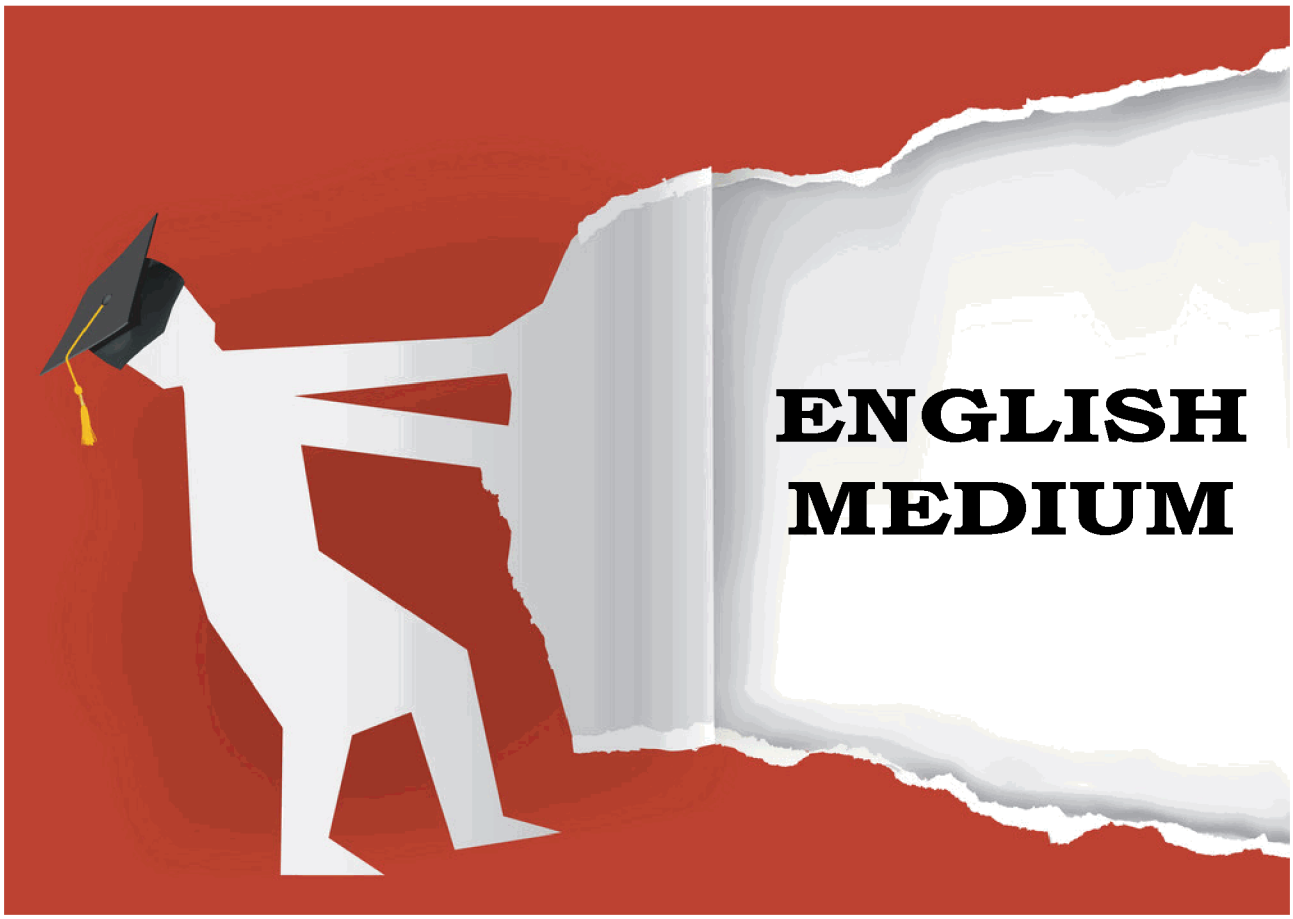

ENGLISH
MEDIUM

Unit 1

PERIODIC TABLE AND ELECTRONIC CONFIGURATION

Score : 40
Time : 1.30 hr

Questions from 1 to 4 carries 1 score each. **(4 ×1 = 4)**

1. Certain sub shells are given below. Which are the subshells that do not exist

   (3s, 1p, 3f, 3d)

2. Identify the relation and complete the following.

   [Ne] $3s^2$ $3p^4$: Group 16 : : [Ar] $3d^3$ $4s^2$: Group ___

3. Which of the following subshell electronic configuration represent noble gas.

   a - $1s^2$ $2s^2$ $2p^4$

   b - $1s^2$ $2s^2$ $2p^6$

   c - $1s^2$ $2s^2$ $2p^6$ $3s^2$

   d - $1s^2$ $2s^2$ $2p^6$ $3s^2$ $3p^2$

4. Which of the following is not a property of p block elements

   a. High electro negativity.

   b. Includes elements of group 13-18

   c. High ionisation energy

   d. High metallic nature

Questions from 5 to 8 carries 2 score each. **(4 × 2 = 8)**

5. The element Y shows +2 and +3 oxidation states

   a. Identify the block to which Y belongs

   b. Write the formula of any chloride of Y

6. A student was asked to write the sub shell electronic configuration of chromium $_{24}$Cr. The following answer was obtained .

   [Ar] $3d^4$ $4s^2$.

   Is it correct ? Justify your answer

7. The third shell of an element contains 7 electrons

   a. Write its sub shell electronic configuration

   b. Identify the block and group of the element

8. The most common oxidation state of an element which belongs to second period is –2

   a. How many electrons are present in its last shell?

b . Write its subshell electronic configuration.

Questions from 9 to 12 carries 3 score each. **(4 ×3 = 12)**

9. Complete the table (Symbols are not real)

Element	Subshell electronic configuration	Period number	Group number
A	$1s^2\ 2s^2$	2	2
B	$1s^2 2s^2 2p^1$	2	(a)
C	(b)	3	17
D	$1s^2 2s^2 2p^6 3s^2 3p^6 3d^2 4s^2$	(c)	4

10. The subshell electronic configuration of the element A is written in two different ways

(Symbol is not real)

$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^1$

$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^1$

a. Find the right one

b. To which block of the periodic table , does it belong

c. Write the formula of its oxide

(Valency : Oxygen = 2)

11. Match the following.

A	B	C
$_{20}Ca$	$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^5$	p- Block
$_{17}Cl$	[Ar] $3d^6 4s^2$	f- Block
$_{26}Fe$	[Ar] $4s^2$	d- Block
		s-Block

12. The subshell electronic configurations of some elements are given below. (Symbols are not real)

A - $1s^2\ 2s^2\ 2p^6$

B - $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^4$

C - $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^6\ 4s^2$

D - $1s^2\ 2s^2\ 2p^6\ 3s^2$

a. Which of these elements shows -2 oxidation state?

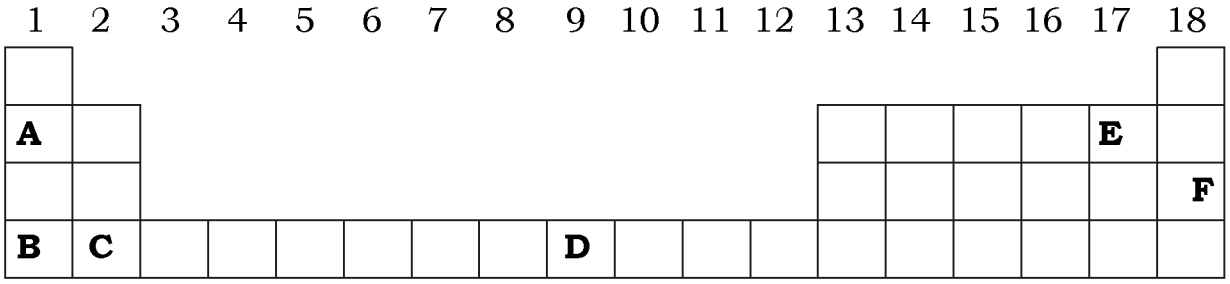
b. Which element is usually not taking part in chemical reactions

c. Which element shows different oxidation states

Questions from 13 to 16 carries 4 score each. **(4 ×4 = 16)**

13. The element X has three shells Its outermost shell has 6 electrons
    a. Write its sub shell electronic configuration
    b. Find its block and group
    c. Write the sub shell electronic configuration of the element of the same group but having two shells only
14. Some peculiarities of manganese is given
    - It has 4 shells .
    - The last 5 electrons enter into d sub shell

    a. Write the sub shell electronic configuration of Mn
    b. Write the sub shell electronic configuration of Mn in MnO_2 (Oxidation state : Oxygen =-2)
    c. Write any two properties of the elements which belong to the same block.
15. Atomic number of Fe is 26 . It becomes 3+ ion during chemical reactions
    a. Write the sub shell electronic configuration of Fe
    b. Write the sub shell electronic configuration of the ion formed in the reaction
    c. Is it possible for this element to exhibit different oxidation states? Justify your answer
16. A portion of the periodic table is given below.(Symbols are not real)



    a. Which of these are 's' block elements?
    b. Which element is likely to form coloured compounds ?
    c. Which is the most reactive non metal
    d. Which element has only one electron in 4s sub shell ?

Unit 1

PERIODIC TABLE AND ELECTRONIC CONFIGURATION

Answer Key

1. *1p,3f*

2. [Ne] $3s^2$ $3p^4$: Group 16 : : [Ar] $3d^3$ $4s^2$: Group : 5

3. b - $1s^2$ $2s^2$ $2p^6$

4. d. High metallic nature

5. a . d/f

   b . YCl_2 / YCl_3

6. No. Half filled configuration is more stable. Hence the correct configuration is [Ar]$3d^5$ $4s^1$

7. a . $1s^2$ $2s^2$ $2p^6$ $3s^2$ $3p^5$

   b . Group =17 Block = p

8. a . 6

   b . $1s^2$ $2s^2$ $2p^4$

9.

Element	Subshell electronic configuration	Period number	Group number
A	$1s^2$ $2s^2$	2	2
B	$1s^2 2s^2 2p^1$	2	13
C	$1s^2 2s^2 2p^6 3s^2 3p^5$	3	17
D	$1s^2 2s^2 2p^6 3s^2 3p^6 3d^2 4s^2$	4	4

10. a. $1s^2$ $2s^2$ $2p^6$ $3s^2$ $3p^6$ $4s^1$

    b. s

    c. A_2O

11.

A	B	C
$_{20}Ca$	[Ar] $4s^2$	*s*-Block
$_{17}Cl$	$1s^2$ $2s^2$ $2p^6$ $3s^2$ $3p^5$	*p*- Block
$_{26}Fe$	[Ar] $3d^6 4s^2$	*d*- Block

12. a. B - $1s^2$ $2s^2$ $2p^6$ $3s^2$ $3p^4$

    b. A - $1s^2$ $2s^2$ $2p^6$

    c. C - $1s^2$ $2s^2$ $2p^6$ $3s^2$ $3p^6$ $3d^6$ $4s^2$

13. a. $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^4$

    b. Block = p , Group =16

    c. $1s^2\ 2s^2\ 2p^4$

14. a. $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^5\ 4s^2$

    b. $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^3$

    c. Any two properties of d block elements

15 a. $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^6\ 4s^2$

    b. $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^5$

    c. This is a 'd' block element. In 'd' block elements there is only a slight difference in energy between the 's' electrons in the outer shell and the 'd' electrons in the penultimate shell. It exhibits a different oxidation state because electrons in the 's' sub-shell, as well as 'd' electrons in the penultimate shell take part in chemical reactions under suitable conditions

16. a. A , B, C

    b. D

    c. E

    d. B

Unit 2

GAS LAWS AND MOLE CONCEPT

Score : 40
Time : 1.30 hr

Questions from 1 to 4 carries 1 score each. **(4 ×1 = 4)**

1. Some statements about gas molecules are given below. Find the wrong one and correct it
   a. Compared to the total volume of the gas , volume of a gas molecule is negligible
   b. Gas molecules are always in random motion.
   c. Due to this irregular motion , the gas molecules collide with each other and also with the walls of the container.
   d. Since the collisions are perfectly elastic , the gas molecules lose their energy
2. What is the volume of gas if one litre of gas is transferred to another vessel of five litres volume?
3. The size of the air bubble rising from the bottom of an aquarium increases. What is the law of gas that validates this if the temperature is constant?
4. When temperature and pressure are constant, the volume of a given mass of gas is directly proportional to the number of molecules. Which gas law is this?

Questions from 5 to 8 carries 2 score each. **(4 × 2 = 8)**

5. Volume of a gas in different temperatures at constant pressure is tabulated.

Volume V	Temperature (Kelvin scale)	V/T
900 mL	300 K	900 / 300 = 3
960 mL	320 K	960 / 320 = 3
819 mL	273 K	819 / 273 = 3

   a. State the gas law according to the information given in the table.
   b. What is the volume of the gas at a temperature of 400 K in the same case?
6. a. Atomic mass of hydrogen is 1. How many atoms are there in 5 gram of hydrogen ?
   b. If the atomic mass of an element is *'x'*, how many atoms are present in *'x'* grams of the same element?
7. Fill in the blanks suitably
   a) 1 Mole = ———— Molecules

b) 140 g Nitrogen = —— GAM (Atomic Mass of N = 14)

8. Complete the table given below.

Element	Atomic Mass	Atomic mass in grams	Given mass	Number of GAM	Number of atoms
Oxygen	16	16 g	16 g	1 GAM	.....
Oxygen	16	16 g	80 g	.....	$5 \times 6.022 \times 10^{23}$
Sodium	23	23g	23g	1 GAM	6.022×10^{23}
Sodium	23	23g	230g	.....	.....

Questions from 9 to 12 carries 3 score each. (4 × 3 = 12)

9. Find the number of atoms in the following

(Atomic Mass: N = 14, C = 12, Mg = 24)

a) 42 g of nitrogen

b) 60 g of carbon

c) 240 g of magnesium

10. Which of the following will have more number of atoms if the mass is 100 grams each

SO_2, NaOH (Atomic Mass: S = 32 ,0 = 16 , Na= 23, H= 1)

11. Find the number of GMM and number of molecules of the following.

a) 900 g Glucose (Molecular mass= 180g)

b) 196 g H_2SO_4 (Molecular mass = 98 g)

c) 90 g H_2O (Molecular mass = 18 g)

12. 89.6L of NH_3 and CO_2 at STP is given.

a) What is the mass of NH_3 ?

b) Find the number of molecules present in CO_2

(GMM, of NH_3 =17, CO_2 = 44)

Questions from 13 to 16 carries 4 score each. (4 × 4 = 16)

13. 460g NO_2 gas is taken at STP.

a) Find the volume of the gas at STP.

b) Find the number of molecules

c) Find the number of atoms

d) Find the mass of same volume of Hydrogen gas at STP.

Hint : (Molecular mass NO_2 = 46, H_2 - 2)

14. Complete the table

Substance	GMM	Given mass(g)	Number of moles	Number of molecules	Volume at STP (L)
O_2	32	160g	——a—-	——b—-	5×22.4 L
CO_2	—c—	——d—	—e——	$2\times6.022\times10^{23}$	—f——-
CH_4	16	——g—	5	$5\times6.022\times10^{23}$	——h—

15. a) Complete the table.

Volume	Number of moles
5L	——(i) ——
10 L	x
——(ii)——	$2x$

b) Slate the law related to this.

16. Arrange the following in the increasing order of their number of molecules

44.8 Litres of NH_3 at STP

1 mole of H_2SO_4

20 g of He

67.2 Litres of N_2 at STP

Unit 2

GAS LAWS AND MOLE CONCEPT

Answer Key

1. Since the collisions are perfectly elastic , the energy of the gas molecules remains the same.
2. 5L
3. Boyle's Law
4. Avogadros Law
5. a. At constant pressure , the volume of fixed mass of a gas is directly proportional to the temperature in Kelvin scale. This is Charle's Law
   b. 1200 mL
6. a. $5 \times 6.022 \times 10^{23}$
   b. 6.022×10^{23}
7. a) 1 Mole = 6.022×10^{23} Molecules
   b) 230 g Sodium = 10 GAM
8.

Element	Atomic Mass	Atomic mass in grams	Given mass	Number of GAM	Number of atoms
Oxygen	16	16 g	16 g	1 GAM	6.022×10^{23}
Oxygen	16	16 g	80 g	5	$5\times 6.022 \times 10^{23}$
Sodium	23	23g	23g	1 GAM	6.022×10^{23}
Sodium	23	23g	230g	10	$10\times 6.022\times 10^{23}$

9. a) $3 \times 6.022 \times 10^{23}$
   b) $5 \times 6.022 \times 10^{23}$
   c) $10 \times 6.022 \times 10^{23}$
10. 100g NaOH
11. a) $5, 5 \times 6.022 \times 10^{23}$
    b) $2, 2 \times 6.022 \times 10^{23}$
    c) $5, 5 \times 6.022 \times 10^{23}$
12) a) 68 g
    b) $4 \times 6.022 \times 10^{23}$
13. a) 224 L
    b) $10 \times 6.022 \times 10^{23}$
    c) 3×10 6.022×10^{23}

d) 20 g

14.

Substance	GMM	Given mass(g)	Number of moles	Number of molecules	Volume at STP (L)
O_2	32	160g	5 (a)	$5 \times 6.022 \times 10^{23}$ (b)	5×22.4 L
CO_2	44 (c)	88 (d)	2 (e)	$2 \times 6.022 \times 10^{23}$	2×22.4 L (f)
CH_4	16	80 (g)	5	$5 \times 6.022 \times 10^{23}$	5×22.4 L (h)

15. a) (i) $\frac{X}{2}$

(ii) 20 L

b) The volume of a gas at constant temperature and pressure is directly proportional to the number of moles.

16. 1 mole H_2SO_4 < 44.8 L NH_3 of STP < 67.2 L N_2 at STP < 20 g He

Unit 3

REACTIVITY SERIES AND ELECTRO CHEMISTRY

Score : 30
Time : 1 hr

Questions from 1 to 4 carries 1 score each. **(4 ×1 = 4)**

1. In Zn-Cu Galvanic cell which one act as negative electrode (Reactivity Zn>Cu)?
2. Which product is obtained at cathode in the electrolysis of molten NaCl?
3. Which is the reaction of cathode in a galvanic ell?
4. Give any one metal which vigorously react with water.

Questions from 5 to 6 carries 2 score each. **(2 × 2 = 4)**

5. Observe the table given below. Find the situations in which displacement reaction is possible (Reactivity Mg>Zn>Fe>Cu>Ag)

Beaker	Rod	Solution
1	Mg	$ZnSO_4$
2	Ag	$FeSO_4$
3	Cu	$ZnCl_2$
4	Mg	$MgSO_4$
5	Mg	$CuSO_4$
6	Cu	$MgSO_4$

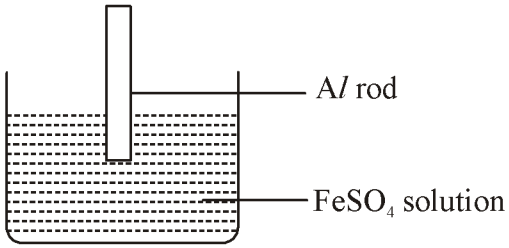
6. Identify anode and cathode from the given pairs.

Electrode pairs	anode	Cathode
Mg and Al Al and Ni		

(Order of metals in the reactivity series is K, Na, Ca, Mg, Al.....)

Questions from 7 to 8 carries 3 score each. **(2 × 3 = 6)**

7. What are the practical applications of Electrolysis?
8. Analyse the given figure.



a) Write the chemical equation of the oxidation reaction.

b) Complete the equation.

$\ldots\ldots + 6e^- \rightarrow 3Fe$

c) Write the chemical equation of the redox reaction?

Questions from 9 to 12 carries 4 score each. **(4 × 4 = 16)**

9. You are given a solution of $AgNO_3$, a solution of $MgSO_4$, a silver (Ag) rod and a Mg rod. Draw the galvanic cell using these and label anode and cathode. Write down the reactions taking place at the cathode and the anode?

10. During the electrolysis of sodium chloride solution.

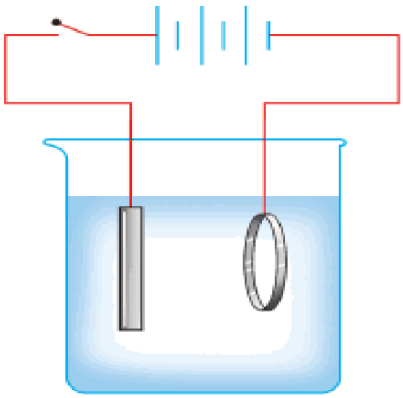
    (a) Which ion is attracted towards anode

    (b) Give the equation of reaction occurring at cathode

    (c) What is the biproduct formed after electrolysis

    (d) Which gas is liberated from anode

11. Observe the figure, which shows the electroplating of copper over iron bangle. Answer the questions given below.



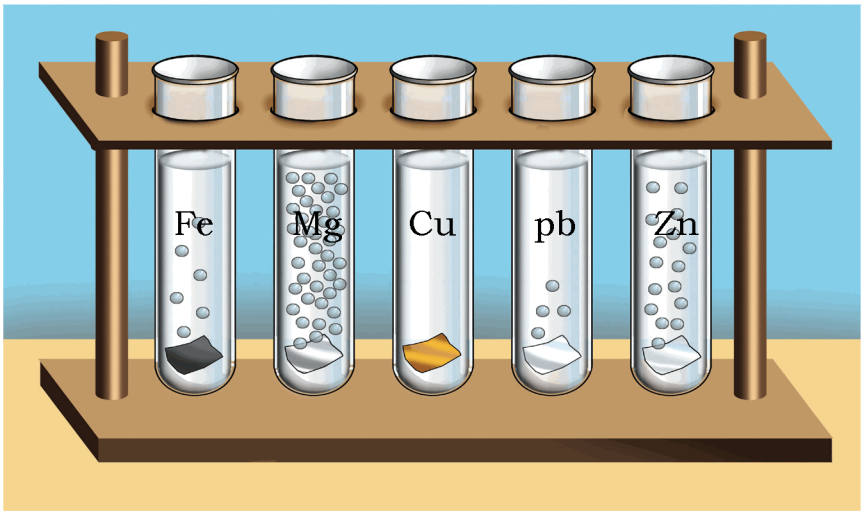
    (a) Name the metal which is connected to the negative terminal of battery?

    (b) Which metal is connected to the positive terminal of the battery?

    (c) Write the chemical equation of the reaction occurring at anode.

(d) Name an electrolyte used to plate gold over copper bangle.

12. Some metals having same mass are added to equal volume of dil. HCl having same concentration. Observe the figure and answer the questions.



(a) Name the metal which react very fast.

(b) Name the gas formed here

(c) Which metal does not react with acid ?

(d) Arrange the given metal in the increasing order of their reactivity

Unit 3

REACTIVITY SERIES ANDELECTRO CHEMISTRY

Answer Key

1. Zn
2. Na
3. Reduction
4. Na or K
5.

Beaker	Rod	Solution
1	Mg	$ZnSO_4$
5.	Mg	$CuSO_4$

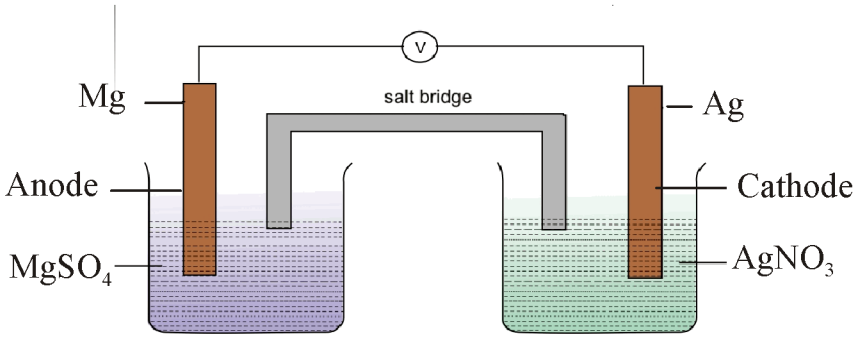
6.

Electrode pairs	anode	Cathode
Mg and Al	Mg	Al
Al and Ni	Al	Ni

7. Manufacture of metals and nonmetals
   Preparation of chemicals
   Purification or refining of metals
   Electroplating

8. a) $2Al \rightarrow 2Al^{3+} + 6e^-$
   b) $3Fe^{2+}$
   c) $2Al + 3Fe^{2+} \rightarrow 2Al^{3+} + 3Fe$

9.



Anode: Oxidation

$Mg \rightarrow Mg^{2+} + 2e^-$

Cathode: Reduction

$2Ag^{+} + 2e^{-} \rightarrow 2Ag$

Net cell reaction

$Mg + 2Ag^{+} \rightarrow Mg^{2+} + 2Ag$

10. (a) Chloride ion (Cl^{-})

(b) Cathode: Reduction (negative electrode)

$2H_2O + 2e^{-} \rightarrow 2OH^{-} + H_2$

(c) NaOH

(d) Chlorine gas (Cl_2)

11. (a) Iron bangle

(b) Copper rod

(c) $Cu \rightarrow Cu^{2+} + 2e^{-}$

(d) Mixture of sodium cyanide and gold cyanide solution.

12. (a) Mg

(b) Hydrogen (H_2)

(c) Cu

(d) Cu<Pb<Fe<Zn<Mg

Unit 4

PRODUCTION OF METALS

Score : 25
Time : 1 hr

Questions from 1 to 5 carries 1 score each. **(5 × 1 = 5)**

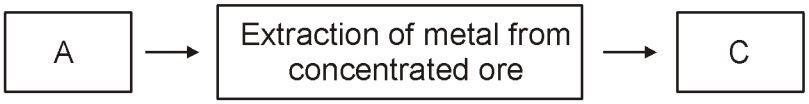
1. Name the method for the concentration of sulphide ores.
   (Magnetic separation, Froth floatation, Leaching)
2. Which method is used for refining of Copper.
3. Which is the ore of Iron and write its chemical formula.
4. Complete the chemical equation for the reaction taking place when Aluminium hydroxide is heated.

   $2AI(OH)_3 \rightarrow \ldots\ldots\ldots\ldots + 3H_2O$

5. During metallurgy extraction of a metal from its ore is .....
   (Oxidation/reduction)

Questions from 6 to 8 carries 2 score each. **(3 × 2 = 6)**

6. Complete the stages of metallurgy



7. Bauxite ($Al_2O_3 2H_2O$), Cryolite (Na_3AlF_6) and Clay ($Al_2O_3 2SiO_2 2HiO$) are the minerals of Aluminium.
   (a) Which one is the main ore of Al?
   (b) Write any two characteristics of minerals that are used for the extraction of metals?
8. Write the differences between calcination and roasting.

Questions from 9 to 10 carries 3 score each. **(2 × 3 = 6)**

9. Complete the table.

Metals	Method of refining
Zinc	
Lead	
Mercury	

10. The equations related to the chemical process taking place in Blast furnace during the production of Iron is given below.

    $C + O_2 \rightarrow CO_2$

    $CO_2 + C \rightarrow 2CO$

$CaCO_3 \rightarrow CaCO + CO_2$

$CaO + SiO_2 \rightarrow CaSiO_3$

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

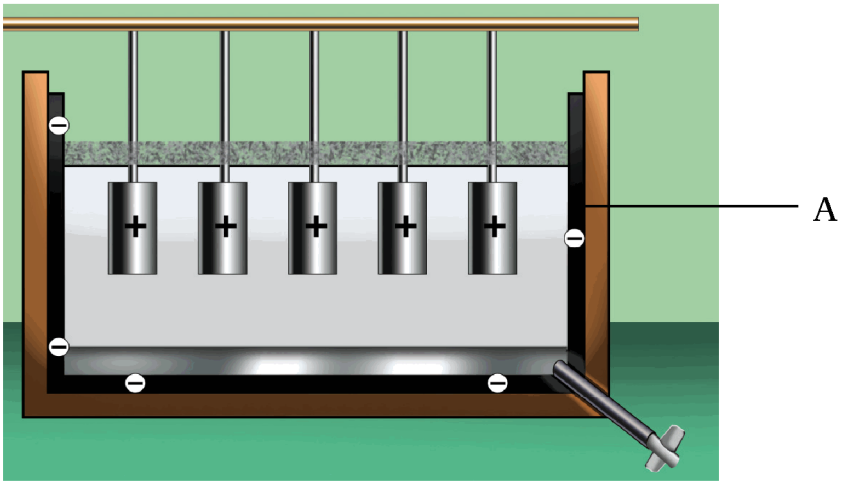
(a) Identify the gangue and the slag.

(b) What is the role of limestone in Blast furnace ?

(c) Which substance reduces Haematite in the metallurgy of Iron?

Questions from 11 to 12 carries 4 score each. **(2 × 4 = 8)**

11. The electrolytic cell for the extraction of Aluminium is given below. Based on this answer the questions.



(i) Alumina (Al_2O_3) obtained by concentration of bauxite is mixed with molten cryolite (Na_3AlF_6) and subjected to electrolysis. What is the purpose of adding cryolite?

(ii) Write the equation of the reaction at the electrode labeled as 'A'.

(iii) Complete the equation of the reaction at anode.

$2O^{2-} \rightarrow O_2 + ...$

(iv) Anode is replaced from time to time during the process. Why ?

12. Complete the table and answer the question.

(i)

Alloy	**Constituents**
Alnico	Al, CO, —(a)—
Nichrome	Fe, Ni, C, —(b)—
Steel	Fe, C

(ii) Which alloy steel is used in heating coils ? Give the reason.

Unit 4

PRODUCTION OF METALS

Answer Key

1. Froth floatation
2. Electrolytic refining
3. Haematite, Fe_2O_3

   Magnatite, Fe_3O_4
4. $2AI(OH)_3 \rightarrow AI_2O_3 + 3H_2O$
5. Reduction
6. Concentration of the ore → Extraction of metal from concentrated ore → Refining of the metal
7. (a) Bauxite, ($AI_2O_3.2H_2O$)

   (b)
   - Abundance
   - Easily and cheaply separable
   - High metal content
8. **Calcination** is the process of heating the metal ore in the absence of air or oxygen below its melting point.

   Roasting is the process of heating the metal ore in the pressure of oxygen or air below its melting point.
9.

Metals	**Method of refining**
Zinc	Distillation
Lead	Liquation
Mercury	Distillation

10. (a) Gangue : Silicon dioxide, SiO_2

    Slag : Calcium silicate, $CaSiO_3$

    (b) The flux used for the removal of SiO_2 is produced from the decomposition of limestone.

(c) Carbonmonoxide, CO

11. (i) The melting point of alumina is very high. Cryolite is added to alumina to reduce its melting point and increase its electricl conductivity.

(ii) $AI^{3+} + 3e^{-} \rightarrow 3AI$

(iii) $2O^{2-} \rightarrow O_2 + 4e^{-}$

(iv) Oxygen produced at the anode reacts with the carbon rods itself.

12. (i) a – Ni

b – Cr

(ii) Nichrome, Because of high resistance.

Unit 5

COMPOUNDS OF NON METALS

Score : 25
Time : 1 hr

Questions from 1 to 5 carries 1 score each. **(5 × 1 = 5)**

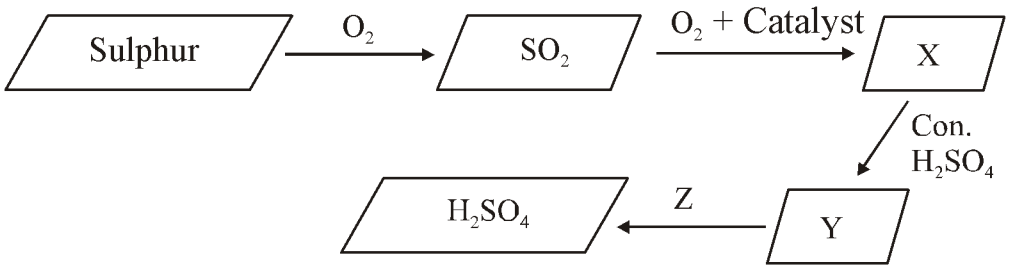
1. Which gas is used as a Refrigerant in ice plants?
2. Which substance is used as a drying agent in the laboratory preparation of NH_3?
3. Which property of sulphuricacid is used to convert sugar into a black substance.
4. When a salt solution is treated with $BaCl_2$ solution; a white precipitate is formed which does not dissolved in dil HCl. Then the salt contain ..... as anion.
5. A highly concentrated aqueous solution of Ammonia is known as .....

Questions from 6 to 8 carries 2 score each. **(3 × 2 = 6)**

6. Ammonium chloride is heated in a dry boiling tube. Then a wet red litmus paper is shown on the mouth of the tube: What would you observe: Justify?
7. What is the role of a catalyst in equilibrium? Justify:
8. Pick out the correct statements from the following regarding to chemical equilibrium.
   (a) At equilibrium forward reaction dominate than backward Reaction.
   (b) At equilibrium reactants and products coexist in the system.
   (c) Equilibrium is dynamic in nature.
   (d) At equilibrium reaction is stopped.
   (e) Equilibrium is possible in closed system.
   (f) At equilibrium rate of forward and backward reaction are equal.

Questions from 9 to 10 carries 3 score each. **(2 × 3 = 6)**

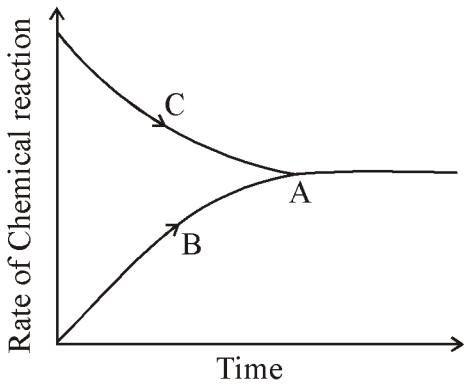
9. Analyse the following chart. Which shows the industrial preparation of sulphuric acid.



(a) Identify X, Y, Z and catalyst :

(b) This process is known as .....?

10.



Analyse the Graph and Identify A, B and C.

Questions from 11 to 12 carries 4 score each. **(2 × 4 = 8)**

11. Consider the reaction $N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)} + \text{heat}$. Explain how the following factors affect the rate of forward reaction:

(a) Increasing pressure

(b) Increasing temperature

(c) Removal of NH_3 at regular intervals from the system:

(d) Which principle is behind it.

12. (a) Which are the chemicals used in the laboratory preparation of Ammonia?

(b) Write down the chemical equation for this reaction.

(c) During the laboratory preparation of NH_3, ammonia gas is collected in an inverted glass jar. Why?

(d) When an ammonia tanker leaks water is sprayed to reduce it's intensity. Why ?

Unit 5

COMPOUNDS OF NON METALS

Answer Key

1. NH_3 (Ammonia)
2. CaO (Calcium Oxide/quick lime)
3. Dehydrating property
4. Sulphate (SO_4^{2-})
5. Liquor Ammonia
6. Red litmus changes to blue. After some time blue litmus charges to red. Because NH_4Cl decomposes to give NH_3 and HCl. The less denser basic NH_3 evolved first and turns red litmus to blue. After that HCI comes out and turns blue to red.
7. A catalyst has no effect on equilibrium. Because it alter both forward and backward reaction to an equal extent:
8. b, c, e, f

   OR

   - At equilibricum reactants and product coexist.
   - Equilibrium is dynamic in nature.
   - Equuilibrium is possible in clossed system.
   - At equilibrium rate of forward and backward reaction are equal.

9. (a) X = SO_3 Y= $H_2S_2O_7$ Z= H_2O

   Catalyst = V_2O_5 (Vanadium pentoxide)

   (b) Contact process:

10. A = Equlibrium state

    B = Backward Reaction

    C = Forward Reaction

11. (a) Increasing pressure increases the rate of forward reaction because the number of moles of reactant (4) is greater than that of product (2)

    (b) Increasing temperature decreases the rate of forward reaction;

since the forward reaction is exothermic:

(c) Increasing the rate of forward reaction.

(d) Le-chatelier's principle.

12. (a) NH_4Cl and $Ca(OH)_2$

(b) $2NH_4Cl + Ca(OH)_2 \rightarrow 2NH_3 + CaCl_2 + 2H_2O$

(c) Because the density of Ammonia is less than that of air.

(d) Because ammonia is highly soluble in water.

Unit 6

NOMENCLATURE OF ORGANIC COMPOUNDS & ISOMERISM

Score : 25
Time : 1 hr

Questions from 1 to 5 carries 1 score each. **(5 × 1 = 5)**

1. Name the functional group present in this compound.

   $CH_3-CH_2-O-CH_3$

   (Alkoxy, Alcohol, Carboxylic acid)

2. What is the minimum number of carbon atoms required to form a cyclic compound?

   (4, 3, 2, 5)

3. The common name of Ethanoic acid is .....

4. The open chain compounds having single bonds between the carbon atoms are included in ..... category.

   (Alkane, Alkene, Alkyne)

5. Write the structure of C_2H_6

Questions from 6 to 8 carries 2 score each. **(3 × 2 = 6)**

6. The structures written by two students are given.

   Student1 $CH_3-\underset{\displaystyle OH}{\underset{|}{CH}}-CH_2-CH_3$

   Student 2 $CH_3-CH_2-\underset{\displaystyle OH}{\underset{|}{CH}}-CH_3$

   Write the IUPAC name of these compounds?

7. The structural formula of an organic compound is given.

   $$H-\underset{\displaystyle H}{\overset{\displaystyle H}{\overset{|}{\underset{|}{C}}}}-C\equiv C-H$$

   a) Write the condensed formula?

   b) Write its molecular formula?

8. Choose the odd one out. Give Reason.

   $(CH_4, C_2H_2, C_4H_{10}, C_7H_{16})$

Questions from 9 to 10 carries 3 score each. **(2 × 3 = 6)**

9. Some molecular formula are given.

   (i) C_5H_{12} (ii) C_5H_{10}

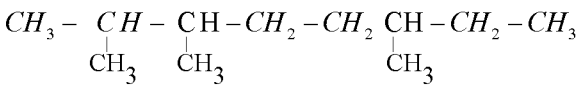
   (iii) C_5H_8 (iv) $C_5H_{12}O$

   a. Which of the above is the molecular formula of pent -2 ene?

   b. Write the structure of pent-2-ene?

   c. Can there be a compound named pent-3-ene?

10. Analyse the given structural formula.



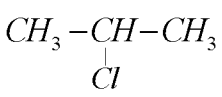
   a) How many branches are there in this compound ?

   b) Give the position of the branches.

   c) Write the IUPAC name.

Questions from 11 to 12 carries 4 score each. **(2 × 4 = 8)**

11. Examine the given structural formula.



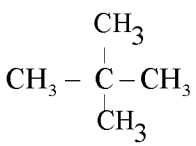
   (a) What is the molucular formula of the compound?

   (b) Identify the functional group.

   (c) Give the IUPAC name of the compound?

   (d) Write the structure of its isomer?

12. Match suitably :-

$CH_3-CH=CH-CH_3$	2,2-Dimethyl propane
CH_3-CH_2-COOH	Pent-2-yne
$CH_3-C\equiv C-CH_2-CH_3$	But - 2 - ene
	Propanoic acid

(4 × 2 = 8)

Unit 6

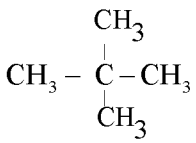
NOMENCLATURE OF ORGANIC COMPOUNDS & ISOMEISM

Answer Key

1. Alkoxy
2. 3
3. Acetic acid
4. Alkane
5. $CH_3 - CH_3$
6. 1) Student 1 : Butan- 2 -ol
   2) Student 2 : Butan - 2 - ol
7. a. $CH_3 - C \equiv CH$
   b) C_3H_4
8. C_2H_2 rest of them are saturated hydrocarbons or alkanes
9. a. C_5H_{10}
   b. $CH_3 - CH = CH - CH_2 - CH_3$
   c. No
10. a. 3 branches
    b. 2,3,6
    c. 2.3.6 - Trimethyloctance
11. a. C_3H_7Cl
    b. Chloro
    c. 2-Chloro propane
    d. $CH_3 - CH_2 - CH_2Cl$
12. $CH_3 - CH = CH - CH_3$ — But - 2 -ene

    $CH_3 - CH_2COOH$ — Propanoic acid

    $CH_3 - C \equiv C - CH_2CH_3$ — Pent - 2 - yne

    
    — 2-2-Dimethyl propane

Unit 7

ORGANIC COMPOUNDS

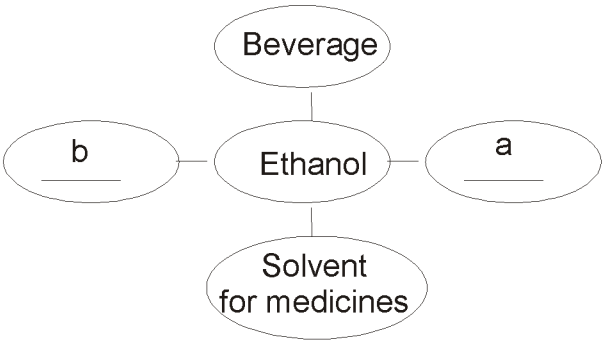
Score : 25
Time : 1 hr

Questions from 1 to 3 carries 1 score each. **(3 × 1 = 3)**

1. 95.6 strong ethanol is known as .....
2. The compounds which have the pleasant smell of fruits and flowers are known as .....
3. Name the byproduct obtained as the industrial production of soap?

Questions from 4 to 7 carries 2 score each. **(4 × 2 = 8)**

4. Complete the following Word Web.



5. a) How ethanoic acid is manufactured industrially?
   b) Give any one use of ethanoic aid.
6. What is power alcohol? What is its use?
7. Complete suitably:

   (i) $CH_3 - COOH + CH_3 - CH_2OH \rightarrow \underline{(a)} + H_2O$

   (ii) Name the product obtained here?

Questions from 8 to 9 carries 3 score each. **(2 × 3 = 6)**

8. Complete suitably :

   $C_{12}H_{22}O_{11} + H_2O \xrightarrow{(a)} C_6H_{12}O_6 + \underline{\text{(b)}}$

   $\underline{\text{(b)}} \xrightarrow{\text{zymase}} \underline{\text{(c)}} + 2CO_2$

9. a. Complete the equation :

   (i) $CH_2 = CH_2 + H_2 \rightarrow \underline{(A)}$

   (ii) A + $CI_2 \rightarrow \underline{(B)} + HCI$

   b. Name the reaction in (ii)

Questions from 10 to 11 carries 4 score each. **(2 × 4 = 8)**

10. Match the following.

Reactants	**Products**	**Type of Reaction**
$CH_4 + Cl_2$	$CO_2 + H_2O$	Polymerisation
$\eta CH_2 = \underset{\displaystyle Cl}{\underset{\vert}{CH}}$	$CH_4 + CH_2 = CH_2$	Combustion
$CH_3 - CH_2 - CH_3$	$\left[CH_2 - \underset{\displaystyle Cl}{\underset{\vert}{CH}} \right]_n$	Substitution
$CH_4 + O_2$	$CH_3Cl + HCl$	Thermal cracking

11. Complete suitably:

Monomer	*Polymer*	*Use*
(*a*)	PVC	(*b*)
Ethene	(*c*)	Bags
(*d*)	Teflon	Coating on the inner surface of non-stick cookware

Unit 7

ORGANIC COMPOUNDS

Answer Key

1. Rectified spirit
2. Esters
3. Glycerol
4. a. Organic compounds
   b. Fuel
5. a. Ethanoic acid can be manufactured by treating methanol with carbon monoxide in the presence of catalyst
   b. In manufacture of rayon
6. A mixture of absolute alcohol and petrol known as power alcohol. It is used as fuel in automobiles.
7. a. $CH_3-COO-CH_2-CH_3$
   b. Ethyl ethanoate
8. a. Invertase
   b. $C_6H_{12}O_6$
   c. C_2H_5OH
9. a.
   (i) CH_3-CH_3
   (ii) CH_3-CH_2Cl
   b. Substitution reaction
10.

Reactants	Products	Type of Reaction
CH_4+Cl_2	$CH_3Cl+HCl$	Substitution
$\eta CH_2=\underset{\displaystyle Cl}{\underset{\downarrow}{CH}}$	$\left[\begin{array}{c} CH_2-CH \\ \vert \\ Cl \end{array}\right]_n$	Polymerisation
$CH_3-CH_2-CH_3$	$CH_4+CH_2=CH_2$	Thermal cracking
CH_4+O_2	CO_2+H_2O	Combustion

13.

Monomer	*Polymer*	*Use*
Vinyl chloride	PVC	Manufacture of pipe
Ethane	Polythene	Manufacture of Bags
Tetra fluro ethane	Teflon	Coating on the inner surface of non-stick cookware