

Natubhai. V. Patel college of pure and applied sciences
Vallabh Vidyanagar

T.Y. B.Sc (Chemistry) C-301

Marks: 30 Unit test : 01 Date: 08/08/11
Time: 10:30 to 11:30 am

Q1 (A) Define Pericyclic reactions and discuss it with respect to characteristics and utility in organic synthesis (05)

(B) What is theoretical basis of Hückel ($4n+2$) Rule? (05)

OR

Q1 (A) Derive Woodward-Hofmann rules for thermal and photochemical cyclization of disubstituted butadiene. (06)

(B) Discuss various aspects of stereochemistry of Diels-Alder reaction. (04)

Q2 (A) Draw and explain electronic configuration of ethylene and 1,3-butadiene. (05)

(B) Write a short note on p-claisen rearrangement (05)

OR

Q2 (A) Explain cope rearrangement. Give evidence of mechanism of claisen rearrangement. (05)

(B) Write a short note on [1,3] and [1,5] carbon migration with suitable example (05)

Q3 (A) Define Carbohydrates and prove that D-Fructose is a 2-Ketohexose sugar (04)

(B) Discuss Kiliani-Fischer synthesis by giving its importance. (06)

OR

Q3 (A) Write short notes on following (10)

(i) Importance of osazone formation in carbohydrate chemistry (04)

(ii) The Ruff degradation (03)

(iii) conversion of aldose sugar into its epimer. (03)

N. V. Patel College of pure and applied sciences
V. V. Nagar

T.Y. B.Sc (Chemistry) C-302

Marks: 30

Unit test: 02

Date: 16/8/2011

Time: 10.30 to 11.30 a.m

Q1 (A) Discuss the following (10)
ci) Buchner reaction²
cii) Sulphonation of naphthalene⁴
ciii) Aromatization.³

OR

Q1 (A) Explain the following (06)
ci) Naphthalene contains two equivalent benzene rings fused together.
c2) Nitration of naphthalene gives 1-nitro naphthalene.

(B) Give Haworth synthesis of naphthalene (09)

Q2 (A) Write a short note on Friedel-Craft acylation of naphthalene. (03)

(B) Write resonating structure of naphthalene, anthracene and phenanthrene. (03)

(C) Give synthesis of 1,4,6-trimethylnaphthalene from toluene. (04)

OR

Q2 (A) Give synthesis of pyrene from 4-keto-1,2,3,4-tetrahydrophenanthrene (05)

(B) Give the following synthesis (05)

ci) phenanthrene from naphthalene

cii) 1,7-Dimethylnaphthalene from toluene.

Q3 (A) Give the synthesis of following (05)

ci) Nirvanol cii) Thiobarbitone.

(B) Explain the term Histamine and discuss their functions. (02)

(C) Write function of antipyretic drug and discuss the mode of action of antipyretic drug. (03)

OR

Q3 (A) Give the following synthesis (06)
ci) chloroquine cii) Miracit-D.

(B) Differentiate between Virus and Bacteria. (1.5)

(C) What are Haematological agents? Discuss the classification of hematological agent in detail. (2.5)

NATUBHAI V. PATEL COLLEGE OF PURE & APPLIED SCIENCES
TYBSc CHEMISTRY C303

29-08-11
1 HOUR

UNIT TEST-4

30 MARKS

Q1

- A Define the following terms: symmetry operation, symmetry element, principal axis, improper rotation and identity operation. [5]
- B Identify the symmetry elements and detect the point groups of the following molecules and ions: ICl_4^- , C_2H_4 , C_5H_5N (Pyridine), 1:3:5 trichlorobenzene, Ammonia. [5]

OR

Q1

- A Prepare the multiplication table for NH_3 and hence prove that C_{3v} is a non abelian point group. [5]
- B What is a similarity transformation? "A group of six elements can have subgroups of order 1 or 2 or 3 only": Explain [5]

Q2

- A Calculate the LFSE for Cr^{+3} ($Z=24$) in high spin state in an octahedral complex. [5]
 Given: ($\Delta_o = 13900 \text{ cm}^{-1}$ and $P = 23500 \text{ cm}^{-1}$)
- B " $[Ti(H_2O)_6]^{+3}$ is violet in colour." Explain. [5]

OR

Q2

- A Calculate the spin only magnetic moments that are expected in d^4 , d^5 , d^6 & d^7 complexes in both high spin and low spin configurations in an octahedral ligand field. [5]
- B Sketch and discuss correlation diagram for a d^2 ion in octahedral environment. [5]

Q3

- A Define stability. Discuss the stepwise formation of complexes, stepwise formation constant and overall formation constant. [5]
- B Giving suitable diagrams, discuss the energy changes involved in endothermic and exothermic reactions. [5]

OR

Q3

- A Discuss Jørgensen's method to determine the stability constant and composition of a complex experimentally.
- B Explain base hydrolysis reactions of six-coordinated Co (III) ammine complexes along with mechanism in detail.

Natubhai V. Patel college of Pure and applied Sciences

V. V. Nagar

T. Y. B. Sc.

Date: 08-09-2011

Unit test No.-5

Time: 10.30 to 11.30 am

Chemistry C-304

Marks: [30]

- Q-1** [10]
(a) Discuss the Grinberg's method for the identification of cis and trans isomers.
(b) Square planar complexes seldom show optical isomerism. Explain with example.

OR

- Q-1** [10]
(a) What is meant by resolution of racemic mixture? Explain resolution of racemic mixture by taking suitable example.
(b) What is optical isomerism? Discuss the optical isomerism in tetrahedral complexes.

- Q-2** [10]
(a) Discuss the preparation, properties, structure and hybridization in $Ni(CO)_4$.
(b) Discuss EAN rule for metal carbonyls and nitrosyls.

OR

- Q-2** [10]
(a) Write notes on sodium nitroprusside and nitroso ferrous sulfate.
(b) Explain multiple bonding between metal and carbonyl ligand in mononuclear metal carbonyls.

- Q-3** [10]
(a) Describe the manufacture of caustic soda by using Nelson cell.
(b) Discuss Oswald's process for the manufacturing of nitric acid with required diagram and suitable principle.

Date: 08-09-2011 Unit test No. 5 Marks: [30] [10]

- Q-3** [10]
(a) How is ammonia manufactured by Haber's process? Give conditions at which maximum yield can be obtained.
(b) How and why the chamber acid is concentrated?

OR

- Q-1** [10]
(a) What is meant by resolution of racemic mixture? Explain resolution of racemic mixture by taking suitable example.
(b) What is optical isomerism? Discuss the optical isomerism in tetrahedral complexes.

- Q-2** [10]
(a) Discuss the preparation, properties, structure and hybridization in $Na_2C_2O_4$.
(b) Discuss EAN rule for metal carbonyls and nitrosyls.

OR

- Q-2** [10]
(a) Write notes on sodium nitroprusside and nitroso ferrous sulfate.
(b) Explain multiple bonding between metal and carbonyl ligand in mononuclear metal carbonyls.

- Q-3** [10]
(a) Describe the manufacture of caustic soda by using Nelson cell.
(b) Discuss Oswald's process for the manufacturing of nitric acid with required diagram and suitable principle.

OR

- Q-3** [10]
(a) How is ammonia manufactured by Haber's process? Give conditions at which maximum yield can be obtained.

MAHARAJA COLLEGE OF PURE & APPLIED SCIENCES

6th UNIT TEST

WEDNESDAY, 14TH SEPTEMBER, 2011

T.Y.B.Sc.

CHEMISTRY: C-305

Duration : 1.0 Hrs

Maximum marks: 30

Q.1.

- [A] What are the different ways in which colloids can be classified. Explain in detail the classification based on physical state of the colloidal particles. [5]
- [B] Explain in detail any two methods adopted for the purification of colloidal solutions. [4]

OR

Q.1

- [A] Define the terms
i. Peptisation ii. Flocculation iii. Gold number iv Zeta potential
v. Suspension [5]
- [B] Give the application of colloids. [4]

Q.2.

- [A] Explain the term zeta potential. Discuss its roll in flocculation of the colloidal systems. [5]
- [B] Illustrate with examples the formation of lyophobic sol by condensation method. [4]

OR

Q.2.

- [A] Write short note on: Electrical double layer [5]
- [B] Illustrate in detail the methods employed to determine the size of colloidal particles. [4]

Q.3.

- [A] Derive Bragg's equation to determine the spacing between the successive parallel planes in a crystal. What are the limitations of this equation. [5]
- [B] The 222 plane of cubic tantalum gives a reflection at 54.12° with radiation of $\lambda = 1.5418 \text{ \AA}$.
a. At what angle would these planes give a reflection at $\lambda = 0.7107 \text{ \AA}$.
b. Determine 'a' of the unit cell. [4]

OR

Q.3.

- [A] How many types of crystal systems are known? Give the axial & angular relation for each crystal system along with at least one example. [5]
- [B] A powder pattern produced by X-rays from a Cr target, which have wavelength of 229 pm , contains a line at $\theta = 65^\circ$ that is indexed as 200. What is the value of d_{200} ? At what angle would the 100 line occur, if it occurs, and what would be the value of d_{100} ? [4]

Natubhai V. Patel College of Pure and Applied Sciences
Vallabh Vidyanagar

T.Y. B.Sc. Chemistry C-306

UNIT TEST 7

Date-19/09/2011

Duration - One hour

Total Marks:30

Q-1

- (a) Define half wave potential. Show that the ions can be identified from the measurements of half wave potential polarographically [05]
- (b) The diffusion current constant of Cd^{+2} in 0.1 M KCl is 3.42. Calculate the diffusion current in 0.001 M Cd^{+2} solution using a capillary with a drop time 3 sec. 20 drops of mercury weight 100 mg. [05]

OR

Q-1

- (a) State different methods to determine diffusion current. Describe standard addition method and internal standard method in detail. [05]
- (b) Calculate the diffusion current that would be expected from the reduction of 2.0×10^{-3} M Pb^{+2} . The diffusion coefficient for Pb^{+2} is 1.01×10^{-5} cm^2/sec , $m = 1.9$ mg/s and $t = 3.47$ sec /drop. An unknown solution containing Pb^{+2} gives diffusion current of $11.7 \mu\text{A}$ with same DME as above. What is the concentration of Pb^{+2} in this solution? [05]

Q-2

- (a) Derive the relation for amount of solute unextracted after 'n' no. of operation. [05]
- (b) An organic compound is 20 times more concentrated in ether than in water. Calculate the amount of substance left unextracted when 100 ml of aqueous solution containing 1 gm of the compound is shaken with 100 ml of ether in (I) one extraction (II) Two extraction using 50 ml ether each time. [05]

OR

Q-2

- (a) Describe the factors affecting the process of extraction. [05]
- (b) When 0.83 gm succinic acid was shaken with 100ml of each, water and ether, the water layer was found to contain 0.70gm of acid. Calculate the quantity of acid that can be extracted from 1 lit. of aqueous solution containing 1 gm of acid using 100 ml ether (I) In single extraction (II) In two equal installments. [05]

Q-3

- Attempt the following. [10]
1. How and why dissolved oxygen can be removed from polarographic cell solution?
 2. What are polarographic maxima? How it can be removed in polarography?
 3. State & explain distribution law. What are the limitations of distribution law?
- Write a note on Discontinuous infusion type extractor

OR

Q-3

- Attempt the following. [10]
1. How and why migration current can be eliminated in polarography.
 2. State components of current in polarography. Explain any one of them in detail.
- Show that pH of the chelating agent is a function of distribution of metal in two phases.
- Discuss applications of liquid extraction in analytical processes.

Discuss the hydride compounds of carbon family in their tetravalent state.

Write a short note on substitutional alloy.

How size and valency of metals determine the formation of different types of alloys.

What is interhalogen compound? Why do they form? Discuss the general properties of interhalogen compounds.

Explain: ClF_3 molecule is bent-T shape while $(ICl_3)_2$ has square planar shape.

Naturbhai V. Patel college of Pure and applied Sciences

V. V. Nagar

T. Y. B. Sc.

Unit test No.-4

Date: 26-12-2011

Time: 10.30am to 11.30 am

Chemistry C-304

Marks: [30]

Why IF_7 molecule has theoretical importance. Discuss its structure.

Q-1 Write a note on halides, oxides and salts of lead (Pb). [10]

(a) Write a short note on substitutional alloy.

(b) How size and valency of metals determine the formation of different types of alloys.

(c) Write a note on: Intermetallic compound. [10]

(a) Discuss different types of steel of ferrous alloys with respect to their industrial application.

(b) Write a note on: Zeolites. [10]

(a) Write a note on: Zeolites.

(b) Write a note on halides, oxides and salts of lead (Pb). [10]

OR

Q-2 Trisilylamine such as $(H_3Si)_3N$ differs from $(CH_3)_3N$ is being planar rather than pyramidal and disilyl ethers all have large angle at oxygen. [10]

(a) Discuss the hydride compounds of carbon family in their tetravalent state.

(b) Write a short note on substitutional alloy.

(c) How size and valency of metals determine the formation of different types of alloys. [10]

Q-3 What is interhalogen compound? Why do they form? Discuss the general properties of interhalogen compounds.

(a) Explain: ClF_3 molecule is bent-T shape while $(ICl_3)_2$ has square planar shape.

(b) Discuss different types of steel of ferrous alloys with respect to their industrial application. OR [10]

Q-3 IF_5 molecule is square pyramidal shape. Explain.

(a) Why IF_7 molecule has theoretical importance. Discuss its structure.

(b) Write a note on: Intermetallic compound.

Natubhai V. Patel College of pure and applied sciences
V. V. Nagar.

Unit test No. 01

T. Y BSC (Chemistry) C-301

Date: 05/12/2014

Marks: 30

Time: 10.30 to 11.30

Q1 (A) What are the facts that are inconsistent with open chain structure of D(+) - Glucose? Explain in detail. (04)

(B) How will you determine the configuration about C₁ in methyl- α -glycosides. (03)

(C) Explain anomeric effect. (03)

OR

Q1 (A) Discuss the structure of (1) maltose (06)

(B) Write a short note on cyclodextrins (04)

Q2 (A) Discuss the structure of (1) lactose (06)

(B) Give mechanism of Sommelet rearrangement (04)

OR

Q2 (A) Discuss the structure of (1) sucrose (06)

(B) Give Criegee-Kasper mechanism for the conversion of ketone into ester. (04)

Q3 (A) Explain the following statements (10)

(i) Hoffmann-Löffler reaction does not proceed in the dark.

(ii) In unsymmetrical benzil, the aryl group with electron donating group migrates faster.

OR

Q3 Give mechanism for the following (10)

(i) Birch reduction of aromatics

(ii) Pinacol-Pinacolone

(iii) Benzilic acid rearrangement

x — x — x

Natubhai V. Patel College of Pure and Applied Sciences

Unit Test-II

T. Y. B.Sc. (Chemistry)

Date: 12/12/2011

Marks: 30

Time: 10:30-11:30am

- Q-1 Discuss the following. [10]
(A) Isoelectric point of amino acids.
(B) Frederick Sanger's method for N terminal residue analysis.
(C) Amino acid as a dipolar ion.

OR

- Q-1 Give the following synthesis. [10]
(A) Aspartic acid by Direct ammonolysis method.
(B) Valine by Malonic ester synthesis.
(C) Lysine by Gabriel Pthalimide synthesis.

Q-2

- (A) What are peptides? Discuss the geometry of the peptide linkage. [04]
(B) Give synthesis of Glycylalanine (Gly-Ala) by benzyloxycarbonyl method. [04]
(C) Give two name and structure of essential amino acid. [02]

OR

Q-2

- (A) What is Chymotrypsin? Discuss the mechanism of enzyme action of chymo trypsin. [04]
(B) Differentiate between fibrous and globular protein. [04]

Q-3

- (A) Explain Sulpha drug and give its application. [02]
(B) Explain the term 'Antitubercular agent'. Write the function of rifampin with their structure. [03]
(C) Give the synthesis and application of following drugs. [05]
(i) Marfanil (ii) Dapsone

OR

Q-3

- (A) Give mechanism action of sulpha drug. [03]
(B) What is anti-leprotic drug? Give the list of drug used as anti-leprotic. [02]
(C) Give the synthesis and application of following drug. [03]
(i) Primaquin (ii) Warfarin

ALL THE BEST

NATUBHAI V. PATEL COLLEGE OF PURE & APPLIED SCIENCES

TYBSc CHEMISTRY C303

19-12-11
1 HOUR

UNIT TEST-3

30 MARKS

Q1

- A Write a note on organometallic compounds Aluminum. [5]
B Discuss the preparation, properties and structure of organometallic compounds [5]
alkali metals.

OR

Q1

- A Give an account of organometallic compounds alkaline earth metals. [5]
B Write the general properties of organometallic compounds. [5]
Q2 Give a full account of metallocenes. [10]

OR

- Q2 Explain the preparation, properties and bonding in ferrocene. [10]
Q3 Give an account of olefinic complexes. [10]

OR

- Q3 Define organometallic compound. Discuss the general methods of preparation of organometallic compounds. [10]

Natubhai V. Patel College of Pure and Applied Sciences
Vallabh Vidyanagar
T.Y. B.Sc. Chemistry C-306
UNIT TEST 6

Date- 09-01-12
Duration - One hour

Total Marks-30

- Q-1
- (a) Differentiate physical adsorption and chemical adsorption. [05]
- (b) Derive equation for Gibbs adsorption isotherm. Give its significance. [05]

OR

- Q-1
- (a) Starting with assumption derive Langmuir adsorption isotherm equation. [05]
Also discuss its various forms in different condition.
- (b) Define: Adsorption, Adsorbent, Adsorbate, Adsorption isotherm, Sorption [05]

- Q-2
- (a) Discuss the phase diagram for sulphur system with help of suitable sketch. [05]
- (b) Write a note on Fractional Distillation. [05]

OR

- Q-2
- (a) Discuss the phase diagram for Water system with help of suitable sketch. [05]
- (b) Derive the Phase rule thermodynamically. [05]

- Q-3 [10]
1. Differentiate between adsorption and absorption.
 2. Discuss the influence of temperature & pressure on the process of adsorption.
 3. Define: Phase, Component
 4. Define: Polymorphism, Triple point.

OR

- Q-3 [10]
1. Write a note on Vanderwaals adsorption.
 2. Discuss Freundlich adsorption isotherm.
 3. Define: Degree of freedom, Monotropy.
 4. Define: Transition temperature, Enantiotropy.

N.V.PATEL COLLEGE OF PURE & APPLIED SCIENCES

5th UNIT TEST

WEDNESDAY, 2nd January, 2012

T.Y.B.Sc.

CHEMISTRY: C- 305

Duration : 1.0 Hrs

Maximum marks : 30

Q.1.

[A] Show that rate of anionic polymerization is second order with respect to monomer concentration. [5]

[B] Give the classification of polymer based on stereoisomerism. [5]

OR

Q.1

[A] Differentiate between thermoplasts & thermosets. [5]

[B] Discuss the kinetics of cationic polymerization. [5]

Q.2.

[A] Discuss the mechanism of cationic polymerization for isobutene. [5]

[B] What is the \overline{M}_n of a polymer prepared by the self polycondensation of p- hydroxy benzoic acid, if 99.5% of the functional groups react. [5]

OR

Q.2.

[A] In case of free radical chain polymerization, how is kinetic chain length related to monomer and initiator concentration? Deduce expression showing the relation. [5]

[B] (i) If \overline{M}_n for LDPE is 1,400,000. What is the value of degree of polymerization? [5]

(ii) The fractional conversion in an ester interchange reaction is 0.999. what would be the Degree of polymerization of the polymer produced.

Q.3.

[A] How will you distinguish addition polymerization method from condensation polymerization method [5]

[B] Derive Carothers's equation. [5]

OR

Q.3.

[A] Write the polymers & repeat units of the following monomers [5]

a) 2- methyl- 1,3- butadiene

b) Dimethyl Siloxane

c) Isobutene

d) Butadiene

e) Methacrylate

[B] Give reasons : "diamond structure do not possess polymeric properties while graphite structure possess typical polymeric properties. [5]