

V.S. NIKETAN SECONDARY SCHOOL

[Under the management of V.S. Education Foundation]

Tinkune, Kathmandu, Nepal

FIRST TERM EXAMINATION – 2081

Grade: Science – XI

FM.: - 75

Subject: Chemistry

Time: - 3 hours

PM : - 30

Group 'A' (11 × 1 = 11)

Attempt all questions: select the best answer from the given choices:

1. The principle utilized for hot air balloons is
a) Boyle's law
b) ~~Charles' law~~
c) Graham's law
d) Dalton's law
2. The unit and value of universal gas constant (R) in $PV = nRT$ equation depends upon
a) pressure of gas
b) temperature of gas
c) nature of gas
d) ~~units of measurements~~
3. Which of the gaseous mixture does not follow Graham's law of diffusion at room temperature
a) hydrogen and oxygen
b) carbon dioxide and CO
c) ~~ammonia and hydrogen chloride~~
d) nitrogen and hydrogen
4. Standard conditions of temperature and pressure are
a) ~~273K and 1 atm~~
b) 0K and 760 mm of Hg
c) 0 degree centigrade and 273 mm
d) 273K and 760 atm
5. The total number of electrons that can be accommodated in principal quantum number 2 and azimuthal quantum number 1 is
a) ~~8~~
b) 6
c) ~~18~~
d) 2
6. Which of the following is meaningless
a) 2p
b) 1s
c) 3d
d) ~~3f~~
7. All particles residing inside the nucleus of an atom are termed as
a) protons
b) electrons
c) ~~neutrons~~
d) nucleons
8. What makes the atomic mass fractional
a) presence of isotopes
b) ~~quantum numbers~~
c) wave nature of electron
d) number of unpaired electrons
9. All the elements in a group of periodic table have the same
a) atomic mass
b) number of electrons
c) ~~number of valence electrons~~
d) ~~protons~~

10. An element of atomic number 26 belongs to
a) ~~s~~-block b) p-block c) ~~d~~-block d) f-block

11. Which of the following ions has the smallest size
a) ~~Ca²⁺~~ b) K⁺ c) Cl⁻ d) S²⁻

Group 'B' (8×5 = 40)

12. Ideal gas equation is strictly valid only for ideal gas at all the conditions of temperature and pressure.

a) Starting from Boyle's and Charles' law, prove that, $PV = nRT$.

b) What does the universal gas constant (R) signify?

c) Determine the value of R in $\text{atm L K}^{-1} \text{mol}^{-1}$ (2+1.5+1.5)

OR

One mole of nitrogen gas at 0.8 atm takes 38 second to diffuse through a pin hole where as one mole of an unknown compound of xenon with fluorine at 1.6 atm takes 57 seconds to diffuse through the same hole. Calculate the molecular formula of the compound. (5)

13. Aufbau principle and Hund's rule give a way to fill the electrons in various subshells and orbitals in their increasing order of energy.

a) State and illustrate Aufbau principle.

b) State Hund's rule of maximum multiplicity. Why this rule is called rule of maximum multiplicity? (3+2)

14. Neil Bohr applied the quantum theory of radiation developed by Planck and Einstein to explain the stability of atom and the origin of atomic spectra.

a) How did Bohr's model overcome the limitation of Rutherford model?

b) Explain the different types of hydrogen spectra with help of this theory. (1.5+3.5)

15. John Dalton developed a law to calculate the total pressure of a gaseous mixture with help of partial pressure of the component gases at same temperature.

a) State Dalton's law of partial pressure.

(b) Show that partial pressure of a component gas is equal to the mole fraction × total pressure of gaseous mixture.

(c) Define aqueous tension.

d) Write an application of Dalton's law of partial pressure. (1+2+1+1)

16. Ammonia is used for the manufacture of urea which is used as chemical fertilizer.

a) Write the principle involved for the manufacture of ammonia by Haber's process

Group 'C' $3 \times 8 = 24$

20. The α -ray scattering experiment of Rutherford and co-workers led to the discovery of nucleus.
- Draw the figure for Rutherford α -ray scattering experiment and label it properly.
 - What are the observations and conclusions of this experiment?
 - Thin gold foil was chosen for the experiment, why?
 - Mention the limitations of this nuclear model of an atom.
- (2+3+1+2)
21. State and explain Graham's law of diffusion of gases. 4 g of hydrogen gas diffuses from a container in 10 minutes. How many grams of oxygen gas would diffuse through the same container in the same time under the identical conditions of temperature and pressure? What do you mean by effusion of gas?

OR

Kinetic molecular theory of gas was first proposed by Bernoulli and later developed by Clausius, Kronings, Maxwell, Boltzmann and others.

- Write the fundamental postulates of kinetic molecular theory of gases.
 - Differentiate between real gases and ideal gas.
 - Why do real gases deviate from ideal gas behaviour?
 - Gases do not settle down at the bottom of the container, why?
- (3+2+2+1)
22. a) Atomic radius and ionic radius are used to compare the size of elements and ions.
- What do you mean by effective nuclear charge and shielding effect?
 - Which one is larger in size: Cl or Cl^- ? Give reason.
 - Compare the size of isoelectronic species with reason: F^- , O^{2-} , N^{3-} and Na^+
- (1+1+2)
- what is meant by ionization energy?
 - How does it vary in a group and a period?
- Why is the second ionization energy of an element higher than the first ionization energy?
- (0.5+2+1.5)

--- Best of Luck ---

$$PV = nRT$$



Sukuna Secondary School

(Sundarharaicha-10, Morang)

FIRST TERM EXAMINATION-2081

Class – XI (Science)

Subject – Chemistry [CHE 3011]

FM : 37.5

Time: 1.5 hour

Candidates are required to give their answers in their own words as far as practicable. The figures in the margins indicate full marks.

Group-A [MCQ]

Rewrite the correct answer choice;

[1x5=5]

1. The electronic configuration $[\text{Ar}]4s^13d^1$ corresponds to;
a. Mn b. Cr c. Fe d. Cu
2. 16 g of a gas at STP occupies 5.6 litre. What is the molecular mass of the gas?
a. 4 g b. 64g c. 8 g d. 22.4 g
3. When electrons descends from higher level to $n = 4$ and spectrum falls in IR region called;
a. Lyman b. Paschen c. Brackett d. pfund
4. A falling rain droplet acquires spherical shape due to;
a. Surface tension b. viscosity
c. Osmosis d. diffusion
5. The oxidation no. of S in H_2SO_3 is;
a. +4 b. +8 c. +10 d. +6

Group B

Short answer questions;

[5x5=25]

1. Neils Bohr awarded with Nobel Prize in 1922, based his studies on hydrogen and proposed energy levels planetary model of the atom.

[3+1+1]

- i. Write any 3 postulates of his model of an atom.
- ii. How did it overcome the limitation of Rutherford's atomic model?
- iii. Give its drawbacks.

2. In elementary chemical calculations mole concept plays an important role.

[1+2+2]

- i. Define 1 mole.
 - ii. Which of the following has a larger number of molecules, 7 gm of nitrogen or 11.2 liters of hydrogen gas?
 - iii. A cylinder is filled with 14 kg LPG. 95% of the total weight of LPG is methane gas. Calculate the number of methane gas molecules present in the cylinder.
3. Which law is illustrated by the figure alongside? State the law. A metallic spoon is coated with silver by passing a current of 5 amperes through AgNO_3

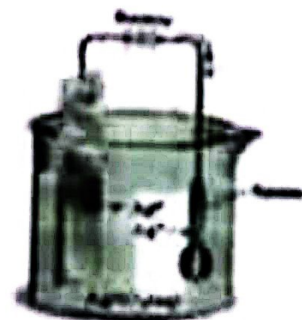
solution for 5 hrs. What is the thickness of silver plating if the area of the spoon is 12 cm^2 ? (density of silver is 10.5 g/cm^3). [1+1+3]

4. "Inflation or deflation of vehicle tire depending on the atmospheric temperature is a real-life application of gas law"

i. Which law belongs to this statement? State the law.

ii. How did this law lead to the development of the absolute scale of temperature?

iii. Derive the ideal gas equation, $PV = nRT$. [1+2+2]



5. Formation of H-spectrum bolsters the atomic theory proposed by Neils Bohr. [1+1+3]

i. Define H-spectrum.

ii. Why does a hydrogen atom produce so many spectral lines even though it contains one electron?

iii. Sketch and label the various spectral series observed.

OR

What is redox reaction? Balance the given redox reaction by the O.N. method and assign oxidant and reductant. [1+4]



Group C

Long answer questions;

[7.5]

6. What is a limiting reactant? Why is it called so? 20 g of 40% pure CaCO_3 is treated with 5g HCl to produce CaCl_2 , H_2O , and CO_2 .

[1+1+1.5+1+1+2]

i. Find which one is the limiting reactant.

ii. Calculate the mass of CaCl_2 formed.

iii. How many no. of water molecules are produced?

iv. Calculate the volume of CO_2 produced at 27°C and 0.5 atm pressure.

OR

State and explain Graham's law of diffusion. Give its real-life application. A saturated hydrocarbon $\text{C}_n\text{H}_{2n+2}$ diffuses twice as fast as SO_2 gas. Calculate the volume occupied by hydrocarbon at 27°C and 2 atm pressure.

[1+2+1+3.5]

*** BEST OF LUCK ***

Group - A

11×1=11

Attempt all objective questions:

- Which is the most powerful reducing agent?
 - Nascent hydrogen
 - Atomic hydrogen
 - Molecular hydrogen
 - Occluded hydrogen
- The volume of 7 gm of nitrogen gas at NTP is
 - 5.6
 - 2.8
 - 11.2
 - 22.4
- The law of reciprocal proportion is illustrated by
 - CO_2 , H_2O and CH_4
 - CO , CH_4 and C_2H_6
 - CH_4 , C_2H_6 and C_3H_8
 - NO , NO_2 and N_2O_5
- Which one of the followings has higher ionization energy
 - Nitrogen
 - Oxygen
 - Fluorine
 - Neon
- All the elements in a group of the periodic table have the same
 - Same atomic number
 - Same atomic mass
 - Same number of valence electrons
 - Same number of electrons.
- Most active metal is
 - Na
 - Li
 - K
 - Mg
- An atom having maximum unpaired electron in P orbital is
 - Carbon
 - Nitrogen
 - Oxygen
 - Fluorine
- The main achievement of Rutherford's atomic model is discovery of
 - Electron
 - Proton
 - Nucleus
 - Neutron
- Which of the followings set of quantum number is not possible?
 - $n=2, l=1, m=0$ and $s=+1/2$
 - $n=2, l=2, m=+1$ and $s=+1/2$
 - $n=2, l=1, m=-1$ and $s=+1/2$
 - $n=2, l=1, m=0$ and $s=-1/2$
- Two chlorides of a metal contain 34% and 54% of chlorine respectively. Which law of stoichiometry do these data illustrate?
 - Law of multiple proportion
 - Law of constant proportion
 - Law of equivalent proportion
 - None of above
- $\text{CH}_3\text{OCH}_2\text{CH}_3$ is an example of
 - Ester
 - Ketone
 - Ether
 - Aldehyde

Group - B

Answer the following questions.

8×5=40

- State Avogadro's hypothesis. How would you apply this hypothesis to show that molecular weight of a gas is twice it's vapour density.
- American scientist Harold C. Urey was awarded the Nobel prize (1934) for the separation of deuterium by physical method.
 - Write the name and symbol of the natural isotope of hydrogen.
 - Which isotope of hydrogen does not contain neutrons?
 - Which isotope of hydrogen is used as tracer in reactions?
 - Write the radioactive isotope of hydrogen with one important use.
 - What is active hydrogen?
- Quantum numbers determine the position of an electron in an atom
 - Which quantum number determines the energy of an electron in an atom?

- b. What are the possible values of m when $n = 3$?
 - c. An atom has 2, 8, 2 electrons in K, L and M shells. Find the value of n , l , m and s quantum numbers for the last electron in it.
15. What is Avogadro's number?
- a. Calculate the number of oxygen atoms present in 36 gm of water.
 - b. How many moles of CO will be left when 2×10^{21} molecules are removed from 0.28 gm of CO.
16. Define functional group.
- a. Write the functional groups of aldehyde, alcohol, carboxylic acid and ester.
 - b. Write the IUPAC name of the followings
 CH_3CHO , CH_3COCH_3 , CH_3Cl and CH_3NO_2
17. Periodicity is the basis of classification of elements in the periodic table.
- a. Define periodicity.
 - b. Define electron affinity and explain the variation of electron affinity in a period.
 - c. Compare the size in the followings i) Na and Mg ii) P^{3-} , S^{2-} and Cl^-
18. Write four examples of each of acid (electronegative) and basic (electropositive) radicals. Write the molecular formula of
- a. Ammonium nitrate
 - b. Potassium ferrocyanide
 - c. Calcium oxide
 - d. Cuprous chloride
19. Write the differences between
- a. Organic and inorganic compounds
 - b. Orbit and orbital

Group - C

Answers to the following questions.

$3 \times 8 = 24$

20. Aufbau principle, Hund's rule are the important rules for the electronic configuration of an atom.
- a. State Hund's rule with suitable example.
 - b. State Aufbau principle with an example.
 - c. Write the electronic configuration of neon and phosphorus. Which one has the most stable electronic configuration?
 - d. An orbital can contain two electrons. State the principle on which this concept is based on?
- OR**
- Rutherford's alpha ray scattering experiment presented the model of an atom and the defects in the model was explained by Bohr's theory.
- a. What are the conclusions of Rutherford's alpha ray scattering experiment?
 - b. Write the postulates of Bohr's theory?
 - c. Why Heisenberg's uncertainty principle is against Bohr's theory?
21. Define homologous series with an example. Write the characteristics of a homologous series. Write the first member each of alcohol, ketone, carboxylic acid and alkene with their IUPAC name.
22. a. State the law of reciprocal proportion. Phosphine (PH_3) contains 91.1% of phosphorus, water contains 88.7% of oxygen and the phosphorus trioxide (P_2O_3) contains 56.4% of phosphorus. Show that these data illustrate the law of reciprocal proportion.
- b. State Gay Lussac's law of gaseous volume. Calculate the volume of air required for the complete combustion of 2.5 litres of methane gas on the basis of the law of gaseous volume. Air contains 20% by volume of oxygen.

11. Which of the following is radioactive isotope of Hydrogen?

- a. Protium b. Deuterium c. Tritium d. All

Group-B

Short answers questions

[8×5=40]

12. Alkenes and alkynes are homologous series of unsaturated hydrocarbons.

All alkenes contain a C=C double bond.

a. Complete table showing information about the first three alkenes. 2

Formula	C ₂ H ₄	C ₃ H ₆	
Structure	H ₂ C=CH ₂	H ₂ C=CH-CH ₃	—
IUPAC Name			But-1-ene

b. Write first four members of homologous series of aldehyde. 2

c. Write the functional group of carboxylic acid and ester. 1

13. Ionization energy of element decreased on moving down in the group of periodic table.

a. Define ionization energy. 1

b. Compare the ionization potential of Be and B. 2

c. Ionization energy of inert gas is very high but electron affinity is zero. Why?

2

14. Sodium is one of the important alkali metal used in laboratory.

a. Sketch a well-labelled diagram of Down's cell for the manufacture of sodium. 2

b. Why is sodium metal kept in kerosene? 1

c. Why is sodium fire not extinguished by adding water? 2

OR

Graphite is one of the allotrope of carbon and is used to make lead of pencil, brushes in electric motors and furnace linings

a. Name the latest discovered allotrope of carbon. 1

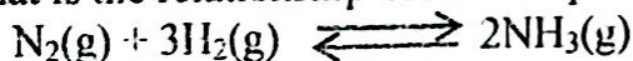
b. Give balanced chemical equation for the preparation of CO from Oxalic acid. 2

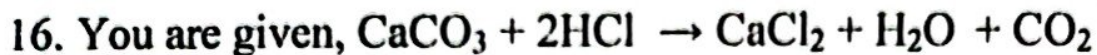
c. Carbon monoxide is extremely poisonous. Why? 2

15. a. Derive the relationship between K_p and K_c. 3

b. Define equilibrium constant(K_c). 1

c. What is the relationship between K_p and K_c for the following reaction? 1





If 10g of pure CaCO_3 is added in a solution containing 8g of HCl .

- Find the limiting reactant. 1
- Calculate the number of mole of excess reagent left over. 1
- Calculate the volume of CO_2 gas produced at NTP. 1
- Calculate the mass of NaOH required to absorb whole CO_2 formed in the reaction. 2

17. Redox reactions are used in the process of electroplating by applying a thin coating of a material on a object.



- Balance the above redox reaction by oxidation number method or ion-electron method. 3
- Point out oxidant and reductant in the above redox reaction. 1
- Define oxidation number. 1

18. Dipole moment is the degree of polarity of a bond and polar molecule.

- Define dipole moment. 1
- What is the unit of dipole moment? 1
- Dipole moment value for CH_4 molecule is zero. Explain. 2
- Write the Lewis Dot structure of SO_4^{2-} . 1

OR

Oxygen is the third abundusnt element by mass which is readily forms oxides with other elements. Some oxides are given below.

Na_2O	SnO_2	Fe_2O_3	H_2O_2
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- Identify the oxide from the above table. 2
- How is CFC responsible for the depletion of ozone layer? 2
- Which isotope of hydrogen is called radioactive isotope? 1

19. Write an example of

- Decarboxylation reaction
- Wurtz synthesis
- Ozonolysis
- Markovnikov's addition Reaction
- Halogenation Reaction

Group-C

Long answer questions

[3×8 =24]

20. Different spectral lines in hydrogen spectrum are formed due to the jump of electrons from higher energy levels to lower energy levels.

- a. What do you mean by Lyman series? 1
- b. Which series of spectral lines fall in visible region? 1
- c. How many spectral lines in Balmer series are obtained when electron drop from fifth energy level? 1
- d. Draw the spectral line of hydrogen. 2
- e. Write all possible quantum number of outermost electron of Sodium. 2
- f. Define Pauli's exclusion principle. 1

OR

Gases which obey the gas laws under all conditions of temperature and pressure are called ideal gases. Actually, no gas is an ideal gas.

- a. Derive the relation $PV = nRT$ 3
 - b. Write the value of universal gas constant? 1
 - c. Why is mercury droplet spherical? 1
 - d. Through the two ends of a glass tube of length 2 meters, hydrogen chloride and ammonia gases are allowed to enter. At what distance from ammonia, ammonium chloride will be appear? 3
21. Sodium hydroxide is manufactured from brine solution by electrolytic process.
- a. What is brine solution? 1
 - b. Write the name of gas produced at cathodic and anodic compartment. 1
 - c. Name the electrolyte that is used in this process. 1
 - d. Write the equation that takes place in each electrode. 2
 - e. Draw the flow sheet diagram for this process. 2
 - f. Write the Molecular formula of washing soda. $\text{Na}_2\text{CO}_3 \cdot x\text{H}_2\text{O}$ 1
21. An organic compound A is produced by heating ethanol with conc. H_2SO_4 at 170°C . The compound A is treated with hydrogen in presence of platinum catalyst, compound B is formed. The compound B is treated with chlorine in presence of sunlight, compound C is obtained. The compound C is heated with sodium metal in presence of organic ether, the compound D is formed.
- a. Write the reaction sequence of the conversion of A to D. 4
 - b. Write the IUPAC name of C and D. 2
 - c. How can you prove chemically the compound A is unsaturated? 1
 - d. Write the name of reaction for the conversion of compound C to D. 1

Best of Luck

SUKUNA SECONDARY SCHOOL

Sundarharaincha-10, Morang

(Second terminal examination - 2079)

Class: 11 (Science)

F.M. - 50

Subject: Chemistry

Time: 2 hour

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

GROUP: A

Rewrite the correct options of each questions in your answer sheet.

(1×9 = 9)

- The symbolic formula of element ${}_{19}\text{K}^{39}$ doesn't indicate?
 - atomic no.
 - atomic mass
 - neutron no.
 - proton no.
- The percentage of oxygen in ethanol is;
 - 52.17
 - 13.14
 - 30.78
 - 34.78
- 2 g of O_2 at NTP has volume:
 - 1.4 litre
 - 2.8 litre
 - 8 litre
 - 11.2 litre
- In Balmer series electron from excited energy level jumps to;
 - 1st orbit
 - 2nd orbit
 - 3rd orbit
 - 4th orbit
- Nitrogen atom should have three unpaired electrons according to:
 - Hund's rule
 - Heisenberg's uncertainty principle
 - Aufbau principle
 - Pauli's exclusion principle
- The amount of substance deposited $W = ZIt$. Which law is represented by this ?
 - Avogadro's law
 - Faraday's law
 - Dalton law
 - Boyle's law
- According to oxidation no. concept, decrease in oxidation no. is called?
 - oxidation
 - redox reaction
 - reduction
 - oxidant

8. Cyclohexane is an:
- | | |
|-----------------------|--------------------------|
| a) Aliphatic compound | b) Alicyclic compound |
| c) Aromatic compound | d) Heterocyclic compound |
9. The homologues have nearly the similar chemical properties because of;
- | | |
|--------------------------|---------------|
| a) equal carbons no. | b) catenation |
| c) same functional group | d) All |

GROUP: B

Short answers questions

(5×5 =25)

10. Mole represents number, mass and volume of any particles
- How does mole represent number and volume?
 - A person drink 2kg of water daily. How many molecules of water he drinks in a week?
 - How many numbers of moles of CO will be left when 2×10^{21} molecules are removed from 0.28g of CO? [1+2+2]
11. The chemist is more interesting in the calculation of percentage yield in the industry.
- Define theoretical yield and experimental yield.
 - Define percentage yield.
 - 6.5g of zinc reacts with 7.3 gram of HCl. If experimental yield of hydrogen gas is 0.175g, calculate the theoretical yield and percentage yield. [1+1+3]

OR

11. Define oxidant and reductant. Balance the given chemical equation by oxidation no. or ion-electron method and also specify oxidant and reductant.



12. An atom has 2 electrons in the first orbit, 8 electrons in second orbit and 2 electrons in third orbit.
- Give the electronic configuration of the atom and atomic number of the element.

- ii) Write number of principle quantum number and number of sub shells.
- iii) Write number of s-orbitals and number of p-orbitals electrons.
- iv) What are the quantum numbers for valence electrons of this element?
- v) Write the name of noble gases just before and just after this element.

[1+1+1+1+1]

13. Halogens are highly reactive elements. They have high electronegativity values and they are good oxidizing agents.
- i) What happens when chlorine is treated with excess of ammonia?
 - ii) How does bromine react with hot and conc. NaOH?
 - iii) Give the correct order of acidic strength of HCl, HBr and HI.
 - iv) Why can't HBr and HI be prepared by the action of conc. H_2SO_4 on bromide and iodide respectively? Suggest alternative methods for preparation of HBr and HI.

[1+1+1+2]

OR

13. What are foreign elements? Write examples. Give outline and chemical reaction for the detection of nitrogen in the organic compound. Also write the structural formula for;
- (a) 3-hydroxybutanoic acid
 - (b) 2-amino-3,4-dimethylpent-2-enal

[1+2+2]

14. Write the basic postulates of kinetic theory of gas. [5]

Group-C

Long answer questions

(2x8=16)

15. What is limiting reactant? 20g of 40% pure CaCO_3 if reacted with 5g of HCl to give CaCl_2 , H_2O and CO_2 .
- i) Which one is limiting reactant and why?
 - ii) Calculate the number of moles of excess reagent left over.
 - iii) Calculate the mass of CaCl_2 formed.

- iv) How many numbers of water molecules are produced?
 v) Calculate the volume of CO_2 produced at 27°C and 0.5 atm pressure. [1+2+1+1+1+2]

16.

- (i) Write short note on hydrogen spectrum. [4]
 (ii) Define ECE and 1 Faraday. A metallic spoon is coated with silver by passing a current of 5A through AgNO_3 solution for 5 hrs. What is the thickness of silver plating if the area of the spoon is 12 cm^2 (density of silver is 10.5 g/cc and atomic mass of silver is 108g) [2+2]

OR

Study the given homologous series and answer the following question.

R
$\text{CH}_3\text{-CH}_2\text{-OH}$
S
$\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-CH}_2\text{-OH}$

- (i) Define homologous series and functional group.
 (ii) Identify R and S with their mass difference.
 Write their IUPAC names.
 (iii) Write any two characteristics of homologous series.
 (iv) Write the functional group and first three members of aldehyde. [2+2+2+2]

BEST OF LUCK



Sukuna Secondary School

Sundarhaicha-10, Morang
Final Examination-2081

Class-XI(Science)

Sub- Chemistry(3011)

Time-3Hrs

Full Marks-75

Candidates are required to give their answers in their own words as far as practicable. The figures in the margins indicate full marks.

Group-A

Tick the best alternative to the following questions.

{11×1=11}

- The number of mole in 2g of sodium hydroxide is
a. 0.25 mole b. 3 mole c. 0.5mole d. 1.5 mole
- Which of the following is the smallest cation?
a. Na^+ b. Mg^{++} c. Ca^{++} d. Al^{+++}
- Azimuthal quantum number gives
a. Size of orbital b. orientation of orbital
c. Shape of orbital d. Spin of orbital
- Oxidation number of Mn in KMnO_4 is
a. +10 b. +7 c. +5 d. +6
- Molecular formula of plaster of paris is
a. CaSO_4 b. $\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}$
c. $\text{CaSO}_4 \cdot \text{H}_2\text{O}$ d. $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$
- Structure of CH_4 molecule is
a. Tetrahedral b. Pyramidal
c. Angular d. Linear
- Sodium nitroprusside test is carried for the detection of
a. Halogens b. Nitrogen
c. Sulphur d. Carbon
- Which of the following is Oleum?
a. H_2SO_4 b. H_2SO_3
c. $\text{Na}_2\text{S}_2\text{O}_7$ d. $\text{H}_2\text{S}_2\text{O}_7$
- Benzene reacts with methyl chloride in presence of AlCl_3 to give
a. Acetophenone b. Toulene
c. Benzophenone d. Ethyl benzene
- Haemoglobin contains
a. Mg^{++} b. Ca^{++} c. Cu^{++} d. Fe^{++}
- Which of the following is radioactive isotope of Hydrogen?
a. Protium b. Deuterium c. Tritium d. All

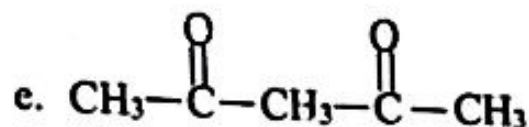
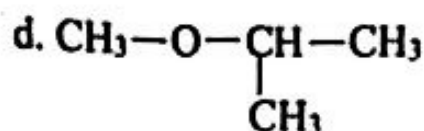
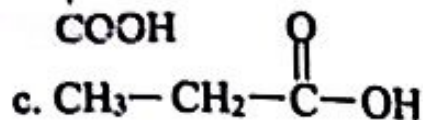
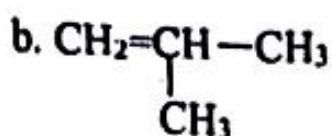
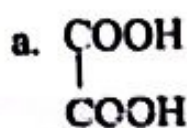
Group-B

Short answers questions

[8×5=40]

[5×1=5]

12. Write the IUPAC name of following organic compounds.



OR

Study the given homologous series and answer the following question.

X
CH_3-COOH
Y
$\text{CH}_3-\text{CH}_2-\text{CH}_2-\text{COOH}$

- (i) Define homologous series. [1]
- (ii) Identify X and Y. Also write their IUPAC names. [1]
- (iii) Write any two characteristics of homologous series. [2]
- (iv) Write the first member of ketone. [1]

13. Ionization energy of element decreased on moving down in the group of periodic table.

- a. Define ionization energy. [1]
- b. Compare the ionization potential of Be and B. [2]
- c. Ionization energy of inert gas is very high but electron affinity is zero. Why? [2]

14. Sodium is one of the important alkali metal used in laboratory.

- a. Sketch a well-labelled diagram of Down's cell for the manufacture of sodium. [2]
- b. Why is sodium metal kept in kerosene? [1]
- c. Why is sodium fire not extinguished by adding water? [2]

OR

Graphite is one of the allotrope of carbon and is used to make lead of pencil, brushes in electric motors and furnace linings

- a. Name the latest discovered allotrope of carbon. [1]

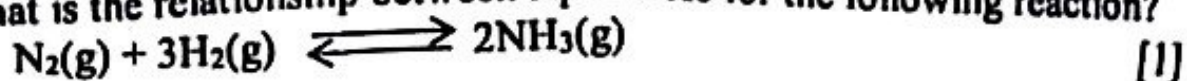
b. Give balanced chemical equation for the preparation of CO from Oxalic acid. [2]

c. Carbon monoxide is extremely poisonous. Why? [2]

15. a. Derive the relationship between K_p and K_c . [3]

b. Define equilibrium constant (K_c). [1]

c. What is the relationship between K_p and K_c for the following reaction? [1]



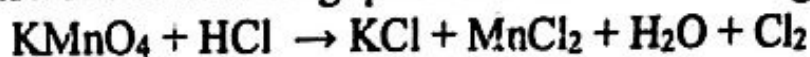
16. In metallurgical operation, we have to follow different steps like concentrations, calcinations or roasting, reduction and refining.

a. Define the terms Flux and gangue. [1]

b. Differentiate between calcination and roasting. [2]

c. Every ore is mineral but every mineral is not ore. Give reason. [2]

17. Answer the following questions on the basis of given redox reaction.



a. Balance the above redox reaction by oxidation number method or ion-electron method. [3]

b. Point out oxidant and reductant in the above redox reaction. [1]

c. Define oxidation number. [1]

18. Valence shell electron pair repulsion theory has been developed for the determination of geometry of molecule.

a. Determine the geometry of BF_3 based on VSEPR theory. [2]

b. Define hybridization? [1]

c. Write the Lewis dot structure of N_2O_5 and H_2SO_4 . [2]

OR

Hydrogen is the most abundant element in the universe lightest element ever known.

a. Distinguish between ortho and para hydrogen. [2]

b. What are the different isotopes of hydrogen? Write their symbols. [2]

c. Mention an important use of each of the following. [1]

a. Deuterium

b. Ozone

19. Write an example of

a. Decarboxylation reaction

b. Wurtz synthesis

c. Ozonolysis

d. Markovnikov's addition Reaction

e. Dehydrohalogenation reaction

[5x1=5]

8
5
6
5
2

[3×8=24]

Group-C

Long answer questions

20. Different spectral lines in hydrogen spectrum are formed due to the jump of electrons from higher energy levels to lower energy levels.
- What do you mean by Lyman series? [1]
 - Which series of spectral lines fall in visible region? [1]
 - How many spectral lines in Balmer series are obtained when electron drop from fifth energy level? [1]
 - Draw the spectral line of hydrogen. [2]
 - Write all possible quantum number of outermost electron of Sodium. [2]
 - Define Pauli's exclusion principle. [1]

OR

Gases which obey the gas laws under all conditions of temperature and pressure are called ideal gases. Actually, no gas is an ideal gas.

- Derive the relation $PV = nRT$ [3]
 - What is water of crystallization? Write two examples of hydrated salt.
 - Through the two ends of a glass tube of length 2 meters, hydrogen chloride and ammonia gases are allowed to enter. At what distance from ammonia, ammonium chloride will be appear? [3]
21. Sodium hydroxide is manufactured from brine solution by electrolytic process.
- What is brine solution? [1]
 - Write the name of gas produced at cathodic and anodic compartment. [1]
 - Name the electrolyte that is used in this process. [1]
 - Write the equation that takes place in each electrode. [2]
 - Draw the flow sheet diagram for this process. [2]
 - Write the Molecular formula of washing soda. [1]
21. An organic compound A is produced by heating ethanol with conc. H_2SO_4 at $170^\circ C$. The compound A is treated with hydrogen in presence of platinum catalyst, compound B is formed. The compound B is treated with chlorine in presence of sunlight, compound C is obtained. The compound C is heated with sodium metal in presence of organic ether, the compound D is formed.
- Write the reaction sequence of the conversion of A to D. [3]
 - Write the IUPAC name of C and D. [2]
 - How can you prove chemically the compound A is unsaturated? [2]
 - Write the name of reaction for the conversion of compound C to D. [1]

Best of Luck

NEW GALAXY ENGLISH SECONDARY SCHOOL

First term examination

Class: 11 (Science) Day

Full Marks: 50

Subject: Chemistry Time: 2 hrs.

Candidates are required to answer the following questions in their own words as far as practicable.

The figures in the margin indicate full marks.

Group A

Multiple Choice Questions [9×1=9]

- Shape of Ammonia is
 - Pyramidal
 - Tetragonal
 - Coplanar
 - Trigonal
- Universal gas constant is-
 - K
 - n
 - R
 - Ge
- The reason of formation of many organic compounds is.
 - tetra-covalency of carbon
 - isotopes of carbon
 - catenation property
 - both a and b
- Vital force theory reveals the origin of organic compounds from.
 - Living beings
 - Water
 - minerals
 - None
- If the valence cell electronic configuration for an element is ns^2np^5 , then the element belongs to the group
 - Halogens
 - Alkali metals
 - Noble gases
 - Inert metals
- Empirical formula of ethyl alcohol is
 - C_2H_6O
 - C_2H_5OH
 - CH_3CH_2OH
 - CHO
- Brass is an alloy of.
 - Cu + Sn
 - Zn + Sn
 - Cu + Zn
 - Cu + Al
- Liquid diffuses slowly as compared to gases because
 - Liquids have no definite shape
 - The molecules of liquid are heavy
 - The molecules of liquid are fast.

Group B
Very Short Answer Questions

[5×5=25]

9. State and explain Graham's law of diffusion. What are the applications of Graham's law of diffusion. [3+2]
10. During smelting, except carbon other chemical substances are added to remove impurities (gangue) in the calcinated or roasted ore. (1+1+1+2)
- What is the name of that chemical substance added?
 - Define slag.
 - Is slag fusible or infusible mass?
 - If CaO is flux and SiO₂ is impurity, which slag is formed? Write the reaction involved for this.
11. Why is it necessary to prepare Lassaigne's solution for detection of foreign element present in organic compounds? How do you detect nitrogen as a foreign element from organic compound by Lassaigne's test method? (2+3)
12. Write short notes about octane number and anti-knocking effect.
13. Write the IUPAC name of the following organic compounds.
- CH₃CHBrCH₂CH₂Cl
 - CH₂BrCl
 - CH₂=CHCH₂I
 - NC-CH₂-CH(OH)-COOH
 - CH₃-CH(OH)-COOH

Group C

Long Answer Questions

[2×8=16]

14. Define homologous series. What are the characteristic features of homologous series? Give the IUPAC name and structure of third member of alcohol, aldehyde, ketone and carboxylic acid. [1+3+4]
15. State Boyle's law and Charles's law. Derive $PV=nRT$. What volume of CO₂ will be delivered at NTP to extinguish fire from a cylinder of 10 L capacity containing 5 Kg of CO₂ gas? (4+4)

Best of Luck

If the pH is higher than 7 the solution is

- acidic
- neutral
- basic
- none