

K.T.S.P.MANDAL'S
SAHEBRAOJI BUTTEPATIL MAHAVIDYALAYA, RAJGURUNAGAR
Department Of Chemistry
CLASS – F.Y.B.Sc.

Internal Exam A.Y. 2023-4
Subject-Physical Chemistry

Date-06/10/2023

Marks-20

Time- 09:00-10:00 p.m.

Q.1) Answer the following (5M)

- 1) Write the mathematical formulation of first law of thermodynamics.
- 2) Define-Thermodynamics.
- 3) Define- Bond energy.
- 4) Define- Zeroth law of thermodynamics.
- 5) Explain- Resonance Energy.

Q.2) Answer the following (Any 5) (10M)

- 1) Explain- Extensive & Intensive properties
- 2) Distinguish between Isothermal & Adiabatic process.
- 3) State first law of thermodynamics in two different ways.
- 4) Give the limitations of thermodynamics
- 5) What is mean by Reversible & Irreversible Processes?
- 6) What are main objectives of thermodynamics?
- 7) State and explain the following terms with suitable example- Open,Closed & Isolated system

Q. 3) Solve the following (Any 2) (5M)

1) Calculate the bond energy of C-H bond ,given the heat of combustion of methane (CH₄) ,graphite and hydrogen are 891 kJ and 286 kJ respectively while the heat of sublimation of graphite is 717kJ and the heat of dissociation of hydrogen molecule is 436 kJ.

2) Calculate the amount of heat evolved when :

600 cm³ of 0.1 M HCL is mixed with 200 cm³ of 0.2 M NaOH solution.

3) Calculate the amount of heat evolved when :

250 cm³ of 0.1 M H₂SO₄ is mixed with 400 cm³ of 0.5 M KOH solution.

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SAHEBRAOJI BUTTEPATIL MAHAVIDYALAYA, RAJGURUNAGAR
Department Of Chemistry
CLASS – F.Y.B.Sc.

Internal Exam A.Y. 2023-24
Subject- Organic Chemistry

Date-06/10/2023

Marks-20

Time- 10:30 - 11:30 p.m.

Q.1) Answer the following question

(5M)

- 1) Define- Boiling Point
- 2) Write type of Inductive Effect
- 3) Define- Free Radical
- 4) Write Structure of –Furan
- 5) Write Structure of –Thiophene

Q. 2) Answer the following question (Any 5)

(10M)

- 1) Difference between – Inductive Effect & Resonance Effect.
- 2) Define- i) Covalent bond ii) Intermolecular forces
- 3) Explain- Aniline is a weaker base than cyclohexyl amine.
- 4) What is Hybridization?
- 5) State essential condition for a molecule to be Aromatic.
- 6) What is mean by Resonance effect? Explain.
- 7) What is mean by Inductive effect? Explain.

Q. 3) Draw the Resonance of the following molecule (Any 2)

(5M)

1)

2)

3)

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SAHEBRAOJI BUTTEPATIL MAHAVIDYALAYA, RAJGURUNAGAR
DEPARTMENT OF CHEMISTRY
Internal Exam -A.Y.-2022-2023
F.Y.B.Sc. – Sem- II (CBCS-2019)
Paper-I – Inorganic Chemistry

Date - 03/05/2023

Time-1 Hr

Q. 1. Answer the following (Any 5)

5M

- i) State- Heisenberg uncertainty principle.
- ii) State Aufbau principle.
- iii) Give electronic Configuration of Cr (24).
- iv) Define- Chemical Bond.
- v) Types of Bond.
- vi) Hybridization.

Q. 2. Answer the following (Any 5)

10M

- i) Explain Postulates of Bohr's theory.
- ii) Explain Photoelectric Effect.
- iii) Write Short note on Covalent bond with example .
- iv) Draw Shapes of 1s ,2s , 3s Orbitals .
- v) Difference between Quantum mechanics and Classical mechanics.
- vi) Explain Black body radiation.

Q. 3. Solve the following (Any 2)

5M

- i) Calculate the wave number ,Wavelength and frequency of the first line in the Lyman series. Given $R=109677.6 \text{ cm}^{-1}$
- ii) Calculate the wave number of the spectral line in the Balmer's series when electron jumps from $n=3$ Given $R=109677.6 \text{ cm}^{-1}$
- iii) Write the electronic Configuration of Mg (12) , Ca(20), Cu(29).

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Internal Exam -A.Y.-2022-2023
F.Y.B.Sc. – Sem- II (CBCS-2019)
Paper -II – Analytical Chemistry

Date - 03/05/2023

Marks-20

Time-1 Hr

Q. 1. Answer the following (Any 5)

5M

- i) Test for Acid
- ii) Definition of Normality
- iii) SI unit for Temperature.
- iv) What is mean by Avogadro's Number.
- v) Long Form of TLC
- vi) P_H Formula & definition

Q. 2. Answer the following (Any 5)

10M

- i) Explain Separation of solid-Solid Phenol-Base Separation.
- ii) Explain in short Paper Chromatography
- iii) Application of PH meter
- iv) Explain Calomel electrodes with neat labeled diagram.
- v) Functional group test for Acid & Phenol.
- vi) Write the test for Nitrogen and Sulpher.

Q. 3. Answer the following (Any 2)

5M

- i) Find the significant number for following.
1) 453 2) 0.345 3) 0.0024 4) 3456778
- ii) Explain ppm, ppb & ppt
- iii) Explain in short – Separation of liquid –liquid mixture from a binary mixture with neat labeled diagram

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CLASS – S. Y. B.Sc.

Internal Exam A.Y. 2023-24 Sem-I
Subject- Physical & Analytical Chemistry

Date- 05/10/2023

Marks-20

Time- 09:00-10:00 p.m.

Q.1) Answer the following

(5M)

- 1) Give the statement for Law of Mass Action.
- 2) Define-Thermodynamics.
- 3) Define- Rate of a Chemical reaction.
- 4) Give unit for zero order reaction & first order reaction.
- 5) Give the definition - Half life Period.

Q.2) Answer the following (Any 5)

(10M)

- 1) Factors affecting on rate of a chemical reaction.
- 2) Difference between Order of the reaction and molecularity of the reaction.
- 3) Show that for first order reaction $t^{1/2} = 0.693/k_1$.
- 4) Give the Characteristic of Zero order reaction.
- 5) Give the Characteristic of First order reaction.
- 6) State integrated rate law expression for first order reaction.

Q. 3) Solve the following (Any 2)

(5M)

- 1) Show that in every first order reaction the time required for 75% reaction is double the time required for 50% reaction.
- 2) Find the time required to complete 75% of the reaction . The rate constant of first order reaction is – $6.4 \times 10^{-3} \text{ Sec}^{-1}$
- 3) In a first order reaction , 40 % of the reaction is completed in 100 min .How Long will it take to go to 99.9 % Completion?

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CLASS – S. Y. B.Sc.

Internal Exam A.Y. 2023-24 Sem-II
Subject- Physical & Analytical Chemistry

Date- 4/3/2024

Marks-20

Time- 09:00-10:00 p.m.

Q.1) Answer the following

(5M)

- 1) Define the Term-Normality.
- 2) Define-Component.
- 3) Define-Raoult's law.
- 4) Give the Statement of- Lambert's Law.
- 5) What is mean by Molar Absorptivity.

Q.2) Answer the following (Any 4)

(10M)

- 1) Draw and discuss Phase diagram for carbon dioxide.
- 2) Explain Photomultiplier tube with neat labeled diagram.
- 3) Draw labeled diagram of fractionating Column & Give Applications of it .
- 4) Explain triethylamine –water System.
- 5) Give the relation between frequency, wave number and wavelength.
- 6) Explain- Phase Rule.

Q. 3) Solve the following (Any 2)

(5M)

1) 0.01 M solution of a colored substance absorbs 90% of the incident radiation. if path length of a cell is 1.5 cm, calculate the molar absorptivity of the substance .

2) 0.15 kg of acetic acid is dissolved in water so that the resultant volume of the solution was 0.8 dm³. The density of the solution at 20°C was 1.02 x 10³ kg m⁻³ Calculate molarity , molality, of the solution and also mole fraction of the solute and solvent . (Mol. Wt. of acetic acid= 60, Water =18)

3) The molar Absorptivity of a particular solute is 2.1 x 10⁴ . Calculate the transmittance through a cuvette with a 5.0 cm light path for a 2.0 x 10⁻⁴ M solution

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CLASS – S. Y. B.Sc.

Internal Exam A.Y. 2023-24 Sem-I

Subject- Inorganic & Organic Chemistry

Date- 06 /10/2023

Marks-20

Time- 10:30-11:30 p.m.

Q.1) Answer the following question

(5M)

- 1) Give- Huckel Rule
- 2) Define-Aromaticity
- 3) Draw the structure of carbonium ion.
- 4) Draw Structure of –Toluene.
- 5) Draw Structure of –Acetophenone.

Q. 2) Answer the following question (Any 6)

(12M)

- 1) Friedel Craft alkylation by using alkyl halide.
- 2) Give the classification of homocyclic compounds.
- 3) Explain three types of benzene derivatives.
- 4) What are the criteria for Aromatic character.
- 5) How to prepare benzene from phenol.
- 6) What is electrophilic substitution reaction? Explain nitration of benzene.
- 7) Explain halogenations of benzene.

Q. 3) Answer the following

(3M)

- 1) What is Friedel Craft acylation ? How it is carried out by using
a) acyl halide b) acid anhydride ?

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Department Of Chemistry

CLASS – S. Y. B.Sc.

Internal Exam A.Y. 2023-24 Sem- II

Subject- Inorganic & Organic Chemistry

Date-4 /3/2023

Marks-20

Time- 10:30-11:30 p.m.

Q.1) Answer the following question

(5 M)

- 1) Define the term- Angle Strain
- 2) Define-Isomerism
- 3) Draw the Structure of- Benzaldehyde.
- 4) Draw Structure of – 1 Phenyl -2- propanone.
- 5) What is silver mirror test.

Q. 2) Answer the following question (Any 4)

(12 M)

- 1) Explain- Bayer strain theory.
- 2) Explain Structural isomerism types in Co-ordination Complexes.
- 3) Give the Cis and tras isomers of $[\text{Co}(\text{NH}_3)_3\text{Cl}_3]$.
- 4) Reimer-Tiemann Reaction – Explain the reaction with example.
- 5) Write a note on - Locking of Conformation.
- 6) Explain Rosenmund Reduction.

Q. 3) Identify product 'A' and 'B' and rewrite the reactions

(3 M)

1)

2)