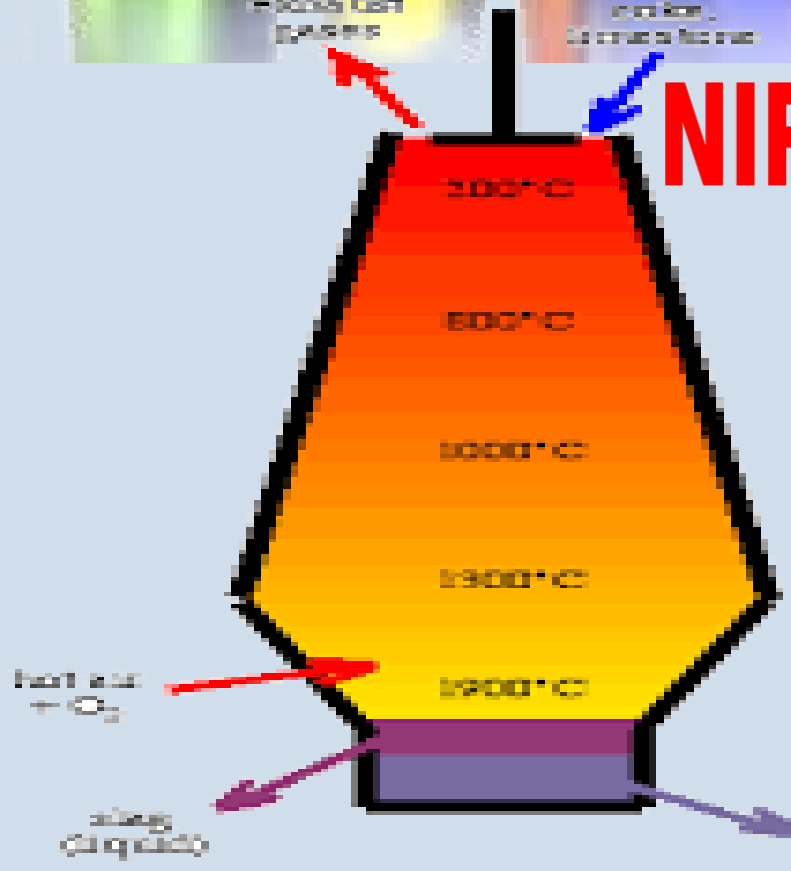
District Institute of Education and Training (DIET) ALAPPUZHA

NIRAKATHIR - 2021



$$Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$$

$$CaCO_3 \rightarrow CaO + CO_2$$

$$CaO + SiO_2 \rightarrow CaSiO_3$$

$$CO_2 + C \rightarrow 2CO$$

$$C + O_2 \rightarrow CO_2$$

CHEMISTRY

SSLC 2021 REVISION MATERIAL BASED ON FOCUS AREAREA

ആമുഖം

പത്താംതരം വിദ്യാർത്ഥികളുടെ പഠനത്തിന്റെ ഭാഗമായ സംശയ നിവാരണ പ്രവർത്തനങ്ങളുമായി ബന്ധപ്പെട്ട് ,കോവിഡ് മാനദണ്ഡങ്ങൾ പാലിച്ചുകൊണ്ടുതന്നെ ജില്ലയിലെ വിദ്യാലയങ്ങൾ സജീവമായിരിക്കുകയാണ്.ആലപ്പുഴ ഡയറ്റ് നടത്തിയ വിദ്യാലയ സന്ദർശനങ്ങളുടെ ഭാഗമായി അധ്യാപകർ,രക്ഷിതാക്കൾ, ജനപ്രതിനിധികൾ തുടങ്ങിയവരുമായി നടത്തിയ ചർച്ചയിൽ പത്താംതരം പൊതു പരീക്ഷയുടെ റിവിഷൻ പ്രവർത്തനങ്ങളെ സഹായിക്കുന്ന ഒരു വായനാ സാമഗ്രിയുടെ ആവശ്യകത പരക്കെ ഉന്നയിക്കപ്പെടുകയുണ്ടായി .പൊതു പരീക്ഷയിൽ പ്രത്യേക ഊന്നൽ നൽകേണ്ട പാഠഭാഗങ്ങൾ പൊതുവിദ്യാഭ്യാസ വകുപ്പ് നിർദ്ദേശിച്ചിട്ടുമുണ്ട്. ഈ പശ്ചാത്തലത്തിലാണ് നിറകതിർ 2021, എസ്.എസ്.എൽ.സി റിവിഷൻ സഹായി ആലപ്പുഴ ഡയറ്റ് തയ്യാറാക്കി പുറത്തിറക്കുന്നത്.

പൊതുവിദ്യാഭ്യാസ വകുപ്പ് നിർദ്ദേശിച്ചിട്ടുള്ള വിവിധ വിഷയങ്ങളുടെ ഊന്നൽമേഖലകളാണ് ഇതിലെ പ്രതിപാദ്യം. വിദ്യാർത്ഥികൾക്ക് ഉന്നത വിജയം കരസ്ഥമാക്കുന്നതിന് ഇത് ഉപകരിക്കും. ഊന്നൽ മേഖലകൾ നിശ്ചയിച്ചിരിക്കുന്നതു തന്നെ ഉപരിപഠനത്തിന് സഹായകമായ പാഠഭാഗങ്ങളെ മുൻനിർത്തിയാണല്ലോ? എന്നിരുന്നാലും പാഠഭാഗങ്ങൾ പൂർണ്ണമായി മനസ്സിലാക്കാനും പൊതു പരീക്ഷക്കു സഹായകമായി ഈ ഊന്നൽ മേഖലകൾ കേന്ദ്രീകരിച്ചുള്ള പഠനം നിർവ്വഹിക്കാനും ശ്രദ്ധിക്കണം.
വളരെ കുറഞ്ഞ സമയത്തിനുള്ളിൽ തന്നെ വ്യത്യസ്ത വിഷയങ്ങളിൽ ഈ വായനാ സാമഗ്രി തയ്യാറാക്കാൻ കഴിഞ്ഞത് ജില്ലയിലെ അധ്യാപകരുടെ ആത്മാർത്ഥമായ പരിശ്രമം കൊണ്ടു മാത്രമാണ്. ഡയറ്റിൻ്റെ എല്ലാ പ്രവർത്തനങ്ങളിലും ജില്ലയിലെ അധ്യാപകരും, വിദ്യാഭ്യാസ പ്രവർത്തകരും നൽകി വരുന്ന പിന്തുണ ഇതിൻ്റെപ്രവർത്തനത്തിലും ഉണ്ടായിട്ടുണ്ട്. പത്താംതരം പൊതു പരീക്ഷയെ മികച്ച ആത്മവിശ്വാസത്തോടെ അഭിമുഖീകരിക്കാൻ **നിറകതിർ 20 -21** സഹായിക്കുമെന്ന് പ്രതീക്ഷിക്കുന്നു.ഈ സംരംഭത്തെ സഹായിച്ച എല്ലാവർക്കും നന്ദി.

മിനി ബഞ്ചമിൻ
പ്രിൻസിപ്പൽ ഇൻ ചാർജ്ജ്
ഡയറ്റ് ആലപ്പുഴ

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ഡയറ്റ് ആലപ്പുഴ

(കോഡിനേറ്റർ)

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രസതന്ത്രം

നം	യൂണിറ്റിന്റെ പേര്	ഫോക്കസ് ഏരിയ
1	പീരിയോഡിക് ടേബിളും ഇലക്ട്രോൺ വിന്യാസവും	• ഷെല്ലുകളും സബ്ഷെല്ലുകളും. • സബ്ഷെല്ലിലെ ഇലക്ട്രോണുകളുടെ എണ്ണം. • സബ്ഷെല്ലിലെ ഇലക്ട്രോൺ പൂരണം • ക്രോമിയത്തിന്റെയും കോപ്പറിന്റെയും ഇലക്ട്രോൺ വിന്യാസത്തിലെ പ്രത്യേകത. • സബ്ഷെൽ ഇലക്ട്രോൺ വിന്യാസവും ബ്ലോക്കും. • സബ്ഷെൽ ഇലക്ട്രോൺ വിന്യാസത്തിന്റെ അടിസ്ഥാനത്തിൽ പീരിയഡ്, ഗ്രൂപ്പ് എന്നിവ കണ്ടെത്താം. • s ബ്ലോക്ക് മൂലകങ്ങളുടെ ഗ്രൂപ്പ് നമ്പർ. • p ബ്ലോക്ക് മൂലകങ്ങൾ. • d ബ്ലോക്ക് മൂലകങ്ങൾ. • d ബ്ലോക്ക് മൂലകങ്ങളുടെ പ്രത്യേകതകൾ.
2	വാതകനിയമങ്ങളും മോൾ സങ്കല്പനവും	• വ്യാപ്തവും മർദവും തമ്മിലുള്ള ബന്ധം. • വ്യാപ്തവും താപനിലയും തമ്മിലുള്ള ബന്ധം. • ഗ്രാം അറ്റോമിക മാസ്. • ഒരു മോൾ ആറ്റങ്ങൾ. • മോളിക്യുലാർ മാസും ഗ്രാം മോളിക്യുലാർ മാസും. • തന്മാത്രകളുടെ എണ്ണം. • ഒരു മോൾ തന്മാത്രകൾ.
3	ക്രിയാശീല ശ്രേണിയും വൈദ്യുത രസതന്ത്രവും	• ക്രിയാശീല ശ്രേണിയും ആദേശ രാസപ്രവർത്തനവും. • ഗാൽവനിക് സെൽ. • വൈദ്യുത വിശ്ലേഷണ സെല്ലുകൾ. • ഉരുകിയ സോഡിയം ക്ലോറൈഡിന്റെ വൈദ്യുത വിശ്ലേഷണം.
4	ലോഹനിർമ്മാണം	• ധാതുക്കളും അയിരുകളും • അയിരുകളുടെ സാന്ദ്രണം. • സാന്ദ്രീകരിച്ച അയിരിൽ നിന്ന് ലോഹത്തെ വേർതിരിക്കൽ. • ലോഹ ശുദ്ധീകരണം. • ഇരുമ്പിന്റെ വ്യാവസായിക നിർമ്മാണം.
5	അലോഹ സംയുക്തങ്ങൾ	• അമോണിയ. • ഉഭയദിശാരാസപ്രവർത്തനങ്ങളുംഏകദിശാരാസപ്രവർത്തനങ്ങളും. • രാസസംതുലനം. • ലേ-ഷാറ്റ് ലിയർ തത്വം. • സംതുലനാവസ്ഥയിൽ ഗാഢതയുടെ സ്വാധീനം. • സംതുലനാവസ്ഥയും മർദവും. • സംതുലനാവസ്ഥയും താപനിലയും.
6	ഓർഗാനിക് സംയുക്തങ്ങളുടെ നാമകരണവും ഐസോമെറിസവും	• ആൽക്കെയ്ൻ, ആൽക്കീൻ, ആൽക്കൈൻ. • ഹോമലോഗസ് സീരീസ്. • ശാഖയില്ലാത്ത ഹൈഡ്രോകാർബണുകളുടെ നാമകരണം. • ഒരു ശാഖയുള്ള ഹൈഡ്രോകാർബണുകളുടെ നാമകരണം. • അപൂരിത ഹൈഡ്രോ കാർബണുകളുടെ നാമകരണം • ഫങ്ഷണൽ ഗ്രൂപ്പ് - ഹൈഡ്രോക്സിൽ, ആൽക്കോക്സി. • ഐസോമെറിസം.
7	ഓർഗാനിക് സംയുക്തങ്ങളുടെ രാസപ്രവർത്തനങ്ങൾ	• ആദേശ രാസപ്രവർത്തനം. • അഡീഷൻ രാസപ്രവർത്തനം. • പോളിമൈറൈസേഷൻ - ഹൈഡ്രോകാർബണുകളുടെ ജ്വലനം. • താപീയവിഘടനം.

1 Periodic Table and Electronic Configuration

To Remember

Shell	Number of subshells	Subshells
K(1)	1	s
L(2)	2	s , p
M(3)	3	s , p , d
N(4)	4	s , p , d , f

Subshell	Maximum number of electrons that can be accommodated
s	2
p	6
d	10
f	14

- The subshells in the increasing order of their energies.
1s < 2s < 2p < 3s < 3p < 4s < 3d ....

- **Block = The subshell to which the last electron is added.**

- **Period number = Serial number of the outer most shell**

Block	Group number
s	**Number of electrons in the last 's' subshell** Eg : $_{11}$ Na - $1s^2\ 2s^2\ 2p^6\ 3s^1$ **Group number = 1**
p	**Number of electrons in the last 'p' subshell + 12** Eg: $_{15}$P - $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^3$ **Group number = 12 + 3 = 15**

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d	**Number of electrons in the outer most 's' subshell + number of electrons in the proceding 'd' subshell** Eg : $_{23}$ V - $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^3\ 4s^2$. **Group number = 2 + 3 = 5**

■

Block	Position
s	**Group 1 and group 2**
p	**Group 13 to 18**
d	**Group 3 to 12**

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Each question from 1 to 9 carries 1 score.

1. Which one of the following subshells is not possible in an atom ?
   (1s, 2p, 5s, 2d)
2. What is the maximum number of electrons that can be accommodated in d subshell?
3. Which shell has only one subshell?
4. Which subshell among the following has the highest energy?
   (2p,4s,3d,3p)
5. How many subshells are present in M shell?
6. In which block does the transition elements belong?
7. Subshell electronic configuration of an atom is $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^4$. How many shells are present in this atom?
8. What is the oxidation state of Mn in Mn_2O_3.
   (Hint: oxidation state of Oxygen is (-2))
   [+4, +3, +2, +1]
9. Choose the wrong subshell electronic configuration from those given below.
   ($1s^2\ 2s^1$, $1s^2\ 2s^2\ 2p^4$, $1s^2\ 2s^2$, $1s^2\ 2s^2\ 2p^7$)

Each question from 10 to 14 carries 2 scores.

10. Subshell electronic configuration of an element is [Ar] $4s^1$.
    a) Write the complete subshell electronic configuration of this element.
    b) What is the atomic number of the element.
11. a) Find the oxidation state of Fe in $FeCl_2$.
    [Hint: Atomic number of Fe = 26, Oxidation state of Cl = -1]
    b) Write down the subshell electronic configuration of Fe^{3+}.

12. Find out the correct statements related to d block elements among the given statements below.
    a) Shows variable oxidation state.
    b) They are non - metals.
    c) They produce coloured compounds.
    d) They show high electronegativity.
13. Subshell electronic configuration of some elements are given below.
    (Symbols are not real)

    P- $1s^2\ 2s^2\ 2p^3$
    Q- $[Ar]\ 3d^3\ 4s^2$
    R- $1s^2\ 2s^2\ 2p^6$
    S- $1s^2\ 2s^2\ 2p^6\ 3s^1$

    a) Which element among these can form coloured compounds?
    b) Which are the elements belong to the same group?
14. Subshell electronic configuration of an element is $[Ar]\ 3d^5\ 4s^1$.
    a) What is the atomic number of the element ?
    b) Which is the subshell to which the last electron is added?

Each question from 15 to 17 carries 3 scores.

15. The element X has 1 electron in the s subshell in 3rd shell.
    a) write the complete subshell electronic configuration of X.
    b) Find out the atomic number of this element.
    c) To which block does the element X belong?
16. a) Find out the oxidation state of Mn in the following compounds.
    i) $MnCl_2$ ii) MnO_2
    [Hint :Oxidation state Cl = (-1) , O =(-2)]
    b) Give reason for the variable oxidation state of d block elements.
17. The atomic number of an element is 19.
    a) Write the subshell electronic configuration of this element.
    b) Find out the period number and group number of the element.

Each question from 18 to 20 carries 4 scores.

18. a) Select the correct subshell electronic configuration of $_{24}Cr$ from the following:
    i) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^4\ 4s^2$
    ii) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^5\ 4s^1$
    b) Write the reason for selecting this configuration.
    c) Find out the period number and group number of the element.
19. Analyse the table and answer the questions. (The symbols are not real)

Element	Period number	Group number
X	3	17
Y	2	2

    a) Write the subshell electronic concentration of element Xand Y
    b) To which block of the periodic table does the element Y belong?
    c) How many p electrons are in the element X.

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20. Subshell electronic configuration of some elements are given below.
(Symbols are not real)

X - [Ne] $3s^2$

Y - [Ar] $4s^2$

Z - [Ar] $3d^3\ 4s^2$

a) Write the complete subshell electronic configuration of element Y.
b) Which of them shows variable oxidation state?
c) Find the group number and period number of element Z.

To Remember

- No. of mole atom / No.of GAM = $\frac{\text{Mass in grams}}{\text{GAM of the element}}$
- No. of atoms = No. of mole atom / No.of GAM) x 6.022 x 10^{23}
- Mass in grams(In case of atoms) = No. of mole atom / No.of GAM x 1GAM
- The number 6.022 x 10^{23} is known as Avagadro number.
- 1 GAM = 1 Mole atom = 6.022 x 10^{23} atoms
- No.of GMM / No. of moles = $\frac{\text{Mass in grams}}{\text{GMM}}$
- No. of molecules = No. of GMM((No. of moles) x 6.022 x 10^{23}
- Mass in grams(In case of molecules) = No.of GMM(No. of moles) x 1GMM
- 1 GMM = 1 Mole molecules(Mole) = 6.022 x 10^{23} molecules

Each question from 1 to 9 carries 1 score.

1. The relation between volume of a definite mass of a gas and pressure at a constant temperature is known as .....
[charles' law, Avogadro's law, Boyle's law, Le-chatelier's Principle]

2. Analyse the situations given below and write the one which is related to Charles' law.
a)If an inflated balloon is kept in sunlight, it will burst after sometime.
b) As the balloon is being inflated,its volume increases.
c) The size of air bubbles rising from the bottom of a water body gradually increases

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3. Find the relation and fill in the blank
16g Oxygen = 1 GAM
16g Helium = ... GAM
[Hint : Atomic mass O = 16 ,He = 4]

4. What is the mass of 1GMM CO_2?
[Hint : molecular mass CO_2 = 44]

5. How many GAM is present in 56g nitrogen?
[Hint : Atomic mass N = 14]

6. How many GMM are there in 48g CH_4?
[Hint : Molecular mass CH_4 = 16]

Each question from 7 to 11 carries 2 scores.

7. Examine the data given in the table.
(Temperature and number of molecules of the gas are kept constant)

Pressure (P)	Volume (V)
1 atm	8 L
2 atm	4 L
4 atm	2 L

a) What will be the volume of this gas at 8 atm pressure?
b) Which is the gas law related to this ?

8. What happens to the size of a gas bubble rising from the bottom of a water body? why?

9. a) The volume of a fixed mass of gas at 300K is 10L.What will be the volume of the gas,if the temperature is doubled without changing the pressure.
b) Which is the gas law related to this?

10. The molecular mass of CO_2 is 44.
a)Find the mass of 1GMM CO_2.
b) How many moles of molecules are there in 220 g of CO_2?

11. Atomic mass of nitrogen is 14.
a) How many atoms are present in 1 GAM nitrogen.
b) Find the mass of $4 \times 6.022 \times 10^{23}$ nitrogen atoms.

Each question from 12 to 14 carries 3 scores.

12. The data of an experiment conducted on a fixed mass of gas at constant pressure are given.

Volume(V) L	Temperature(T)K
600	300
800	(X)
(Y)	450

a) Find the values of (X) and (Y)
b) What is the relation between volume and temperature at constant pressure ?

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13. Complete the table

Element	Mass in grams	Number of GAM	Number of atoms
Helium	20g	.....(a).....	.....(b).....
Chlorine	.....(c).....	4	4 x 6.022x10^{23}

(Hint : Atomic mass He = 4 , Cl = 35.5)

14. The molecular mass of CH_4 is16.

a) Find the number of molecules in 1GMM CH_4 .

b) Find out the number of moles and molecules in 8g of CH_4.

Each question from 15 to 17 carries 4 scores.

15. Complete the table given.

Compound	Mass in grams	Number of GMM	Number of molecules
NH_3	170g	.....(a).....	.....(b).....
SO_2	.....(c).....	.....(d).....	5 x 6.022 x 10^{23}

(Hint :Molecular mass NH_3 = 17, SO_2 = 64)

16. a) The number 6.022 x 10^{23} is known as .....

b) Find out the number of mole molecules and molecules in 640g SO_2.

[Hint : Molecular mass SO_2 = 64]

c) How many grams of CO_2 is to be taken to get as many molecules as are in 640g SO_2?

[Hint : Molecular mass CO_2 = 44]

17. Some samples of certain compounds are given.

P - 85 g NH_3
Q - 88g CO_2
R - 20 g H_2
S - 400g $CaCO_3$

a) Calculate the molecular mass of $CaCO_3$.

[Hint : Atomic mass Ca = 40 , C = 12, O = 16]

b) How many GMMs are there in each sample ?
(Hint : molecular mass NH_3 - 17, CO_2 - 44, H_2 - 2)

c) Find out number of molecules in sample R.

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3 Reactivity series and Electrochemistry

To Remember.....

- **Electrochemical series.**

Electropositive nature decreases

K > Na > Ca > Mg > Al > Zn > Fe > Ni > Sn > Pb > Cu > Ag > Au

Electropositive nature increases

- A highly electropositive metal can displace less electropositive metal from its salt solution.
- **In galvanic cell**

  Highly electropositive metal – Anode (Oxidation)
  Less electro positive metal – Cathode (Reduction)
  Direction of electron flow – Anode to Cathode

-

Cell	Energy change
Galvanic cell	Chemical energy to electrical energy
Electrolytic cell	Electrical energy to chemical energy

- **Electrolysis of molten sodium chloride**

Reaction		Products	
Anode	Cathode	Anode	Cathode
Oxidation $2Cl - 2e^- \rightarrow Cl_2$	Reduction $Na^+ + 1e^- \rightarrow Na$	Chlorine (Cl_2)	Sodium(Na)

Each question from 1 to 4 carries 1 marks

1. Which of the following metals can displace Fe from $FeSO_4$
(Ag, Cu, Au, Zn)

2. Electrode at which oxidation takes place is called ----------

3. In Fe-Cu Cell, which electrode acts as anode?

4. Which is the product obtained at the anode during the electrolysis of molten sodium chloride?

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Each question from 5 to 6 carries 2 marks

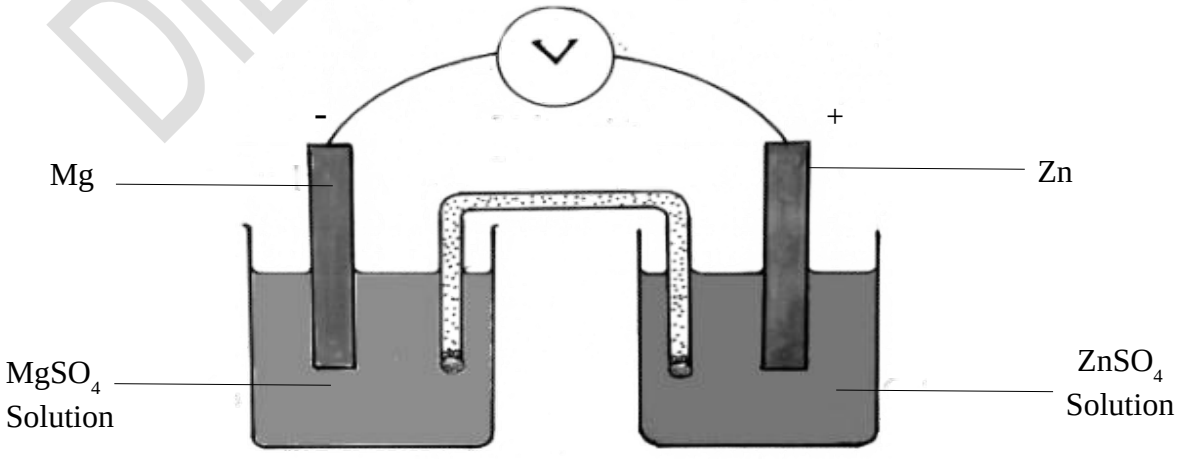
5. $Cu + 2AgNO_3 \rightarrow Cu(NO_3)_2 + 2Ag$
   a) Name the type of reaction takes place here.
   b) Write down reduction reaction in the above reaction ?
6. $Fe + CuSO_4 \rightarrow FeSO_4 + Cu$
   a) Which ion is responsible for the blue colour of $CuSO_4$ solution ?
   b) Write down the oxidation reaction takes place here ?

Each question from 7 to 8 carries 3 marks

7. Electrolysis of molten sodium chloride (NaCl) is conducted.
   a) Which are the ions present in the molten sodium chloride?
   b) Which ion is attracted towards positive electrode ?
   c) Write down the reaction takes place in cathode ?
8. Analyse the following reactions and answer the following questions.
   (Hint : Oder of reactivity Mg>Zn>Fe>Cu)
   Testtube1 : A copper rod is dipped in $FeSO_4$ solution
   Testtube 2 : A Zinc rod is dipped in $FeSO_4$ solution
   a) In which test tube does displacement reaction take place ? Give reason ?
   b) Write the redox reaction taking place here

Each question from 9 to 10 carries 4 marks

9. Fe rod is dipped in $CuSO_4$ Solution.
   a) What changes takes place in the Fe rod after some time ?
   b) Which metal undergoes oxidation ?
   c) If Ag rod is used instead of Fe, does displacement reaction takes place ? Give reason?
10. A picture of galvanic cell is given below
    (Hint:- Reactivity- Mg > Zn)



   a) Which is the energy change takes place in the galvanic cell ?

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b) Write down the reaction takes place at cathode ?

c) Which electrode acts as anode ?

To Remember

■ **Metals and ores**

Metal	Ores	Chemical formula
Iron	Haematite magnetite	Fe_2O_3 Fe_3O_4
Copper	Copper pyrites Cuprite	$CuFeS_2$ Cu_2O
Zinc	Zinc Blend Calamine	ZnS $ZnCO_3$
Aluminium	Bauxite	$Al_2O_3.2H_2O$

■ **Methods of Concentration of ores**

Properties of ores	Properties of the impurities present in the ore	Method of concentration
High density	Low density .	Levigation or hydraulic washing
Magnetic in nature	Non magnetic in nature	Magnetic separation
Lighter sulphide ores	High density	Froth floatation
Aluminium ores that get dissolved in a solution	Insoluble in the same solution	Leaching

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■ Metals and purification methods

Metal	Purification Method	Property used
Tin, Lead	Liquation	Low melting point of metals
Zinc, Cadmium, Mercury	Distillation	Low boiling point of metals

■ Extraction of iron.

Ore of iron	Haematite (Fe_2O_3)
Raw materials fed into the blast furnace	Powdered haematite , Coke, Calcium carbonate ($CaCO_3$)
The compound used for reducing haematite	Carbon monoxide (CO)
Gangue	Silica (SiO_2)
Flux	Calcium Oxide (CaO)
Slag	Calcium Silicate ($CaSiO_3$)
Equation of formation of slag	$CaO + SiO_2 \rightarrow CaSiO_3$
Name of iron obtained from blast furnace	Pig Iron

Each question from 1 to 9 carries 1 scores

1. Find the relation and fill in the blanks.
   Iron – Haematite
   Aluminium – ----------

2. Find the relation and fill in the blanks.
   Tin Stone – SnO_2
   Calamine – ----------

3. Find the relation and fill in the blanks.
   $ZnCO_3$ – Calcination
   Cu_2S - ----------

4. Which among the following metals is refined by liquation ?
   (Zinc, Copper, Mercury, Tin)

5. Iron obtained from blast furnace is called ----------

6. The compound used as reducing agent in the blast furnace is ----------

7. ---------- is the process of heating the concentrated ore in the absence of air at temperature below its melting point.

8. Bauxite ore is concentrated by ---------- method.

9. Which electrolyte is used in the electrolytic refining of copper ?

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Each question from 10 to 13 carries 2 scores.

10. (a) Write are the gangue, flux in blast furnace?
    (b) Write the equation of slag formation reaction.

11.Complete the table

Ore	Method of concentration
Tin Stone	.....(a.).....
Zinc Blend	.....(b).....

12. There are two methods employed for converting concentrated ore into its oxide.

1. Calcination
2. Roasting

a) Among these which method is used for converting $ZnCO_3$ into ZnO ?

b) What is the difference between calcination and roasting ?

13. Complete the table.

Metal	Characteristics	Method of refining
Zn	A	Distillation
Tin	Low melting point	B

Each question from 14 to 15 carries 3 scores.

14. Haematite is converted into iron in blast furnace. Analyse the following equations and answer the questions.

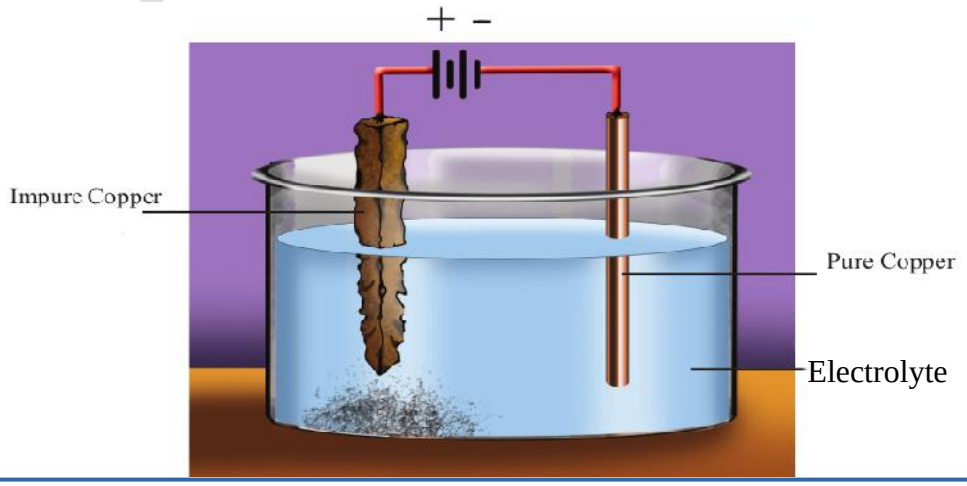
$CaCO_3$ + Heat → A + CO_2
A + SiO_2 → B
Fe_2O_3 + 3CO → 2Fe + $3CO_2$

a) Find A and B ?

b) What is the function of A in the blast furnace ?

c) Name the reducing agent used in the extraction of iron.

15. Analyse the diagram and complete the following table.



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Anode	A
Cathode	B
Name of electrolyte	C

Question 16 carry 4 marks

16. Match the columns A,B And C suitably

A Properties of ores	B The method of concentration	C Example
Ore particle is heavier than impurities.	Leaching	Tin Stone
Ore particle is lighter than impurities.	Magnetic separation	Bauxite
Magnetic nature of ore	Froth Floatation	Ore of Gold
Ore particle soluble in suitable solvent	Levigation	Zinc Sulphide

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To Remember.....

- Laboratory preparation of ammonia

Reactants	Ammonium Chloride, Calcium hydroxide
Drying agent	Calcium Oxide

- $NH_4Cl \rightleftharpoons NH_3 + HCl$
  NH_3 -Basic nature HCl - Acidic nature
- **Characteristics of Chemical equilibrium**
  - At the equilibrium both the reactants and the products coexist.
  - The rates of forward and backward reactions become equal at equilibrium.
  - Chemical equilibrium is dynamic at the molecular level.
  - Chemical equilibrium is attained in closed systems
- **Le Chateliers' Principle**

When the concentration, pressure or temperature of a system at equilibrium is changed, the system will readjust itself so as to nullify the effect of that change and attain a new state of equilibrium.

■ Effect of various changes happening in chemical equilibrium

Change	Effect
Concentration of reactants increases	Rate of forward reaction increases
Concentration of reactants decreases	Rate of forward reaction decreases
Concentration of product increases	Rate of forward reaction decreases
Concentration of product deceases	Rate of forward reaction increases
Temperature increases	Rate of endothermic reaction increases
Temperature decreases	Rate of exothermic reaction increases
Pressure increases	Increase the rate of reaction in the direction in which number of molecules decreases.
Pressure decreases	Increase the rate of reaction in the direction in which the number of molecules increases

Each question from 1 to 9 carries1 marks

1. Reactants used for the laboratory preparation of Ammonia are -------- and --------
2. Drying agent used in the laboratory preparation of ammonia is ------
3. In a reversible reaction the reaction from left to right is called -----
4. Which is the basic nature substance formed by the decomposition of ammonium chloride ?
5. Write the backward reaction from the following reversible reaction.

   $N_2 + 3H_2 \rightleftharpoons 2NH_3$
6. Write the name of concentrated aqueous solution of ammonia ?
7. Which of the following is true about reversible reaction?

   i) Reaction stops after some time.

   ii) Reaction attain equilibrium after some time

   iii) Reaction takes place only in one direction.
8. What is the optimum temperature used in the manufacture of ammonia?
9. Which of the following substance is used as a refrigerant in ice plants.

   (NH_3 ,HCl , SO_2 , H_2SO_4)

Each question 10 to 18 carris 2 marks

10. $NH_4Cl \underset{B}{\overset{A}{\rightleftharpoons}} NH_3 + HCl$

    Identify the reactions A and B
11. In which of the following reversible reactions the change in pressure does not influence the equilibrium? What is the reason?

    i) $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$

    ii) $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$

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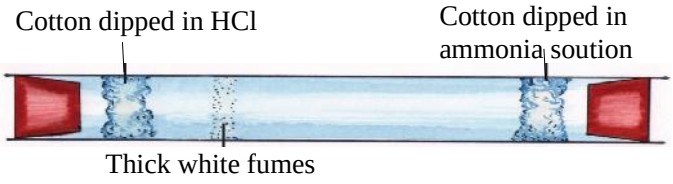
12. Calcium oxide (CaO) is used as drying agent in the preparation of Ammonia in laboratory. Can concentrated H_2SO_4 be used as drying agent instead of CaO? Justify your answer.

13. Analyse the following diagram and observations given below.



Observation :- A white substance is formed

a) Which is the white substance formed here ?

b) Write the balanced chemical equation of the reaction?

14 N_2 (g) + $3H_2$ (g) ⇌ $2NH_3$ (g) + Heat

a) What change is to be made in pressure to get maximum yield of the products?

b) What is the change in concentration of product is required for increasing the rate of the forward reaction?

15. Ammonia is a gas that highly soluble in water and it can be liquefied easily by applying pressure.

a) What is the name of concentrated aqueous solution of ammonia ?

b) What is the name of liquefied ammonia ?

16. Ammonia is manufactured by Haber process.

a) What is the optimum temperature used in this process ?

b) Write any two uses of ammonia ?

17. A reversible reaction can attain chemical equilibrium after some time.

a) Write any one characteristics of chemical equilibrium ?

b) What happens when concentration of reactants is increased at chemical equilibrium?

18. $2NO(g) + O_2(g) ⇌ 2NO_2$ (g) + Heat

Identify the effect of following changes in forward reaction.

a) Pressure is decreased.

b) Products are frequently removed from the system.

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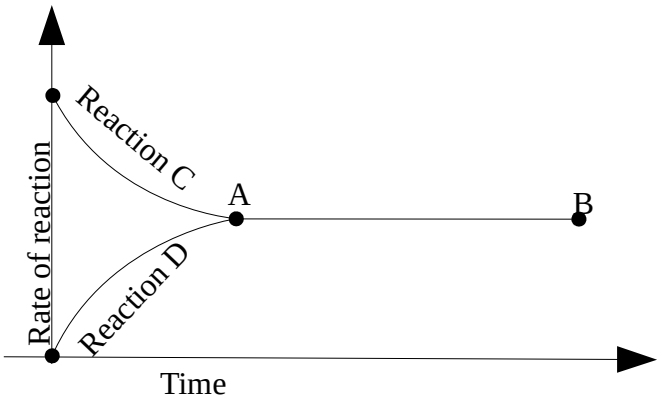
Each question from 19 to 21 carries 3 marks

19. The graph for the reaction $N_2 + 3H_2 \rightleftharpoons 2NH_3$ is given below. Analyse it and answer the following questions



a) Identify the reactions C and D
b) Which stage of reaction is shown by the portion AB of the graph?

20. Take some ammonium chloride (NH_4Cl) in a boiling tube and heat it. When a wet red litmus shown at the mouth of the boiling tube it changes to blue.
a) Which are the gases produced ?
b) Write the chemical equation of the reaction occurred here?
c) Which gas is responsible for the colour change of the litmus paper ?

Each question from 21 to 22 carries 4 marks.

21. a) What are the reactants used in laboratory preparation of ammonia ?
b) Write the balanced chemical equation of the reaction ?
c) Which is the drying agent used ?
d) Ammonia is collected in the gas jar by keeping mouth downwards. Why?

22. $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$ + Heat.

What happens in the yield of ammonia when following changes are made ?
a) Concentration of Nitrogen is increased.
b) Temperature is decreased.
c) NH_3 is removed from the system.
d) Pressure is increased.

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6 Nomenclature of organic compounds and isomerism

To Remember.....

- **General formula**

Alkanes	C_nH_{2n+2}
Alkenes	C_nH_{2n}
Alkynes	C_nH_{2n-2}

- **Homologous series characteristics**

The members can be represented by a general formula.
Successive members differ by a CH_2 group.
Members show similarity in chemical properties.
There is a regular gradation in their physical properties.

- **Functional group**

Name of Functional group	Functional group	Common name of compounds
Hydroxyl group	-OH	Alcohol
Alkoxy group	- O -	Ether

Isomers

Chain Isomer
Eg. 1. $CH_3 - CH_2 - CH_2 - CH_3$
2. $CH_3 - CH(CH_3) - CH_3$

Functional isomer
Eg. 1. $CH_3 - CH_2 - CH_2 - OH$
2. $CH_3 - O - CH_2 - CH_3$

Position isomer
Eg. 1. $CH_3 - CH_2 - CH_2 - OH$
2. $CH_3 - CH(OH) - CH_3$

Each question from1 to 9 carries 1 marks

1. The general formula of alkanes is ----------
2. The general formula of alkynes is ----------
3. Find the odd one out
   (C_2H_6, C_3H_8, C_5H_{10}, C_6H_{14})
4. Find the missing member in the following homologous series .
   C_2H_2, C_3H_4, C_4H_6 , ... , C_6H_{10}
5. Which of the following is an unsaturated compound?
   (C_2H_6, C_3H_4, C_5H_{12}, C_6H_{14})

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6. Which of the following is a saturated compound ?
   (C_2H_6, C_3H_6, C_5H_8, C_6H_{12})

7. Name of the functional group OH is ----------

8. Write the structure of But – 2 – yne.

Each question from 9 to 12 carries 2 marks

9. Molecular formulae of some hydrocarbons are given.

   C_3H_6 , C_4H_8 , C_5H_{10} , C_6H_{12}

   a) To which Homologous series do these belong?

   b) Write its general formula ?

10. A structure of hydrocarbon is given below

    $CH_3-CH_2-CH_2-CH_2-CH_2-CH_3$

    a) Write its IUPAC name ?

    b) In which homologous series does this compound belongs ?

11. Details regarding an unsaturated hydrocarbon is given below.

    - There are five carbon atoms in the main chain .
    - A double bond is present between second and third carbon atom.

    a) Write the structure of this compound ?

    b) Write the IUPAC name of the compound ?

12. A student write the IUPAC name of an organic compound as 2-ethyl Pentane. Teacher says that it is wrong.

    a) Draw the structure of this compound.

    b) Write its correct IUPAC name.

Each question from 13 to 14 carries 3 marks

13 Analyse the given structures and answer the following questions.

a) $CH_3 – CH_2 – CH_2 – O – CH_3$

b) $CH_3 – CH_2 – CH_2 – OH$

c) $CH_3 – CH_2 – O – CH_3$

i) Identify the isomer pair from the above compounds.

ii) Which type of isomerism is exhibited ?

Iii) Write the structural formula of position isomer of compound (b)?

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14. Structure of an alcohol is given below. Analyse it and answer the following questions.

$CH_3 – CH_2 – CH_2 – OH$

a) Write the IUPAC name of this compound ?

b) Write the structure and IUPAC name of functional isomer of this compound ?

Each question from 15 to 17 carries 4 marks

15. Analyse the structure and answer the following questions.

$$CH_3 – CH_2 – CH_2 – \underset{\displaystyle CH_3}{\underset{|}{CH}} – CH_3$$

a) How many carbon atoms are in the main chain?

b) what is the position of the branch ?

c) What is name of branch ?

d) Write its IUPAC name ?

16. Complete the table

Structural formula	IUPAC name
a	2-Methyl propane
$CH_3 - CH_2 - CH = CH_2$	b
c	Ethoxy propane
d	But – 1- ene

17. Structural formula of some organic compounds are given below

i) $CH_3 – CH_2 – CH_2 – CH_3$

ii) $CH_3 – CH_2 – CH_2 – OH$

iii) $$CH_3 – \underset{\displaystyle OH}{\underset{|}{CH}} – CH_3$$

a) Write the structure of chain isomer of compound (i)

b) Which compounds have the same molecular formula ?

c) Write the structural formula and IUPAC name of functional isomer of compound (iii)

DIET ALAPPUZHA

7 Chemical Reactions of Organic Compounds

Each question from 1 to 5 carries 1 score.

1. Which is the monomer of Teflon?
2. $CH_3 - CH_2 - CH_3 \longrightarrow A + CH_4$
   What is the molecular formula of the compound A.
3. Which is the main component in LPG?
4. Which of the following molecule can undergo addition reaction?
   (Methane , Ethane , Propene , Butane)
5. $CH_3 - CH = CH_2 + H_2 \longrightarrow A$
   Write the IUPAC name of the compound A.

Each question from 6 to 8 carries 2 scores.

6. $CH_4 + Cl_2 \xrightarrow{\text{Sunlight}} A + HCl$
   a) What is the IUPAC name of the compound A?
   b) To which type does this reaction belong?
   (Addition reaction, Substitution reaction, Combustion, Polymerisation)
7. a) Which is the main component in LPG?
   b) What are the products obtained by the combustion of LPG?
8. $CH_3 - CH_2 - CH_3 \longrightarrow A + CH_4$
   a)Write the structural formula of compound A.
   b) Which type of chemical reaction is this?

Each question from 9 to 10 carries 2 scores.

9. Given below are two chemical equation.
   i) $CH \equiv CH + H_2 \longrightarrow X$
   ii) $X + H_2 \longrightarrow Y$
   a) Identify the products X and Y .
   b) By which name this type of reaction is known?
10. Complete the following equations
    a) $C_2H_6 + Cl_2 \longrightarrow$ ----- + HCl
    b) $C_3H_6 + Cl_2 \longrightarrow$ --------
    c) n $CH_2 = CH_2 \longrightarrow$ ---------

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Each question from 11 to 12 carries 2 scores.

11. Match the columns A,B and C suitably.

A Reactants	B Products	C Name of Reaction
$CH_4 + Cl_2$	$CO_2 + 2H_2O$	Addition
$CH_4 + 2O_2$	$CH_2 = CH_2$	Thermal Cracking
$CH_3 - CH_2 - CH_3$	$CH_3Cl + HCl$	Combustion
$CH \equiv CH + H_2$	$CH_2 = CH_2 + CH_4$	Substitution

12. The given table is related to different type reactions of hydrocarbons. Fill in the blanks.

$CH_4 +$ a	$\longrightarrow$	$CO_2 + H_2O$
$C_2H_5 + Cl_2$	$\longrightarrow$	b $+ HCl$
c $+ H_2$	$\longrightarrow$	$CH_3 - CH_3$
$n\ CH_2 = CH_2$	$\longrightarrow$	d

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1 Periodic Table and Electronic Configuration

Qn. No	Answer Key / Value points	Score	Total Score
1.	2d	1	1
2.	10	1	1
3.	K	1	1
4.	3d	1	1
5.	3 (s , p, d)	1	1
6.	d	1	1
7.	3	1	1
8.	+3	1	1
9.	$1s^2\ 2s^2\ 2p^7$	1	1
10.	a) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^1$ b) 19	1 1	2
11.	a)+2 b) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^5$ / [Ar] $3d^5$	1 1	2
12.	a) & c)	1+1	2
13.	a)Q b) P & R	1 1	2
14.	a) 24 b) d	1 1	2
15.	a) $1s^2\ 2s^2\ 2p^6\ 3s^1$ b)11 c)s block	1 1 1	3
16.	a) i) +2 ii) +4 b) In d block elements, the energy between the outermost s subshell and the penultimate d subshell is very small. Hence under suitable conditions the electrons in d subshell also take part in chemical reactions. Hence transition elements show variable oxidation states.	1+1 1	3

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17.	a) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^1$ b) Period number =4 , Group number = 1	1 1+1	3
18.	a) ii) b) The half filled or fully filled d subshell elecronic configuration is more stable than other atoms c) Group number = 6 , Period number = 4	1 1 1+1	4
19.	a) X - $1s^2\ 2s^2\ 2p^6 3s^2\ 3p^5$ Y - $1s^2\ 2s^2$ b) s block c)11	1+1 1 1	4
20.	a) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^2$ b) Z c) Group number = 5 , Period number = 4	1 1 1+1	4

Qn. No	Answer Key / Value points	Score	Total Score
1.	Boyle's Law	1	1
2.	a) If an inflated balloon is kept in sunlight, it will burst after sometime.	1	1
3.	4 GAM	1	1
4.	44g	1	1
5.	4 GAM	1	1
6.	3 GMM	1	1
7.	a) 1L b) Boyle' Law	1 1	2
8.	size increases , As the bubbles move from bottom to top in a water body, pressure decreases and correspondingly the volume increases.	2	2
9.	a) 20 L b) Charles' Law	1 1	2
10.	a) 44g b) 5 x 6.022×10^{23} molecules	1 1	2
11.	a) 6.022×10^{23} atoms b) 56 g	1 1	2
12.	a) X = 400 atm , Y = 900 L b) Directly propotional	1+1 1	3

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13.	a) 5 GAM b) 5 x 6.022x10^{23} c) 142 g	1 1 1	3
14.	a) 6.022x10^{23}molecules b) Number of moles = 0.5 Number of molecules = 0.5 x 6.022x10^{23}	1 1 1	3
15.	a) 10 b) 10 x 6.022x10^{23} c) 320g d) 5	1 1 1 1	4
16.	a) Avagadro number b) Number of mole molecules = 10 Number of molecules = 10 x 6.022x10^{23} c) 440g	1 1 1 1	4
17.	a) 100 b) Number of GMM P =5 , Q = 2, R = 10, S = 4 c) 10 x 6.022x10^{23}	1 1/2 x 4 1	4

Qtn No	Answer Key/ Value Points	Score	Total Score
1	Zn	1	1
2	Anode	1	1
3.	Fe	1	1
4.	Cl_2(Chlorine)	1	1
5.	a) Displacement reaction b) 2Ag + 2e$^-$ → 2Ag	1 1	2
6	a) Cu $^{2+}$ b) Fe → Fe $^{2+}$ + 2e$^-$	1 1	2
7.	a) Na$^+$, Cl$^-$ b) Cl$^-$ c) Na+ 1e$^-$ → Na	1 1 1	3
8	a) Test tube -2, Zn more reactive than Fe b) Zn + Fe $^{2+}$ → Zn $^{2+}$ + Fe	1 1	2

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9.	a) Cu deposited over Fe rod b) Fe c) If Ag is used instesd of Fe displacement reaction does not takes place. Reactivity of Ag is less than Cu	1 1 1 1	4
10.	a) Chemical energy is converted to electrical energy. b) $Zn^{2+} + 2e^- \rightarrow Zn$ c) Mg d) $Mg + Zn^{2+} \rightarrow Mg^{2+} + Zn$	1 1 1 1	4

Qtn No	Answer Key/ Value Points	Score	Total Score
1	Bauxite	1	1
2	$ZnCO_3$	1	1
3.	Roasting	1	1
4.	Tin	1	1
5.	Pig iron	1	1
6.	Carbon Monoxide (CO)	1	1
7.	Calcination	1	1
8.	Leaching	1	1
9.	$CuSO_4$ (Copper Sulphate)	1	1
10	a) Gangue- Silica(SiO_2) Flux- CaO b) $SiO_2 + CaO \rightarrow CaSiO_3$	1 1	2
11	a) Magnetic separation b) Froth floatation	1 1	2
12	a) Calcination b) Definition of calcination and roasting.	1 1	2
13.	A) Low boiling point B) Liquation	1 1	2
14	a) A – CaO B- $CaSiO_3$ b) It is used as flux c) Carbon monoxide (CO)	½+½ 1 1	3
15	A) Impure copper B) Pure copper C) Copper Sulphate solution	1 1 1	3

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16	Ore particle is heavier than impurities.	Levigation	Ore of Gold	½+½	4
	Ore particle is lighter than impurities.	Froth floatation	Zinc Sulphide	½+½	
	Magnetic nature of ore	Magnetic separation	Tin Stone	½+½	
	Ore particle soluble in suitable solvent	Leaching	Bauxite	½+½	

Qtn No	Answer Key/ Value Points	Score	Total Score
1	Ammonium Chloride (NH_4Cl) and Calcium hydroxide [$Ca(OH)_2$]	½+½	1
2	CaO	1	1
3.	Forward reaction	1	1
4.	NH_3	1	1
5.	$2NH_3 \rightarrow N_2 + 3H_2$	1	1
6.	Liquor ammonia	1	1
7.	ii) Reaction attain equilibrium after some time	1	1
8.	450 °C	1	1
9.	NH_3	1	1
10	A- Forward reaction $NH_4Cl \rightarrow NH_3 + HCl$ B- Backward reaction $NH_3 + HCl \rightarrow NH_4Cl$	1 1	2
11	i) $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$ Total number of reactant molecules and product molecule are equal	1 1	2
12	a) H_2SO_4 is not used as drying agent instead of CaO in the preparation of ammonia b) H_2SO_4 is an acid and NH_3 is a base . So they react each other.	1 1	2
13.	a) NH_4Cl (Ammonium Chloride) b) $NH_3 + HCl \rightarrow NH_4Cl$	1 1	2
14	a) Increase the pressure. b) Decrease the concentration of NH_3 (Removing NH_3 frequently)	1 1	2
15	a) liquor ammonia b) Liquid ammonia	1 1	2
16	a) 450 °C b) Writes any two use	1 ½+½	2

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17	a) Writes any one characteristic b) Equilibrium changes.	1 1	2
18	a) Rate of forward reaction decreases b) Rate of forward reaction increases	1 1	2
19	a) Reaction C- Forward reaction $N_2 + 3H_2 \rightarrow 2NH_3$ Reaction D – Backward reaction - $2NH_3 \rightarrow N_2 + 3H_2$ b) Chemical equlibrium	1 1 1	
20	a)Ammonia (NH_3) Hydrogen chloride (HCl) b) $NH_4Cl \rightleftharpoons NH_3 + HCl$ c) NH_3	½+½ 1 1	3
21	a) Ammonium Chloride (NH_4Cl) and Calcium hydroxide [$Ca(OH)_2$] b) $2NH_4Cl + Ca(OH)_2 \rightarrow CaCl_2 + 2H_2O + 2NH_3$ c) CaO d) Ammonia is lighter than air	1 1 1	3
22	a) Rate of forward reaction increases. So more NH_3 is formed b) Rate of forward reaction increases. So more NH_3 is formed c) Rate of forward reaction increases. So more NH_3 is formed d) Rate of forward reaction increases. So more NH_3 is formed	1 1 1 1	4

Qtn No	Answer Key/ Value Points	Score	Total Score
1	C_nH_{2n+2}	1	1
2	C_nH_{2n-2}	1	1
3.	C_5H_{10}	1	1
4.	C_5H_8	1	1
5.	C_3H_4	1	1
6.	C_2H_6	1	1
7.	Hydroxyl	1	1
8.	$CH_3 – C \equiv C – CH_3$	1	1

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9.	a) Alkene b) C_nH_{2n}	1	1
10	a) Hexane b) Alkane	1 1	2
11	a) $CH_3 - CH = CH - CH_2 - CH_3$ b) Pent – 2– ene	1 1	2
12	a) $CH_3 - CH_2 - CH_2 - CH(CH_2 - CH_3) - CH_3$ OR $CH_3 - CH(CH_2 - CH_3) - CH_2 - CH_2 - CH_3$ b) 3-Methyl hexane	1 1	2
13.	a) b and c or $CH_3 - CH_2 - O - CH_3$ $CH_3 - CH_2 - CH_2 - OH$ b) Functional isomerism c) $CH_3 - CH(OH) - CH_3$	1 1 1	3
14	a) Propan – 1 – ol b) $CH_3 - O - CH_2 - CH_3$, Methoxyethane	1 1 + 1	3
15	a) 5 b) 2 c) Methyl d) 2- Methylpentane.	1 1 1 1	4
16	a) $CH_3 - CH(CH_3) - CH_3$ b) But – 1 – ene c) $CH_3 - CH_2 - O - CH_2 - CH_2 - CH_3$ or $CH_3 - CH_2 - CH_2 - O - CH_2 - CH_3$ d) $CH_3 - CH_2 - CH = CH_2$ or $CH_2 = CH_2 - CH - CH_3$	1 1 1 1	4
17	a) $CH_3 - CH(CH_3) - CH_3$ b) ii) $CH_3 - CH_2 - CH_2 - OH$ iii) $CH_3 - CH(OH) - CH_3$ c) $CH_3 - O - CH_2 - CH_3$ or $CH_3 - CH_2 - O - CH_3$ Methoxyethane	1 1 1 +1	4

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Qn. No	Answer Key / Value points	Score	Total Score
1.	$CF_2 = CF_2$ / Tetrafluoroethene	1	1
2.	C_2H_4 / $CH_2 = CH_2$	1	1
3.	Butane / C_4H_{10}	1	1
4.	Propene	1	1
5.	Propane	1	1
6.	a) Chloromethane. b) Substitution reaction.	1 1	2
7.	a) Butane / C_4H_{10} b) CO_2 , H_2O	1 1	2
8.	a) $CH_2 = CH_2$ b) Thermal Cracking.	1 1	2
9.	a) X = $CH_2 = CH_2$, Y = $CH_3 - CH_3$ b) Addition reaction	1+1 1	3
10.	a) C_2H_5Cl b) $C_3H_6Cl_2$ c) $[CH_2 - CH_2]$	1 1 1	3
11.	A Reactants / B Products / C Name of Reaction $CH_4 + Cl_2$ / $CH_3Cl + HCl$ / Substitution reaction $CH_4 + 2O_2$ / $CO_2 + 2H_2O$ / Combustion $CH_3 - CH_2 - CH_3$ / $CH_2 = CH_2 + CH_4$ / Thermal Cracking $CH \equiv CH + H_2$ / $CH_2 = CH_2$ / Addition reaction	1 x 4	4
12.	a) $2O_2$ b) C_2H_5Cl c) $CH_2 = CH_2$ d) $-[CH_2 - CH_2]-_n$	1 1 1 1	4

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