 \rightarrow H^+ +$____
- Based on the equation given below write down the correct answers

  $2H^+ +$_____$+2H_2O \rightarrow 2H_3O+SO_4^{2-}$
  - Complete the equation
  - Write down the name of H_3O^+ ion
  - Which ion is moving towards negative ion?
  - Complete the reaction taking place in the negative electrode

  $2H_3O^+ + 2e^- \rightarrow$ .....+.....
- Which ion is having highest oxidation potential - SO42- , H2O
- Complete the reaction taking place in positive electrode

  $2H_2O \rightarrow$ _____$+4H^+$
- Ion s remain in the beaker after the electrolysis are ..... , ...

What product form when these two combined together

ACTIVITY -8

Complete the table based on the Electrolysis of molten sodium chloride

ELECTRODE	REACTION TAKING PLACE	PRODUCT
Anode		
Cathode		

- Write down the reaction taking place in each electrodes and products formed in the Electrolysis of sodium Chloride solution

ELECTRODE	REACTION	PRODUCT
Anode		
Cathode		

- Why hydrogen is formed in the cathode insted of sodium
- Write one word for a solution undergoes chemical change when electricity asses through it.
- Write the name of the above process
- Write down the uses of above type of reaction

Hint Reduction potential of water is higher than Na that is why H2 is formed in the cathode

MORE QUESTIONS

1. Take little water in a test tube add two drops of phenolhthalis in it. Same quantity of Kerosene is added to the mixture. Small piece of sodium is dipped in it.
    - What kind of colour formed in the test tube? why?
    - Which gas bubbled on the surface of sodium metal?
    - Write balanced equation of the reaction between sodium and water
2. What product occur when Iron is react with water vapour
3. Lusture of magnesium disappeared fast when it laced in open space why?
4. Verdigris formed on copper utensils why?
5. Lusture of Aluminium utensils disappeared after some days why?
6. Write down the equation for the reaction between $CuSO_4$ and iron nail? What type of reaction is this?

Chapter 5

PRODUCT OF METAL

Minarals metalica compound present in earth crust

Ores in a mineral used for manyfactery a metal without much cost and difficulty.

concentration of ores - It is the procern in which impuriten along the one is removed.

Methods adopted for the concentration of ore-

- Washning in running water
- Froth floatation
- Magnetic seperation
- Leaching

Methods used the extraction of metals from concentrated ore.

- Converting concentrated ore into oxide the absence of air below its meting point.
- Roasting Ore is heated in presence of air below its melty point.
- Reduction of oxide ore

  Reduction process are done using carbon, CO and Electricity

Methods used for reporting metal,

- Liquation - Tim, Lead
- Distiuation - Zinc, Carmium mercury
- electrolytic procen -Cu, Ag

Gangue - The impurities found in one

Flux - It is added in the ore to remve gangue

Slag - Product obtained after the reaction between gngue & flux

Pig iron - Product formed from the olast furnance is pig iron.

Cast iron - When pig iron is treated with rust.

Wrought - returned iron contains only 0.2 - 0.5% of carbon

Steel- 0.1 - 1.5% carbon containing iron.

Complete the table

Metal	Use	Production
Copper	Condutor of eletricity	
Aluminium	--------	Thermal conductivity
Iron	---------	Harden
Tungston	--------	ductility

Metal and their ores

Metal	Ore	Formula
Aluminium	Bauxite	$Al_2O_3.2H_2O$
Iron	Hematite, Magnetite	Fe_2O_3, Fe_3O_4
Copper	Copper phyriti to Cuprite	$CuFeS_2$, Cu_2O
Zinc	Zinc b'ende' Calamine	ZNS, $ZnCO_3$

Activity

Features of one and impurity are given in the table. Write down the method used for the seperatin of the ore.

Ore	Impurity	Method
High density	Low density	
Magnetic	Non Magnetic	
Low density	High density	
Dis solved in the solvent	didn't disolve	

- How can we convert one into its oxide form. Explain with proper examples

Calcination	
Roasting	

- $ZnCO_3/Cu_2O$ in this two calcination is used for _____ and Roasting is used for _____
- Give Examples for reducing agents for reducing oxide ores.
- Strongest reducing agent _____
- Which reducing agent used for reducing ZnO, Fe_2O_3, Al_2O_3
- Write down the steps used for refining metals.

Process	Metals	Particulars
Liquation Distillation Eletrolyte refining	Tin, Lead Zinc, Cadmium, Mercury Copper, Silver	

Complete the table

	Method of preparation & Content
Pig iron Cast iron Wrought iron Steel	

- Stainten steel and Nichrome are having same content (Fe, Ni, Cr and C) But nature of both alloys are different. Why?
- Bauxite and clay are minerals of aluminium. But bauxite is the only ore of Aluminum. Why?
- Given below are the equation for the reactions taking place inside the blast furnace

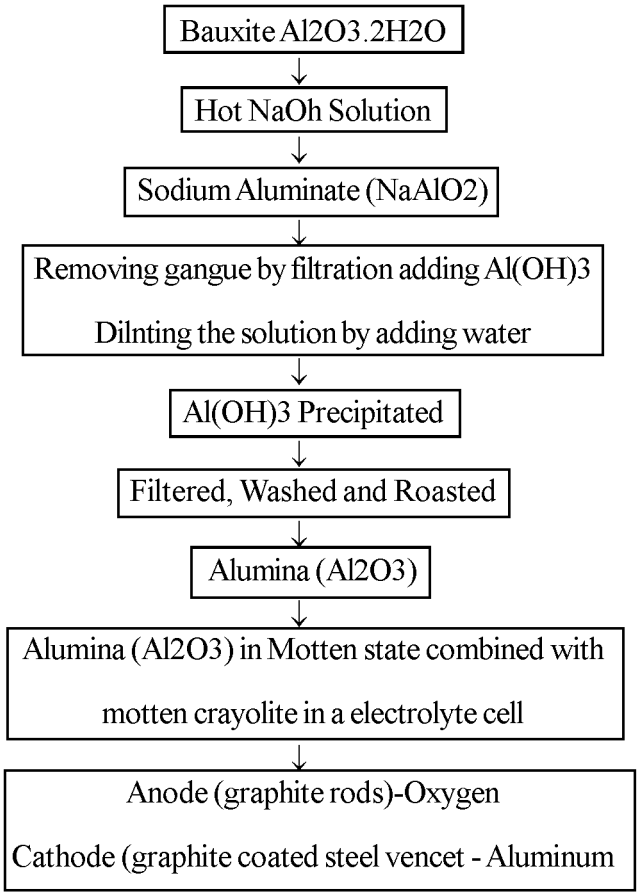
$C + O_2 \rightarrow CO_2$
$CO_2 + C \rightarrow 2CO$
$CaCO_3 + SiO_2 \rightarrow CaSiO_3$
$Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_3$

- Name the ore of iron?
- Which is the gangue in iron ore.
- Name the flux used in blast furnace
- Gangue+flux $\rightarrow$ _____

  Whixh product is formed in blast furnace
- Reducing agent used in blast furnace
- Subjects dropped in blast furnace are _____, _____, _____
- Write down the names of Anode, Cathode, Electrolyte used in the Electrolyte cell used for the manufacturin of copper.
- Write down the equations for the reactions in anode and cathode

- Manufacturing of Iron
  - Name the furnace used for prducing iron
  - Name the materials using for producing iron
  - Write down the reation occuring on cock when hot is blasted on it?
  - Why $CaCO_3$ is dropping inside the furnace
  - Write down the nature of gangue with iron ore
  - gangue + flux $\rightarrow$ _____. Write down the uses of the product formed in blast furnace.
  - Reducing agent in blast furnace
  - Write down the reactions talking place inside the blast furnace.
  - Iron formed from the blast furnace are called _____
  - How can we change iron into steel
  - What are the different types of steel
  - How can we change the nature of steel?

Manufacturing Aluminium



- Draw the Electrolyte cell and then write answers for the following questions.
- Flame the electrolyte ,anufaturing procern of Aluminium
- Anode, Cathod in this cell are _____
- Write down the reactions taking place in Anode and Cathode
- Why Carbon power droped above the electrolyte?
- Which gas is evolving out from the graphite eletrode.
- Uses of Crayolite and Aluminum.

Chapter 6

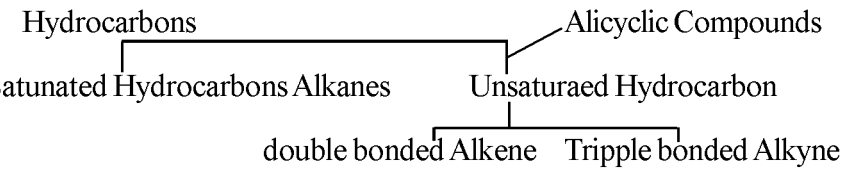
NOMENCLATURE OF ORGANIC COMPOUNDS

Hydrocarbon are divided into Alkanes, Alkenes and Alkynes.

Alkaner are single bonded satunated hydrocarbo.

Alkener are double bonded unsaturated hydrocarbons.

Alkynes are tripple bonded unsatuated Hydrocarbons.



- While naming Hydrocarbons- root word + ane/ene/yne is used.
- While writing the name of a branched hydrocarbon.

  branch attached to the carbon must have lower number
- While naming the branched hydrocarbon following form must be observed.

No of the branch+hyphen + name of the branch+word root+suflex.

- When functional group is attached with hydrocarbon, hydrocarbon exhibits the nature of functional group only.
- Isomerism- Organic compunds having same molicular formular and same structure are known as isomers and this phenomenon is known as Isomerism.

Chain isomerism: Same molicular formula difference in the main chain functional group isomerism: Same molecular formula, difference in functional group.

Position isomerism - Same molicular formula but bosition of the functional group is differents.

Alicyclic Hydrocarbons

Cyclic saturated hydro carbons are known as Alicyclic Hydrocarbons.

Functional group	Name of functional group	Name of compounds formed
-OH	Hydroxil	Alcohol
-COOH	Carboxylic	Acid
-CO	Ketons	Keto
-CHO	Aldehyde	Aldehydes
R-O-	Alkoxy	Ethers
-NH2	Amene	Amino

Activity 1: IUPAC

Molicular formula	Structure	root word	Suffix IUPAC
CH_4			
C_2H_6			
C_3H_8			
C_4H_{10}			
C_5H_{12}			
C_6H_{14}			
C_2H_4			
C_3H_6			
C_4H_8			
C_5H_{10}			
C_6H_{12}			
C_2H_2			
C_3H_4			
C_4H_6			
C_5H_8			
C_6H_{10}			

Activity 2

Write down the IUPAC Name of the compound

- How many Carbons in the main Chain?

- Position number of the branch
- IUPAC Name?

Activity 3

Write down the IUPAC Name

Structure	No of Carbon in maincl	Branch No. & Name

Activity 4

Draw the structure of the following compounds

a. 2,2,- dimethyle pentane

b. 2, 4 - dimethyle octane

Activity 5

Complete the table

Structure	No.of Carbon	Functional group	IUPAC Name

Activity 6

Find out the pair exhibiting same type of ISOMERISM

Structure	IUPAC Name	Molicular form	Isomerism

More Questions

Activity 7

Write down the structure of C_4H_{10} then write all the isomeric fors of the same

Activity 8

Write down all the position isomers of CH_3-CH_2-CH_2-CH_2-CH_2-OH

Activity 9

Write down the IUPAC name of the compound given below and then write the name of isomerism exhibited by it

CH_3-CH_2-CH_2-O-CH_2--CH_2-CH_3

.....

Activity 10

Write down all the position isomers and functional group isomers of the compound. Name all of the compunds

CH_3-CH_2-CH_2-O-CH_2--CH_2-CH_3

Activity 11

Write down all the possible structure of $C_5H_{10}O$.Name them, what type isomerism are they exhibit?

Chapter 7

CHEMICAL REACTIONS OF ORGANIC COMPOUNDS

Main Concept

- Substitution Reactions- An atom of a compound is replaced by another atom or radical.
- Addition Reaction - Organic compound with tripple bond are converted into double bonded and then into single bonded. Saturated compounds. (Tripple bonded or double bonded componds are converted into saturated compounds.)
- Poymerisation - Large number of monomers combined to form polymer are known as polymerisation.
- Thermal decompositin (Thermal Cracking) - Hydrocarbons with higher molicular man on heating in the absence of air get decomposer into hydrocarbons with low man (mostly a small satured hydrocarbon and a double)
- Combustions- Hydrocarbon burns in the presence of oxygen.
- Fermentation : Enzhmative hydrolysis is known as fermentation.

Ethanol- Ethanol is manufactured by the Enzymati hydrolysis (Fermentation) Yeast produce two Enzymer invertuse and Zymase. Invertase convert sugar into glucose and fructose. Zymase convert both into Alcohol.

- Wash, reclified spirit, power alcohol
- carboxylic acids (-COOH)
- Formic acid (Methanoic acid) H COOH
- Acetic acid (Ethanoic acid) CH_3-COOH
- Viniger and glacial acetic acid esters.

An alcohol and organic acid reacted in presence of conc. H_2SO_4 form esters. Smeel of flowers and fruits are due to the presence of it.

Aromatic Compounds

Activity 2

Reactions	Type of Reaction
1. C_4H_{10}+	
2.$C_4H_{10}+Cl_2$	
3.$C_4H_{10}+O_2$	
4.$C_4H_8+H_2$	
5.....	

Activity 3

- Methane is reacting with Cl in presence of an: Complete equation of that reaction

$$CH_4 + Cl_2 \rightarrow CH_3 + HCl$$
$$CH_3HCl + Cl_2 \rightarrow \_\_\_\_\_ + HCl$$
$$\_\_\_\_\_ + \_\_\_\_\_ \rightarrow CH_3Cl + \_\_\_\_\_$$
$$CH_3Cl + Cl_2 \rightarrow \_\_\_\_\_ HCl$$

- Write down the reaction with chlorine and prepare.
- What type of reaction is this

Activity 4

Examples of addition reaction are given below complete the equation

$$a.CH_2 = CH_2 + H_2 \rightarrow \_\_\_\_\_$$
$$b.CH_2 = CH_2 + Cl_2 \rightarrow \_\_\_\_\_$$
$$c.CH \equiv CH + H_2 \rightarrow \_\_\_\_\_$$
$$\_\_\_\_\_ + Cl_2 \rightarrow \_\_\_\_\_$$
$$d.CH_4H_8 + Cl_2 \rightarrow \_\_\_\_\_$$

Activity 5

Examples for combination of Hydrocarbon are given below complete the equation and balance it.

$$CH_4 + O_2 \rightarrow \_\_\_\_\_ + \_\_\_\_\_$$
$$C_2H_6 + O_2 \rightarrow \_\_\_\_\_ + \_\_\_\_\_$$
$$C_3H_8 + O_2 \rightarrow \_\_\_\_\_ + \_\_\_\_\_$$

- Products formed on combination of Hydrocarbon are

Activity 6

- What type of a reaction is this

$3C_2H_2 \rightarrow C_6H_6$ (Benzene)

$nCH_2 = CHCl \rightarrow \_\_\_\_\_$

- Name the product what type of reaction is this?
- Write down the names of monomer in it.

- Give examples for natural polymers.

Activity 7

Complete the table

Monomer	Polymer	Use
Vinyle Chloride		
	Polythene	
Isoprene		
Tetra fluro		
Ethane		

Hints

- $nCH_2 = CH_2 \rightarrow [CH_2 - CH_2]_n$

  Ethene Poly Ethylene

- .....

  Vinyle Chloride Poly Vinyle Chloride

- n(CF_2=CF_2) [CF_2-CF_2]n

  Ethene Poly Ethylene

Activity 8

Arrange the points in two separate column write column heading also.

- CO and H_2 related in presence of a catalyst to form ..... compound.
- Sugar cane juice is fermented
- It is known as wood spirit
- It is used to make point & varnish
- It is used in motor vehicle as fuels.
- Used for drinking
- It is used for adding in industrial spirit

Hints

8-10 % Alcohole formed after fermentation - wash

95-96% Athanol - Rectified Spirit

99.5% Ethanol - Absolute Alcohol

Methanol - Wood spirit

5-8 % -Acetic acid Vinegar

100% Acetic acid - Glacial Acetic Acid

- Falty acids 12-18 Carbn contained

Aliphatic carboxylic acids are known as fatty acids.

- Main source for Aromatic Hydro carbon is coal tar.

Activity 9

- Ethanol has very large industrial utility when it enter into our body it ereats large amount of problems in our body as well as in our society. List out the problem happening in our body and in the society.

In Human body	In Society
• Liver problem	• Economic Problems

- In industrial ethanol always Methanol is adding to not consuming it by humens. Name the procen and what are the side effects formed after consuming it?

Chapter 8

CHEMISTRY FOR HUMAN DEVELOPMENT

Main Concept

Petrolium : It is fssile fule, petrol, diesel, kerosene Naphtha etc. are manufactured by the tractional distribution of petrolium.

Liquified petrolium gas (LPG): Used for cooking purpose. Main content in butane.

oal: It is a fossil fuel. It is of four types based on carbon content in it. Anthracite ?Bitumius Coal>Lignite>peat

Medicines: Different types of medicines are used for decreasing our suffferings.

Cement: Clay, Limi stone, heated above 2000^0c then powered and mixed with gypsum forms cement gypsum is added it for controlling setting time.

- Dyer and colour pigments
- Glam
- Green chemistry - Helps us to attain an ecofriendly, pollution free environment.

Following are the products formed after the fractional distillation of petrolium.

Product Uses

1. Petrol
2. Kerosene
3. Dieasel
4. Petrolium jelly
5. Parrapin wax
6. Bitumin

LIST OF COAL

Coal	Percentage of carbon
Anthralite	94%
Bituminus coal	83%
Liguite	67%
Peat	57%

MEDICINES

Category	Function	Example
Analyesic	pain remover	Aspirin
Antipyretic	decreases temparation	paracentamol
Antacid	Decreases Acidity	Ranitidin
Antiseptic	Decrease the growth of Microbial	Timture lodine
Antibiotic	killing Bacteria	Penciline, Amoxiciline

- Consuming medicine without doctor priscription is harm full. Explain

Cement

Clay and Lime stone are heated in a rotary kilm above 1500^0c form clinker. Power this and mix with proper amount gypsum form cement. Cement is a mixture of Aluminates and silicates.

Cements Mixture	Content	Use
Montar Concrete Re inporced compete		

GLASS : Amixture of silicates and carbonates.

types of glass	content	use
SODA GLASS	SiO_2, Na_2CO_3, $CaCO_3$	Windows, bulbs
HARD GLASS	SIO_2, K_2CO_3, $CaCO_3$	Glass vencels
BOROSILICATE GLASS	SiO_2, Al_2O_3, B_2O_3	Laboratory vencels
FLINT GLASS	SiO_2, K_2CO_3, PbO	Lens, Prism

Materials used for colouring

Compound	Colour
Ferric Compounds	Yellow
Chromium/ Ferrous Compounds	Green
Cobaltt Oxide	Blue
Manganese diaxide	Purple

Additional Questions

- Excen use of fossile fuels ends the life in this earth. Write two points each for supporting this argument and against this.
- 'Chemistry is not a problem it is a way for refliting our problems' based on the ideas of green chemistry write four points for supporting this arguments.
- 'Use of pesticided helps us to reach maximum food' - Write arguments against this and supporting this (maximum 4 arguments only)
- Medicines became harmful when?
- Development of science create all the prblems around us make town arguments supporting and against this dialogue.

SAMPLE QUESTION PAPER

Chemistry **Time 1/2hrs**

Mark 40

- Cool of time 15 mits
- Read all the questions carefully then answer it.
- Don't write answer in the question paper

1. Atomic number of x,y are 11 and 17 respectively

   a. Write down the subshell electronic configaration

   b. Find out the group and period of both atoms.

   c. Write down the subshell electronic configaration of the ion of element.

2. Find out volume and man of 10mole of CO_2 in STP

3. $N_2 + 3H_2 \rightarrow 2NH_3$

   a. How much N1trogen is required to form 100 mole NH_3. (Answer must be in gms)

   b. Find out the number of molicules in 100 mole of Ammonia.

4. Write down the factors affecting the rate of chemical reaction

5. H_2+I_2 ⇌ 2HI. Write down any two methods to increase the rate of reaction.

   ⇌ Write down the law related with this

6. When marble power is added in dil HCl rate of reaction increase. Why

   Answer any one question of (7,8)

7. Draw Cu-Ag cell. Write down the reactions taking place in anode and cathode.

8. CuSO4 solution is taken in two test tubes. Add Zinc in one test tube and silver in other. In whih test tube reaction taken place. Why?

9. List out, materials required for an experiment to explain the effect of temparatue and rate of a reaction.

   - When temperature increase why?

10. $N_2O_4 \rightleftharpoons 2NO_2$

based on the above equation, answer the following questions.

- Write any method to increse the amount of product.
- How exothermic reaction effected on forward reaction? Explain

11. Match the following

A	B
a. Zinc	b. Tin
b. Liquation	b. Bauxite
c. Strong reducing agent	c. Calamin
d. Leaching	d. Alumina
	e. Carbon

12. Write down the diffence between Calcination and Roasting

13. Complete the equation and then write the answer for the questions given below

a. $CaCO_2 \rightarrow \_\_\_ a \_\_\_ + CO_2$

$\_\_\_ + SiO_2 \rightarrow CaSiO_3$

b. Which is the gangue in the above equation

c. Write any one use of Calcium silicate.

14. "Excen use and unscientific use of Antibiotics creates problems" Eliciate

15. Explain the importance of given chemistry with reffernce to the pollution caused by plastic and the use of Pesticides.

16. Match the following

1. $nCH_2 = CH_2 \rightarrow [CH_2 - CH_2]$	Substitution reaction
2. $CH_4 2O_2 \rightarrow CO_2 + 2H_2O$	Polymerisation
3. $C_4H_{10} + Cl_2 \rightarrow C_4H_9Cl + HCl$	Fermentation
4. $CH_3 - CH_2 - CH_2 - CH_3 \rightarrow CH_4 + CH_3 - CH = CH_2$	Addition reaction
	Thermal cracking additional reaction

17. Write down any two uses of Ethanol.

Why methanol is adding in Ethanol?

18. Write any two examples for natural polymer.

19. Find out the pairs of isomers and then write their IUPAC name.

a. $CH_3 - CH_2 - CH_2 - CO - CH_2 - CH_3$

b. $CH_3 - CH_2 - CH_2 - CH_2 - CH_2 - CH_3$

c. $CH_3 - CH_2 - CH_2 - CH_2 - CH_2 - CHO$

d. .....