

Shri Maneklal M. Patel Institute of Sciences & Research

B.Sc. Semester 1 (New Course)
CCH-101 (Fundamentals of Chemistry - 1)
Assignment

Submission Date: 17th October to 19th October
Time: 10 am to 12 pm

Faculties for Submission

B.Sc Chemistry 1 A – Mr. Rajat Patel
B.Sc Chemistry 1 B – Ms Yamini Sharma
B.Sc Microbiology 1 A – Mr. Rohit Koshti
B.Sc Microbiology 1 B – Mr. Raj Pandya
B.Sc Mathematics / Physics 1 – Mr. Akshay Vyas

UNIT – 1

• 1 & 2 Marks Questions

1. Define “covalent Bond”. Give an example.
2. Which is most stable oxidation state for lanthanides?
3. What is common electron configuration of lanthanide series?
4. What is the bond angle of BF_3 , BeCl_2 , SF_6 , SiCl_4 .
5. Give the full form of VBT and VSEPR.
6. What is the bond angle of H_2O , NH_3 , CH_4 ?
7. What are the shapes of NH_3 , H_2O and CH_4 .
8. What is ionic bond? Give an example.
9. What are the limitations of the VBT?

• 5 & 7 Marks Questions

1. Write the names, symbol and electronic configuration of elements of lanthanide series.
2. What is lanthanide contraction? Explain the effect of lanthanide contraction.
3. Write any one method for separation of lanthanides. (1) Ion exchange (2) solvent - extraction method.
4. Find out the bond order for NO and CO with molecular energy level diagram.
5. Define hybridization. Explain SP^3 and SP^3d hybridization with suitable examples.
6. Explain the Valence Bond Theory. How is it useful to understand the covalent bonding?

Unit – 2

• 1 Marks Questions

- The homolytic fission of a hydrocarbon results in the formation of
 - carbonium ion.
 - free radicals.**
 - carbanions.
 - carbenes.
- Which of the following will undergo homolytic fission?
 - Br₂**
 - HBr
 - H₂O
 - HCl
- Which of the following alkyl halides will have the shortest bond length?
 - CH₃F**
 - CH₃Cl
 - CH₃Br
 - CH₃I
- Which among the following is most basic?
 - NH₃
 - CH₃NH₂
 - (CH₃)₂NH**
 - (CH₃)₃N
- The shape of a carbanion is
 - linear.
 - planar.
 - pyramidal.**
 - none of the above.
- The most stable carbanion is
 - (CH₃)₃C⁻
 - (CH₃)₂CH⁻**
 - (CH₃)CH⁻
 - (C₂H₅)₃C⁻
- Which carbonium ion is most stable among the following?
 - (CH₃)₃C⁺
 - (CH₃)₂HC⁺
 - (C₆H₅)₃C⁺**
 - (C₆H₅)₂HC⁺
- Which of the carbanion among the following is least stable?
 - C₆H₅⁻**
 - C₆H₅C⁻H₂
 - (C₆H₅)₂C⁻H
 - (C₆H₅)₃C⁻
- Which among the following is most stable free radical?
 - (CH₃)₃C.**
 - (CH₃)₂CH
 - CH₃CH₂
 - CH₃
- Which among the following is an electrophile?
 - NH₃
 - SO₃**
 - H₂O
 - ROH
- Which of the following species is a nucleophile?
 - N+O₂
 - :CX₂
 - ::NH₂⁻**
 - CH₃
- Which among the following will show highest reactivity in nucleophilic substitution reactions?
 - CH₃F
 - CH₃Cl
 - CH₃Br
 - CH₃I**
- Which among the following will undergo nucleophilic substitution reaction by SN₂ mechanism?
 - CH₃Br**
 - (CH₃)₂CHBr
 - (CH₃)₃CBr
 - C₆H₅CH₂Br
- How many step are present in SN¹ Reaction?
 - one
 - Two**
 - Four
 - None
- Reactions by the E₂ mechanism are always bimolecular. (True / False)
- _____ takes place in polar solvents. (Homolytic fission / Heterolytic fission)
- Electrophiles are Lewis base. (True / False)
 - Define the electrophiles; give two examples
 - Define the nucleophiles : give two examples
 - Give the resonance structure of Chlorobenzene
 - Give the resonance structure of phenoxide ions

5. Give the resonance structure of anilinium ions
6. Write the name of different types of organic reactions.
7. Describe fission of co-valent bond with example.

• **5 and 7 Marks Questions**

1. What are SN1 and SN2 reactions? Give examples. **OR** Explain nucleophilic substitution reaction in detail.
2. Explain following terms (a) dipole-dipole interaction (b) van der Waals forces (c) Inductive effect **OR** What are intermolecular forces? Explain all
3. Explain hyper conjugation effect with example
4. What are addition reactions? Explain the possible mechanisms for addition reactions with an example each.
5. Explain Saytzeff rule and Markovnikov rule.
6. What is elimination reaction? Explain its mechanism with suitable examples.

Unit – 3

• **1 & 2 Marks Questions**

1. Explain entropy in short.
2. What is process? Give the types of process.
3. Define enthalpy with equation.
4. The symbol for change in Enthalpy is
(a) S (b) H (c) G (d) none
5. As the temperature increases, entropy of a system _____.
(a) Decrease (b) increase (c) remains constant
6. For $\Delta U = \Delta H + P\Delta V$, if heat liberated is equivalent to work done on the system, the total value of ΔU remains the same (true/false)
7. The symbol for entropy is (a) S (b) H (c) G (d) none
8. For an isothermal process, _____ remains constant
(a) temperature (b) pressure (c) entropy (d) volume
9. In an isobaric process, _____ remains constant
(a) volume (b) pressure (c) temperature (d) Entropy
10. Define 1) State function 2) Internal Energy
11. Which is not a state function (a) q (b) H (c) G (d) E

• **5 Marks Questions**

1. Explain first law of thermodynamics with work and enthalpy relationship mathematical formula.
2. What is process? Explain the types of process in brief.

3. Prove the relation between C_P and C_V .
4. Define system and surrounding in details with suitable examples.
5. Discuss 1) Gibbs free energy 2) the helmholtz free energy
6. Write a note on Carnot Cycle.
7. For the given reaction $\text{NO} + \frac{1}{2} \text{O}_2 \rightleftharpoons \text{NO}_2(\text{g})$ at 25°C temperature the value of ΔG^0 and ΔH^0 respective 8.33 Kcal and -13.5 Kcal. Find out equilibrium constant for the temperature of 25°C and 35°C .
8. Give detail account of 2th law of thermodynamic.
9. Write about heat capacity .Explain specific heat capacity and molar heat capacity.

Unit – 4

• 5 and 7 Marks Questions

1. Write literature of analytical chemistry in brief.
2. Give a brief note on classical & instrumental methods (electro – analytical techniques). **OR**
Give the classification of analytical methods.
3. The amounts of gold found in an ore are 6.62, 6.02, 6.32, 6.48 and 6.21. Find out the mean, median, range, standard deviation, RSD and variance.
4. In the experiment of volumetric analysis burette readings are given below.
12.25,12.24,12.30,12.28,12.25,12.26 then find Mean, Median, Mode, Range, Deviation, Relative average deviation, Standard deviation, Relative standard deviation & variance.
5. Write some criteria for analytical technics.
6. What is error? Explain the types of error in detail.
7. Three results obtained for Mn colorimetric titration 0.34, 0.34, 0.36 apply the test Q and Grubb's test above to see if 0.36, result cn be discarded or not? ($Q_{90} = 0.94$, $G_{90} = 1.153$)

• 2 Marks Questions

1. What is qualitative & quantitative analysis?
2. Write any two differences between accuracy and precision.
3. If for a particular experiment, the accepted true value is 14.09 and the measured value of sample is 14.40, then calculate % relative error?

• 1 Marks Questions

1. Write the significant figure of 0.005060080 and 1.030030×10^{-6} .
2. What is the equation of Absolute error?
a) $E = X_i - X$ b) $E = X_i - X_t$ c) $E = X_i - X_t$ d) $E = X - X_i$
3. Define the Error.
4. Give the equation of Q test
5. Define deviation

6. Carelessness & laziness are the main sources of _____ .

a) Indeterminate error b) Personal error c) Method error d) Relative error

7. Write the formula for calculating standard deviation & explain each term involved.

8. Give two types of classical method.

9. What is Analytical Chemistry?

10. What is the equation of Relative error?

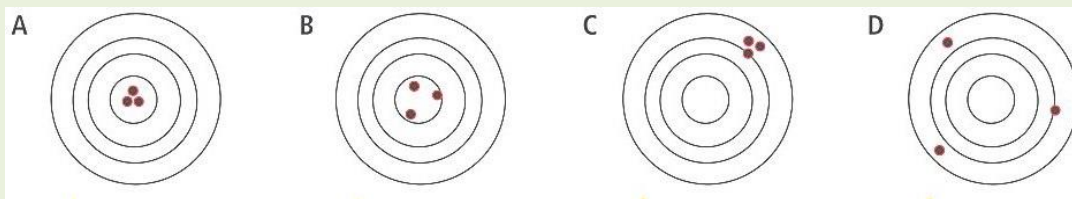
a.
$$\frac{\text{Absolute error} \times 100}{\text{True Value}}$$

b.
$$\frac{\text{Absolute error} \times 100}{N}$$

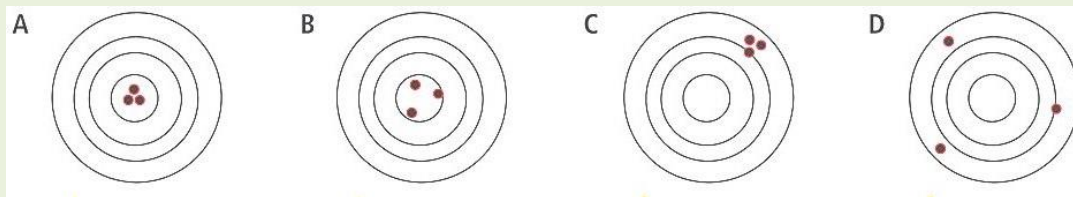
c.
$$\frac{\text{Absolute error}}{\text{True value}}$$

d.
$$\frac{\text{Absolute error} \times \text{True Value}}{N}$$

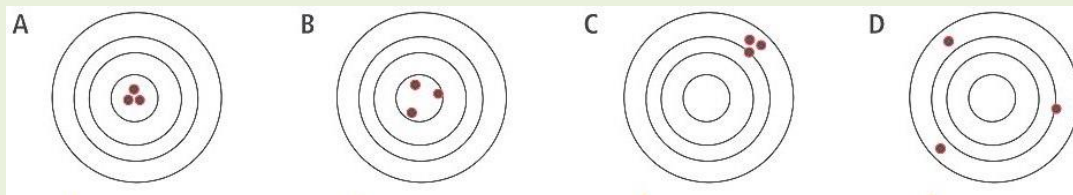
11. Which is the well precise but not accurate?



12. Which is the well accurate but not precise?



13. Which is the well precise and accurate?



14. Which is the not accurate and precise?

