



UNIVERSITY OF THE PUNJAB

Roll No.

First Semester 2017
Examination: B.S. 4 Years Programme

PAPER: Chemistry-I (Physical Chemistry)
Course Code: CHEM-101 / CHM-11020/11304

TIME ALLOWED: 30 mins.
MAX. MARKS: 10

Attempt this Paper on this Question Sheet only.

OBJECTIVE

Q1. Each question has FOUR possible answers, encircle the right one: (1×10=10)

- I The unit of rate constant for first order reaction is
A $\text{dm}^3 \text{mol}^{-1} \text{sec}^{-1}$ B sec^{-1}
C sec^{-1} D $\text{dm}^{-3} \text{mol sec}^{-1}$
- II Movement of sol particle under an applied potential is called _____
A electro osmosis B electrophoresis
C electrolysis D ALL
- III Adiabatic process is one in which
A temperature of system remains constant B no heat enters or leaves the system
C no change in volume takes place D none
- IV Emulsion is formed when _____ is dispersed in _____.
A solid, liquid B liquid, solid
C liquid, liquid D solid, solid
- V For the adsorption of a gas on a solid, the plot of $\log x/m$ against $\log P$ is linear with slope equal to
A $1/n$ B $\log K$
C K D m
- VI Osmosis is the movement of water or solvent molecule from an area of _____ concentration of solute to area of _____ concentration of solute.
A high, low B low, high
C Both A and B D None
- VII Term "partial molar quantity" is used for _____.
A Solution B pure solvent
C Both A and B D none
- VIII Slope of plot for Arrhenius law gives _____.
A Enthalpy B Entropy
C activation energy D molar mass
- IX Critical temperature is the temperature for a gas _____ of which the gas can never be liquefied.
A Below B Above
C Both, A and B D None
- X Coordination number of Na^+ as well as Cl^- is
A 6 B 8
C 4 D 1



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Course Code: CHEM-101 / CHM-11020/11304

TIME ALLOWED: 2 hrs. & 30 mins.
MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

SUBJECTIVE

Q2. Write the short and concise answer for each question:

(2×10=20)

- Describe Collision frequency.
- What is meant by Magnetic susceptibility?
- Differentiate between Helmholtz and Gibbs free energy.
- Briefly describe X-Ray Diffraction.
- What is meant by ebullioscopic constant?
- Define " Heat capacity at constant pressure"
- Differentiate between macromolecules and micells
- what is Adsorption?
- Define "mean free path".
- Describe fractional distillation.

Questions With Brief Answers

(3 X 10 =30)

- Q. 3 Describe critical phenomena of gases and describe determination of P_c , V_c and T_c experimentally?
- Q. 4 Define is order of reaction and derive kinetic expression for second order reaction with different concentrations.
- Q. 5 What are colloids? Describe briefly following properties of colloids:
- Electro dialysis
 - Sedimentation
 - Tyndal Cone effect
 - Precipitation



UNIVERSITY OF THE PUNJAB

Roll No.

First Semester 2017
Examination: B.S. 4 Years Programme

PAPER: Fundamentals of Chemistry (Basic Chemistry)
Course Code: CHEM-111 / CHM-11121

TIME ALLOWED: 30 mins.
MAX. MARKS: 10

Attempt this Paper on this Question Sheet only.

SECTION I

Q. 1 Encircle the correct option in the following questions.

- Which hybridization leads to square planer structure?
(a) dsp^2 (b) d^2sp^3
(c) dsp^3 (d) dsp
- Which has more polar character?
(a) sp^3 hybridized (b) sp^2 hybridized
(c) sp hybridized (d) all are equal
- Phenol is
(a) Basic (b) Amphoteric
(c) Acidic (d) Neutral
- Which is a strong base?
(a) Aniline (b) Ammonia
(c) Nitrobenzene (d) None of above
- Which is taken as rate determining step in a chemical reaction?
(a) Fastest step (b) Intermediate Step
(c) Slowest step (d) rate cannot be determined
- Molecularity and order are identical for
(a) Complex reactions (b) Oxidation reactions
(c) Elementary reactions (d) Reduction reactions
- Davison and Germer experimentally shows that
(a) Mass of electron (b) Lignite
(c) Charge of electron (d) Wave nature of electron
- The explanation of photoelectric effect is given by
(a) Heisenberg (b) Einstein
(c) Rydberg (d) Plank
- Gases behave ideal at
(a) Low temperature (b) Critical temperature
(c) High temperature (d) None of above
- In radioactivity, which emission increases the atomic number?
(a) α emission (b) β emission
(c) γ emission (d) None of the above



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Course Code: CHEM-111 / CHM-11121

MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

SECTION II (2x10=20)

Q. No.2 Give answers to the short questions?

1. Differentiate between order and molecularity?
2. Define the term surface tension .what are its units
3. What is activation energy? Why it is so important?
4. How we can produce isotopes by radioactivity.
5. What do you understand about carbon dating?
6. Write resonance structures for aniline.
7. Why chloroacetic acid is stronger acid as compare to acetic acid?
8. Define most probable velocity.
9. Describe Mendeleev's periodic law.
10. Define critical parameters in liquefaction of gases.

SECTION III (6x5=30)

Q. No. 3 Attempt all the following long questions.

1. Derive kinetic gas equation $PV = \frac{1}{3} mNu^2$
2. Calculate the energy of an electron in hydrogen atom.
3. Briefly explain the reasons of variable valency.
4. How half life of a chemical reaction is calculated, derive the expression?
5. Write down the rules of resonance for drawing Lewis structures.
6. Write main difference between fission and fusion reactions, elaborate your answer with examples.



UNIVERSITY OF THE PUNJAB

Roll No.

Second Semester - 2017
Examination: B.S. 4 Years Programme

PAPER: Chemistry-II (Inorganic Chemistry)
Course Code: CHEM-103, CHM-12304

TIME ALLOWED: 30 mins.
MAX. MARKS: 10

Attempt this Paper on this Question Sheet only.

Objective

(1 × 10 = 10)

Note: Cutting, overwriting, use of pencil, ink removers and Blanko are not allowed.

Q. 1. Select the suitable option.

- Across period atomic size decreases due to
 - shielding effect
 - increase in nuclear force of attraction
 - photoelectric effect
 - decrease in nuclear force of attraction
- Lanthanides and actinides are also called _____.
 - normal elements
 - noble gases
 - Alkaline earth metals
 - inner transition elements
- Out of these four elements Na, Mg, Cl and Ar, which element has the highest ionization potential?
 - Na
 - Cl
 - Mg
 - Ar
- Which of the following pairs of elements are not diagonally related?
 - Lithium and Magnesium
 - Beryllium and Aluminium
 - Oxygen and Sulphur
 - Boron and Silicon
- Which of the following molecule has unpaired electrons in anti-bonding molecular orbitals?
 - O₂
 - Br₂
 - N₂
 - F₂
- On the basis of VSEPR theory, a molecule with three bond pair and no lone pair of electrons will have a structure
 - linear
 - tetrahedral
 - trigonal planar
 - trigonal pyramidal
- Molecular orbitals are filled with available electrons according to
 - Hund's rule
 - Aufbau principle
 - Pauli exclusion
 - All of above
- The electron pair acceptor-donor concept is called as
 - Bronsted-Lowery
 - Lux-Flood
 - Lewis
 - Usanovich
- Reactivity order of acidity of HF, HCl, HBr and HI acid is
 - HCl>HBr>HI> HF
 - HF>HCl>HBr> HI
 - HI>HBr>HCl> HF
 - HF>HI>HCl> HBr
- CFSE (high spin) for d⁷ ions is _____.
 - 1.8
 - 0.8
 - 1.8
 - 0.8



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Second Semester - 2017
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Roll No.

PAPER: Chemistry-II (Inorganic Chemistry)
Course Code: CHEM-103, CHM-12304

TIME ALLOWED: 2 hrs. & 30 mins.
MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

Q. 2. Answer the following short questions.

(2 × 10 = 20)

1. What is meant by periodicity of elements?
2. Chloride ion Cl^- is larger than Cl^0 but K^+ is smaller than K^0 . Why?
3. Distinguish between polarizability and polarity?
4. What are inner and outer transition elements?
5. Why HF is weaker than HCl in aqueous solution?
6. How does VSEPR concept explain the shape of SnCl_2 ?
7. Why water is a liquid at room temperature but H_2S is a gas?
8. Discuss the structure of AB_2E_2 type.
9. Arrange the following in decreasing basic strength?
 NH_3 , PH_3 and AsH_3
10. In each pair of acids, which is stronger and why?
 - a) CH_3COOH and HCOOH
 - b) $\text{C}_6\text{H}_5\text{COOH}$ and CH_3COOH

Q. 3. Briefly answer the following questions.

(3 × 10 = 30)

- (i) (a) Discuss the periodicity in the properties of outer transition and inner transition elements. **06**
- b) Give the postulates of VSEPR and explain the geometry of following: **04**
- i. AB_5
 - ii. AB_4E_2
- (ii) a) Draw the shapes of the following on the basis of MOT **05**
- i. O_2
 - ii. CO
- b) Discuss the splitting of d orbitals in tetrahedral field according to CFT. **05**
- (iii) Describe the soft and hard acid-base SHAB concept and its applications in detail. **10**



UNIVERSITY OF THE PUNJAB

Roll No.

Third Semester 2017
Examination: B.S. 4 Years Programme

PAPER: Chemistry-III (Organic Chemistry)
Course Code: CHEM-201/CHM-21304

TIME ALLOWED: 30 mins.
MAX. MARKS: 10

Attempt this Paper on this Question Sheet only.

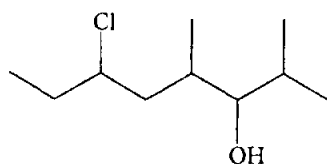
OBJECTIVE TYPE

Q1. Choose suitable answer. (10)

1. Which of the following term relates to angular momentum of the electron and shape of molecule.

- a. Spin Quantum number 2. Magnetic quantum Number 3. Azimuthal Quantum number
4. Spin Quantum Number

2. How many stereocenter are present in compound shown below?



- (a) 1 (b) 2 (c) 3 (d) 4

3. Which of the following compound would show hydrogen bonding?

- a. Chlorine gas b. Methane c. Propane d. Propanol

4. Which of the following compound could exhibit intra-molecular hydrogen bonding?

- a. *p*-hydroxybenzaldehyde b. Acetic acid c. Acetylacetone d. Oxalic acid

5. Appropriate hybridization schemes for the C atoms in molecular CH₃CO₂H are:

- a. sp² and sp² b. sp² and sp³ c. sp³ and sp² d. sp³ and sp³

6. Unit of dipole moment is:

- a. Debye b. Poise c. Pascal d. Newton

7. Which of the following compound would not give an alkene on dehydrohalogenation in elimination reaction.

- a. C₆H₅CH₂Br b. CH₃CH₂Br c. CH₃CHBrCH₃ d. C₆H₅CHBrCH₃

8. Inversion of configuration at one chiral carbon of a molecule having more than one chiral carbon atom is known as.

- a. tautomerization b. racemization c. epimerization d. None of them

9. Walden inversion is observed in which of the following reaction.

- a. S_Ni b. S_N2 c. S_N1 d. S_N1 & S_N2

10. On reaction of glycerol with 2 moles of periodic acid, the final product:

- a. Formaldehyde b. Formic acid c. Methanol d. a & b



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Roll No.

PAPER: Chemistry-III (Organic Chemistry)
Course Code: CHEM-201/CHM-21304

TIME ALLOWED: 2 hrs. & 30 min.
MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

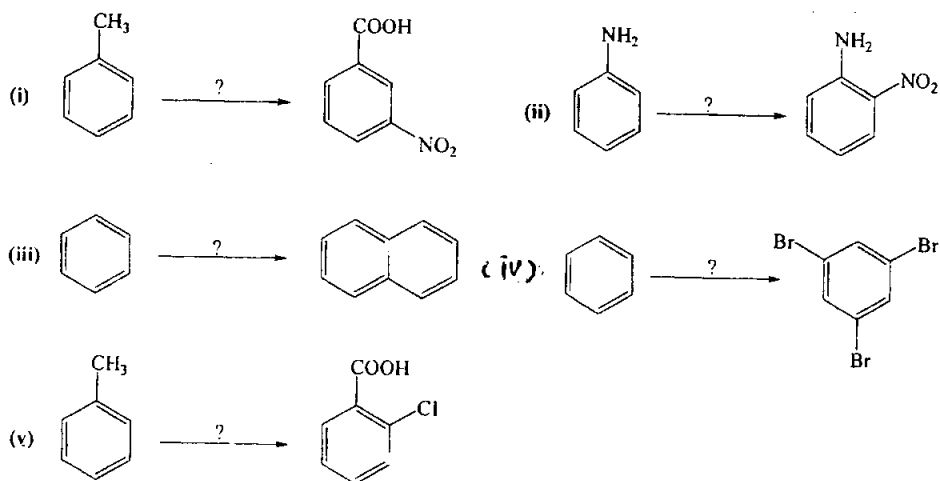
SUBJECTIVE TYPE

Q2. Give brief answers to the following question.

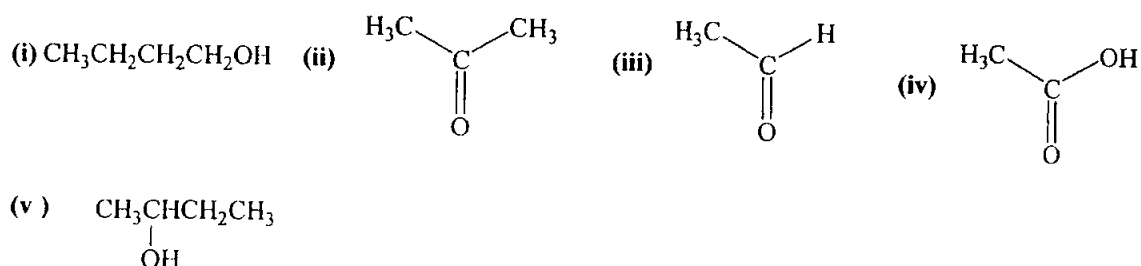
1. Why boiling point of p-hydroxybenzaldehyde is higher than salicylaldehyde. (2)
2. What is difference between racemization and epimerization? (2)
3. Why iodoacetic acid is more acidic than acetic acid. Explain. (2)
4. How could you differentiate between nonaromatic and antiaromatic compounds by Huckel rule? (2)
5. Why isobutylene is more stable than 1-butene? (2)
6. Why tertiary alcohol reacts with HBr faster than secondary alcohol. (2)
7. How would you distinguish between Primary, Secondary and tertiary alcohols with chemical equation by different sets of test. (6)
8. How will you prepare n-propylbromide from propylene. (2)

Q3. (a) Explain the mechanism, kinetic and stereochemistry of S_N1 and S_N2 reaction and discuss also effect of leaving groups and nature of solvent on rates of S_N1 and S_N2 reactions (10)

(b) How will you bring about following transformations? Write equations for the steps involved. (10)



(c) How can you prepare each of the following product by a reaction involving Grignard reagent, CH_3MgBr ? (5)



(d) Draw the structural formula for the following compounds? (5)

- (i) 3-Methyl-1-butene
- (ii) 2,5-Dimethyl-3-hexyne
- (iii) Hydroquinone
- (iv) Picric acid
- (v) Isobutyl iodide



UNIVERSITY OF THE PUNJAB

Roll No.

Fourth Semester - 2017

Examination: B.S. 4 Years Programme

PAPER: Chemistry-IV (General Chemistry)

TIME ALLOWED: 30 mins.

Course Code: CHEM-203 / CHM-22304

MAX. MARKS: 10

Attempt this Paper on this Question Sheet only.

(OBJECTIVE TYPE)

- Q.1 Encircle the most suitable answer from the given options. 10
- i) The aldehyde with α -hydrogen usually undergo
- Cannizarro's Reaction
 - Disproportionation reaction
 - Aldol condensation
 - Both a and b
- ii) Order of reactivity of the functional derivatives of carboxylic acids is
- Acid chlorides > acid anhydride > esters > amides
 - Acid anhydride > acid chloride > amides > esters
 - Acid Chlorides > esters > amides > acid anhydrides
 - Estes > amides > acid chlorides > acid anhydrides
- iii) Quantum Mechanics is branch of science that deals with
- Motion of micro-particles
 - Stability of Micro-particles
 - Both a and b
 - None of these
- iv) Conduction due to free ions is called
- Electronic Conduction
 - Electrolytic Conduction
 - Metallic Conduction
 - There is no conduction due to free ions
- v) The concept of orbital is explained by _____ quantum number
- Principal
 - Azimuthal
 - Magnetic
 - Spin
- vi) Which of the following spectral region has highest wavenumber (cm^{-1})
- Gamma rays
 - X-rays
 - UV
 - Microwaves

P.T.O.



UNIVERSITY OF THE PUNJAB

Fourth Semester - 2017

Examination: B.S. 4 Years Programme

Roll No.

PAPER: Chemistry-IV (General Chemistry)

TIME ALLOWED: 2 hrs. & 30 mins.

Course Code: CHEM-203 / CHM-22304

MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

(SUBJECTIVE TYPE)

Q.2 Short Questions

2x10 = 20

- i. Give the mechanism of addition of phenyl hydrazine in acetaldehyde.
- ii. What are Acidic and Basic buffers?
- iii. Differentiate between Mean and Median for any given data set.
- iv. What is the basic principle of IR Spectroscopy?
- v. What is Cell Constant? How it is measured?
- vi. Write down Hittort's rule for migration of ions.
- vii. Give two defects of Bohr's Model.
- viii. Give two chemical tests detection of aldehydes and ketones.
- ix. How acetaldehyde is converted in to Lactic Acid?
- x. What are acid anhydrides? How these are forme

Q.3 Extensive Questions

30

- a) Give four application of Kohlrausch's law? (5)
- b) Briefly explain the concept of Solubility product. (5)
- c) Derive energy equation for particle motion in one dimension. (5)
- d) Explain the difference between Single and Double beam UV spectrophotometer. (5)
- e) What is Wittig reaction? Give suitable equation and mechanism. (5)
- f) Give four applications if IR Spectroscopy. (5)



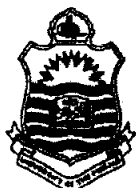
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OBJECTIVE TYPE

Q.1.MCQS

(1x10=10)

- i. Schrodinger wave equation is the basis of quantum mechanics and is based on the following concept
(a) wave nature of electron (b) probability to find the electron
(c) standing wave of electron (d) fixed orbits of electron around the nucleus
- ii. The difference of energy levels in one dimensional box
(a) goes on decreasing from lower to the higher levels
(b) goes on increasing from lower to the higher levels
(c) remain the same from lower to the higher levels
(d) are irregular from lower to higher levels
- iii. The graphical picture of Ψ^2 and Ψ in one dimensional box
(a) is similar (b) is different
(c) depend upon the mass of particle (d) does not depend upon the width of box
- iv. The derivation of principal quantum number can be done from which part of Schrodinger wave equation?
(a) R part of equation (b) σ part of equation
(c) ϕ part equation (d) Any of these
- v. In a first-order reaction, $A \rightarrow$ products, $[A] = 0.620$ M initially and 0.520 M min
What is the half-life $t_{1/2}$, of this reaction?
(a) 7.50 min (b) 46.5 min
(c) 29.6 min (d) 59.2 min
- vi. Which of the following does NOT affect the rate of a chemical reaction?
(a) enthalpy of the reaction (b) concentration of reactants
(c) temperature (d) surface area
- vii. Which out of the following will decompose on passing electric current?
(a) glucose (b) urea
(c) silver nitrate (d) ethyl alcohol
- viii. The distance between two electrodes of a cell is 3.0 cm and area of each electrode is 6.0 cm^2 . The cell constant is?
(a) 2.0 (b) 1.0
(c) 0.5 (d) 18
- ix. When a strong acid is titrated against a strong base the end point is the point of
(a) zero conductance (b) maximum conductance
(c) minimum conductance (d) none of these
- x. The necessary conditions for the working of electrolytic cell is
(a) voltmeter (b) salt bridge
(c) power supply (d) an aqueous solution



UNIVERSITY OF THE PUNJAB

Fifth Semester - 2017

Examination: B.S. 4 Years Programme

Roll No.

PAPER: Physical Chemistry
Course Code: CHEM-301

TIME ALLOWED: 2 hrs. & 30 mins.
MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

SUBJECTIVE TYPE

Section I

Q.2- Attempt all Short question

(2 × 10)

- i. What is the difference between activity and concentration?
- ii. Explain the significance of Quantum mechanics.
- iii. Explain, "order of reaction can be zero but molecularity cannot be".
- iv. Justify : the reactions in solution phase are faster than those in gas phase.
- v. Explain factors affecting the rate of reaction.
- vi. Explain variation of equivalent conductance with dilution.
- vii. What are the units of rate constant for third order reaction having same concentrations of all the reactants?.
- viii. What is cell constant?
- ix. Why the position and velocity of a micro particle cannot be determined with accuracy?
- x. What is Quantum mechanics? Explain its significance.

Section II

Attempt all questions

- Q. 3. What is opposed reaction? Derive the kinetic expression for 1st order opposed by 1st order reaction. Derive its units. (10)
- Q.4. (a) Derive an expression for Debye-Huckel law for weak electrolytes? (6)
(b) What is activity coefficient? Determine the activity coefficient for sparingly soluble electrolytes? (4)
- Q5. (a) Give mathematical quantum mechanical description of diatomic rigid rotators.(7)
(b) Discuss the concept of normalized wave function. (3)



PAPER: Inorganic Chemistry

Course Code: CHEM-303

TIME ALLOWED: 30 mins.

MAX. MARKS: 10

NOTE:- Attempt all the questions on a separate sheet. No mark on question paper except your Roll Number. Cutting, overwriting or use of remover is not allowed.

OBJECTIVE

(1 x 10 = 10)

Choose the correct answer

- i) The $[\text{Co}(\text{NH}_3)_6]^+$ complex ion is a _____.
- a) High spin complex b) Low spin complex
c) Coordination complex d) Both a & c
- ii) The CFSE for tetrahedral complexes (Δ_t) is lesser than CFSE for octahedral complexes (Δ_o); the relationship is _____.
- a) $\Delta_t = 4/9\Delta_o$ b) $\Delta_o = 4/9\Delta_t$ c) $\Delta_t = 9/4\Delta_o$ d) None of these
- iii) In octahedral complexes the *eg* orbitals are called _____.
- a) Nonbonding orbitals b) Bonding orbitals
c) Antibonding orbitals d) None of these
- iv) According to VSEPR theory, the geometry of I_3^- is:
- a) Trigonal Planar b) Tetrahedral c) Pyramidal d) Linear
- v) According to CFT, how many unpaired electron are present in complex $[\text{Fe}(\text{CN})_6]^{3-}$?
- a. 1 b. 2 c. 3 d. 4
- vi) The molecule of _____ has tetrahedral geometry.
- a) BF_3 b) NH_4^+ c) SO_3 d) PbCl_2
- (vii) Insulators, such as diamond and phosphorous do not conduct electricity because they have _____.
- a) small forbidden zone b) large forbidden zone
c) large energy zone d) small energy zone
- viii) According to CFT, how many unpaired electron are present in complex $[\text{Fe}(\text{CN})_6]^{3-}$?
- a. 1 b. 2 c. 3 d. 4
- ix) According to VSEPR theory, the geometry of I_3^- is:
- a) Trigonal Planar b) Tetrahedral c) Pyramidal d) Linear
- x) The Magic number of Co in $[\text{Co}(\text{CO})_4]^-$ is:
- a. 6 b. 7 c. 8 d. 9



UNIVERSITY OF THE PUNJAB

Fifth Semester - 2017

Examination: B.S. 4 Years Programme

Roll No.

PAPER: Inorganic Chemistry

TIME ALLOWED: 2 hrs. & 30 mins.

Course Code: CHEM-303

MAX. MARKS: 50

NOTE:- Attempt all the questions on a separate sheet. No mark on question paper except your Roll Number. Cutting, overwriting or use of remover is not allowed.

SECTION-I

SHORT QUESTIONS

(2 x 10 = 20)

- i) Differentiate between Conductors, Semiconductors and Insulators on the basis of Band theory?
- ii) Why CO is known as π acceptor ligand?
- iii) Give two limitations of Valence Bond Theory.
- iv) Draw M.O diagram of $[\text{Co}(\text{NH}_3)_6]^3+$?
- v) What are Chelates?
- vi) Draw molecular orbital diagram of oxygen.
- vii) Differentiate between $N(E)$ and $n(E)$ curves?
- viii) What are inner orbital complexes? Give an example?
- ix) O_2 is paramagnetic while O_2^{2-} is diamagnetic. Explain on the basis of MOT
- x) Sodium is a good conductor of electricity while Silicon is a semi-conductor. why?

SECTION-II

SUBJECTIVE

(5 x 6 = 30)

- i) Discuss splitting of d-orbitals in Tetrahedral complexes according to CFT.
- ii) Give an account of important features which influence the magnitude of Δ_0 or $10 Dq$?
- iii) Discuss Metallic bond on the basis of band theory.
- iv) Describe the preparation and structure of $\text{Mn}_2(\text{CO})_{10}$.
- v) Explain the soft X-ray spectra
- vi) Describe the bonding in metal carbonyls on the basis of IR.



Attempt this Paper on this Question Sheet only.

OBJECTIVE TYPE

Q. No 1. Answer the following questions.

(1 x 10)

- Among the following, the strongest halogenated fatty acid is
 - Iodoacetic acid
 - Bromoacetic acid
 - Chloroacetic acid
 - Fluoroacetic acid
- Point out the correct order of increasing acid strength among the following:
 - Water > formic acid > methanol
 - Methanol > water > formic acid
 - Water > methanol > formic acid
 - Formic acid > water > methanol
- Indicate the correct order of increasing acid strength
 - Formic acid < oxalic acid < acetic acid
 - Oxalic acid < formic acid < acetic acid
 - Acetic acid < oxalic acid < formic acid
 - Acetic acid < formic acid < oxalic acid
- Ethylamine ($C_2H_5-NH_2$) is a stronger base than acetamide ($CH_3-CO-NH_2$). The reason is
 - $C_2H_5-NH_2$ is a primary amine.
 - The pair of electron on nitrogen in ethylamine is localized while the pair of electrons on nitrogen in acetamide is delocalized.
 - $CH_3-CO-NH_2$ is not a conjugated system.
 - $C_2H_5-NH_2$ is an unstable compound.
- What is the correct order of increasing basicity of NH_3 , CH_3NH_2 , $(CH_3)_2NH$ and $(CH_3)_3N$
 - $(CH_3)_3N < NH_3 < CH_3NH_2 < (CH_3)_2NH$
 - $NH_3 < CH_3NH_2 < (CH_3)_2NH < (CH_3)_3N$
 - $NH_3 < (CH_3)_3N < CH_3NH_2 < (CH_3)_2NH$
 - $CH_3NH_2 < (CH_3)_2NH < (CH_3)_3N < NH_3$
- What is the total no of isomers for the compounds of the formula C_4H_8O ?
 - 4
 - 6
 - 3
 - 2
- Which compound will show optical isomerism?

P.T.O.

- a) 2-Amino butane
 - b) Lactic acid
 - c) 2-Butanol
 - d) All of these.
8. Which one of the following will not cause rigidity in the molecule for geometric isomerism to developed?
- a) Carbon-carbon double bond
 - b) A cyclic ring
 - c) Carbon-nitrogen double bond
 - d) A carbon-oxygen double bond
9. What is the number of isomers of $C_2H_2Cl_2$ including cis-trans isomers?
- a) 4
 - b) 3
 - c) 2
 - d) 5
10. What type of isomerism is exhibited by maleic and fumaric acid?
- a) Functional isomerism
 - b) Cis-trans isomerism
 - c) Optical isomerism
 - d) Position isomerism



UNIVERSITY OF THE PUNJAB

Fifth Semester - 2017

Examination: B.S. 4 Years Programme

Roll No.

PAPER: Organic Chemistry
Course Code: CHEM-305

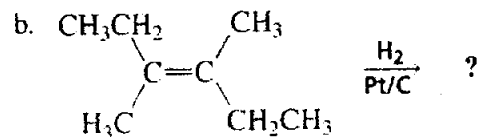
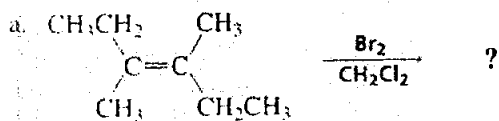
TIME ALLOWED: 2 hrs. & 30 mins.
MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

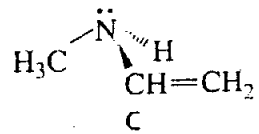
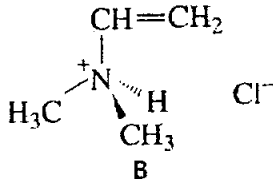
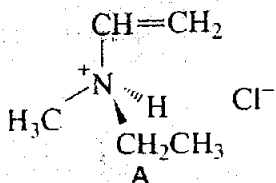
SUBJECTIVE TYPE

Q. No 2. Answer the following questions. (5 x 4 = 20)

- a) Draw the stereoisomers of 2,4-dichlorohexane. Indicate pairs of enantiomers and pair of diastereomers.
- b) Draw and name the four stereoisomers of 1,3-dichloro-2-butanol using
- a) Perspective formulas b) Fisher projections
- c) What stereoisomers would you expect to obtain from each of the following reactions?



- d) Compound A has two stereoisomers, but compounds B and C exist as single compounds. Explain.



Q. No. 3. Answer the following questions.

- a) Complete the following reactions and draw their complete mechanism. (5 x 2 = 10)
- a) $\text{CH}_2=\text{CHCH}_2\text{CH}_2\text{CH}_2\text{COCH}_3 \rightarrow \text{HOCH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{COCH}_3$
- b) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{C}\equiv\text{CH} \rightarrow \text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CHOHCH}_3$
- b) What carbonyl compound and what phosphonium ylide are required for the synthesis of the following alkenes. Explain with the help of mechanism.? (5 x 2 = 10)
- a) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}=\text{C}(\text{CH}_3)_2$
- b) $(\text{C}_6\text{H}_5)_2\text{C}=\text{CHCH}_3$
- c) Write details, mechanism, examples and synthetic applications of following reactions. (5 x 2 = 10)
- a) Knoevenagel condensation
- b) Darzen glycidic ester condensation



UNIVERSITY OF THE PUNJAB

Roll No.

Fifth Semester 2017

Examination: B.S. 4 Years Programme

PAPER: Analytical Chemistry

TIME ALLOWED: 30 mins.

Course Code: CHEM-307

MAX. MARKS: 10

Attempt this Paper on this Question Sheet only.

OBJECTIVE TYPE

MCQs

Q 1. Each question has four possible answers. Encircle the right answer. (1x 10)

1. 'S' represented for a :

- (a) Infinite set of experimental Data (b) Finite set of experimental Data
(c) both (a) and (b) (d) none of these

2. 1 PPM is equal to ;

- (a) $\mu\text{g} / \text{ml}$ (b) mg / L (c) Part / millions (d) All of these

3. which spectral changes occur when absorption maximum shifted to shorter wavelength.

- (a) Bathochromic shift (b) Hypochromism (c) Hyperchromism (d) Hypsochromic shift

4. At isobetic point the absorption of all species _____.

- (a) Same (b) different (c) varies with temperature (d) All

5. For uv region sources which type of window is used.

- (a) Glass (b) quartz (c) fused silica (d) Both (b) and (c)

6. Maximum absorption of potassium permagnate in the green region of the spectrum is _____.

- (a) 360 nm (b) 525 nm (c) 283 nm (d) 780 nm

7. Which resin is used for making replica grating .

- (a) vinyl ester resin (b) polyester (c) Epoxy resin (d) None

8. Location of metallic ions of II and IV group elements is mostly carried out by using.

- (a) Ninhydrin (b) H_2S (c) Iodine vapours (d) Aniline hydrogen phthalate

9. In dipping method slurry is prepared by shaking silica gel with

- (a) chloroform (b) methanol (c) butanol (d) Both a and b

10. Quantitative estimation in coulomb chromatography include methods

- (a) Physical (b) Extrusion (c) Elution (d) Both b and c



UNIVERSITY OF THE PUNJAB

Fifth Semester 2017
Examination: B.S. 4 Years Programme

Roll No.

PAPER: Analytical Chemistry
Course Code: CHEM-307

TIME ALLOWED: 2 hrs. & 30 mins.
MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

SUBJECTIVE TYPE

SHORT QUESTIONS

Q2) Attempt all short questions (2x10)

- (i) What is the main functions of binder in TLC ?
- (ii) Why Rf values are calculated immediately after the spots are visualized ?
- (iii) What is the difference between molality and molarity ?
- (iv) Give formula of ninhydrin ?
- (v) what is meant by reverse phase chromatography ?
- (vi) Differentiate between adsorption and partition chromatography ?
- (vii) What is the difference between spectrometer and spectrophotometer ?
- (viii) what is meant by Beer's law ?
- (ix) Correlate the relative error and relative accuracy ?
- (x) What is eutropic series of common solvents in chromatography ?

LONG QUESTIONS

Attempt all questions

- Q.3 Give detail view of instrumentation of spectrophotometer . (10)
- Q.4 Give comparison of TLC and paper chromatography (10)
- Q.5(a) Differentiate between deviation and standard deviation and relative standard deviation (6)
- (b) Explain confidence limit (4)



Attempt this Paper on this Question Sheet only.

OBJECTIVE TYPE

- Q.1 Encircle the most suitable answer from the given options. 10
- i) Which of the following cannot cause water hardness
 - a) Calcium chloride
 - b) Calcium carbonate
 - c) Calcium bicarbonate
 - d) None of these

 - ii) During evaporation, heating is done at reduced pressure, this is important
 - a) To evaporate water at a high rate
 - b) To avoid thermal degradation of substance
 - c) To minimize the consumption of steam
 - d) None of these

 - iii) Use of sodium hexametaphosphate to avoid boiler scaling can be classified as
 - a) Mechanical treatment
 - b) Internal Treatment
 - c) External Treatment
 - d) None of these

 - iv) The formula of slacked lime is
 - a) Na_2SO_4
 - b) $\text{Ca}(\text{OH})_2$
 - c) NaOH
 - d) $\text{CO} + \text{H}_2$

 - v) If the water contains less than $60\text{mg CaCO}_3/\text{L}$, then the water is said to be
 - a) Soft
 - b) Hard
 - c) Very hard
 - d) Can't Judge

 - vi) In Modified Lime Soda process which chemical is used
 - a) $\text{Ca}(\text{OH})_2$
 - b) $\text{Zn}(\text{OH})_2$
 - c) $\text{Ba}(\text{OH})_2$
 - d) $\text{Mg}(\text{OH})_2$

 - vii) What is the formula of fuming Sulphuric Acid
 - a) $\text{H}_2\text{SO}_4 + \text{SO}_2$
 - b) $\text{H}_2\text{SO}_4 + \text{HNO}_3$
 - c) $\text{H}_2\text{SO}_4 + \text{SO}_3$
 - d) $\text{H}_2\text{SO}_3 + \text{SO}_2$

 - viii) Quick setting of cement is produced by addition of
 - a) Lime
 - b) Aluminum sulphate
 - c) Gypsum
 - d) Silicon oxide

 - ix) When Gypsum is added, setting time of cement
 - a) Increases
 - b) Decreases
 - c) Remains Same
 - d) None of these

 - x) Laser-Diffraction analysis is used to measure the:
 - a) Particle Size
 - b) Quality of material
 - c) Quantity of material
 - d) None of these



UNIVERSITY OF THE PUNJAB

Fifth Semester 2017
Examination: B.S. 4 Years Programme

Roll No.

PAPER: Applied Chemistry
Course Code: CHEM-309

TIME ALLOWED: 2 hrs. & 30 mins.
MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

SUBJECTIVE TYPE

Q.2 Short Questions

2x10 = 20

- i. Draw a labelled diagram of NELSON'S CELL.
- ii. What is the Principle of REVERSE OSMOSIS
- iii. What is BOILER SCALE? Give its types
- iv. Give any two types of SPECIAL CEMENT
- v. Write down different methods used for SIZE REDUCTION?
- vi. What is CLINKER?
- vii. Describe the softening of water by CLARK's method.
- viii. Differentiate between CONDUCTION and COVENTION.
- ix. Differentiate between ALKALINE and NON-ALKALINE hardness.
- x. How WATER HARDENSS can be measured?

Q.3 Extensive Questions

30

- a) How CEMENT is manufactured? (5)
- b) How sulfuric acid is prepared by LEAD CHAMBER PROCESS? (5)
- c) Write a note on water DEMINERALIZATION/DEIONIZATION. (5)
- d) Discuss the role of MULTIPLE EFFECT EVAPORATORS in industry. (5)
- e) Discuss SETTING of CEMENT. (5)
- f) Give the CHEMICAL and MECHANICAL methods for the removal of BOILER SCALES. (5)



Attempt this Paper on this Question Sheet only.

OBJECTIVE TYPE

1. Encircle the most suitable answer from the given options. 10
- i) Mitochondrial DNA is
 - a) Circular double stranded
 - b) Circular single stranded
 - c) Linear double helix
 - d) None of these
 - ii) The general formula of MONOSACCHARIDES is
 - a) $C_nH_{2n}O_n$
 - b) $C_{2n}H_2O_n$
 - c) $C_nH_2O_{2n}$
 - d) $C_nH_{2n}O_{2n}$
 - iii) In glucose the orientation of the —H and —OH groups around the carbon atom 5 adjacent to the terminal primary alcohol carbon determines
 - a) D or L series
 - b) Dextro or levorotatory
 - c) α and β Anomers
 - d) Epimers
 - iv) The number of isomers of glucose is
 - a) 2
 - b) 4
 - c) 8
 - d) 16
 - v) α -D-glucose and β -D-glucose are
 - a) Stereoisomers
 - b) Epimers
 - c) Anomers
 - d) Keto-aldo pairs
 - vi) A nucleoside consists of
 - a) Nitrogenous base
 - b) Purine or pyrimidine base + sugar
 - c) Purine or pyrimidine base + phosphorous
 - d) Purine + pyrimidine base + sugar + phosphorous
 - vii) The carbon of the pentose in ester linkage with the phosphate in a nucleotide structure is
 - a) C_1
 - b) C_3
 - c) C_4
 - d) C_5
 - viii) In RNA molecule
 - a) Guanine content equals cytosine
 - b) Adenine content equals uracil
 - c) Adenine content equals guanine
 - d) Guanine content does not necessarily equal its cytosine content.
 - ix) Important buffer system of extracellular fluid is
 - a) Bicarbonate/carbonic acid
 - b) Disodium hydrogen phosphate/sodium dihydrogen phosphate
 - c) Plasma proteins
 - d) Organic Phosphate
 - x) Which one is the heaviest particulate component of the cell?
 - a) Nucleus
 - b) Mitochondria
 - c) Cytoplasm
 - d) Golgi apparatus



UNIVERSITY OF THE PUNJAB

Fifth Semester 2017
Examination: B.S. 4 Years Programme

Roll No.

PAPER: Bio Chemistry
Course Code: CHEM-311

TIME ALLOWED: 2 hrs. & 30 mins.
MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

SUBJECTIVE TYPE

- Q.2 Short Questions** 2x10 = 20
- i. Define MUTAROTATION.
 - ii. What are reducing sugars? Give example.
 - iii. Differentiate between AMYLOSE and AMYLOPECTIN?
 - iv. Write two Functions of DNA.
 - v. Differentiate between PROTEOGLYCANS and GLYCOPROTEINS?
 - vi. What are weak acids? Give example.
 - vii. What are OLIGONUCLEOTIDES?
 - viii. Name two buffers in biological system.
 - ix. Draw the structure of ADENINE.
 - x. What is a GLYCOSIDIC BOND?
- Q.3 Extensive Questions** 30
- (a) (5+5=10)
- i) Explain importance of Buffers in biological system.
 - ii) Write complete composition of cell wall.
- (b) (5+5=10)
- i) Explain in detail different types of RNA.
 - ii) Write structure and functions of DNA.
- (c) (10)
- i) Explain the classification of carbohydrates in detail.



Attempt this Paper on this Question Sheet only.

Section I (Objective)

Q. 1 Select correct choice from given four options. (1×10=10)

(i) The linear form of Arrhenius equation $k = Ae^{-\frac{E_a}{RT}}$ can be written as

(a) $\ln A = -\frac{E_a}{R} \frac{1}{T} + \ln k$

(b) $E_a = -\frac{k}{T} + A$

(c) $\ln k = -\frac{E_a}{R} \frac{1}{T} + \ln A$

(d) None of these

(ii) The SI units of pre-exponential factor A in equation $k = Ae^{-\frac{E_a}{RT}}$ for zero order reaction are

(a) $M^{-1}S^{-1}$

(b) $M^{-2}S^{-1}$

(c) MS^{-1}

(d) None of these

(iii) The pre-exponential factor A in equation $k = Ae^{-\frac{E_a}{RT}}$ is the rate constant at

(a) Absolute zero

(b) Infinite temperature

(c) Room temperature

(d) None of these

(P.T.O.)

- (iv) The SI units of enthalpy of a process are
(a) K mol^{-1} (b) J mol^{-1} (c) $\text{m}^2 \text{ mol}^{-2}$ (d) mol m^{-2}
- (v) The mathematical relation between Gibbs energy and Equilibrium constant is
(a) $\Delta G = RT \ln K$ (b) $\Delta G = -RT \ln K$ (c) $\Delta G = R \ln K$ (d) $\Delta G = T \ln K$
- (vi) In a reversible process entropy of the universe is always
(a) Increasing (b) Decreasing (c) Remains same (d) None of these
- (vii) Free energy change for spontaneous mixing of two gases must be
(a) zero (b) +ve (c) -ve (d) maximum
- (viii) The mathematical formulation of Sterling's approximation is
(a) $\ln x! = x \ln x - x$ (b) $x = x \ln x$ (c) $\ln x! = \ln x^2$ (d) None of these
- (ix) The units of rate constant for 1st order reaction are
(a) Sec^{-1} (b) K kg mol^{-2} (c) K kg mol (d) $\text{K kg}^{-1} \text{ mol}$
- (x) Bronsted- Bjerrum equation is related to
(a) Collision theory (b) ionic reactions in solution (c) magnetic field (d)
Relaxation methods



UNIVERSITY OF THE PUNJAB

Sixth Semester - 2017
Examination: B.S. 4 Years Programme

Roll No.

PAPER: Physical Chemistry
Course Code: CHEM-313

TIME ALLOWED: 2 hrs. & 30 mins.
MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

Note: Attempt all questions.

Section II (Subjective)

Q. 2 Answers the following short questions: (2×10=20)

- Define the term partition function.
- What are ionic reactions?
- Entropy is state function. Comment.
- Give a mathematical relation between standard Gibbs energy and equilibrium constant.
- What is the effect of temperature on rate constant?
- What are ideal gases?
- How can you determine pre-exponential factor from Arrhenius equation?
- What is difference between translational and rotational partition functions?
- Give significance of Barometric formula.
- What do you understand by cage effect?

Q.3 (a) State and explain Nerst heat Theorem. (5)

(b) Derive two Maxwell relations. (5)

Q.4 (a) What is Eyring equation? How can you determine Eyring parameters experimentally using Eyring equation? (5)

(b) Give five postulates of Collision theory. (5)

Q.5 (a) What is partition function? Give its significance. (5)

(b) Discuss effect of temperature and altitude on vertical distribution of particles. (5)



UNIVERSITY OF THE PUNJAB

Sixth Semester - 2017

Examination: B.S. 4 Years Programme

Roll No.

PAPER: Inorganic Chemistry
Course Code: CHEM-315

TIME ALLOWED: 2 hrs. & 30 mins.
MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

SECTION II

Q.2 Short Questions (20)

- i. Write down two main uses of Lanthanides.
- ii. Mention any two applications of inorganic compounds in biological system.
- iii. Briefly narrate the occurrence of actinides in earth crust?
- iv. What are inner transition elements?
- v. Calculate Z_{eff} for 4s electrons in Cobalt ($Z=27$).
- vi. What is hybridization in XeF_6 molecule in solid state?
- vii. How CFT is superior to VBT?
- viii. Draw the structures for following systems as per VSEPR model
 - i) AB_4E_2
 - ii) AB_3E_3
- ix. Define the term Ferromagnetism.
- x. What is stability constant?

Note: Attempt all questions.

Q.3. Discuss and compare the structures of following coordination compounds on the basis of MOT. 10

- i. $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$
- ii. $[\text{Fe}(\text{CN})_6]^{4-}$

Q.4. What is lanthanide contraction? Discuss the phenomenon in detail along with its consequences? 10

Q.5. a). Briefly discuss Jahn Teller distortion Theorem? 05

b). Write a note on four electrons-three centred bonds 05



Attempt this Paper on this Question Sheet only.

OBJECTIVE

Q.1 Each question has four possible answers. Choose the correct answer and encircle

- it. (1 × 10 = 10)
- i) The element with maximum percentage in monazite mineral is
 - a. Sm
 - b. La
 - c. Gd
 - d. Ce
 - ii) Which of the following has maximum number of unpaired electrons?
 - a. Fe³⁺
 - b. Co²⁺
 - c. Co³⁺
 - d. Fe²⁺
 - iii) According to VSEPR theory, the geometry of I₃⁻ is;
 - a) Trigonal Planar
 - b) Tetrahedral
 - c) Pyramidal
 - d) Linear
 - iv) Which of the following geometry is not consistent with a coordination number 8?
 - a) Dodecahedral
 - b) Squareantiprismatic
 - c) Hexagonal pyramidal
 - d) Bicappedtrigonal prismatic
 - v) In which complex ion, does the metal ion possess a d⁶ configuration?
 - a) [Fe(CN)₆]³⁻
 - b) [CoCl₄]²⁻
 - c) [Ni(OH₂)₆]²⁺
 - d) [MnF₆]²⁻
 - vi) Which of the following series contains *only* paramagnetic metal ions?
 - a) La³⁺, Ce³⁺, Sm³⁺
 - b) Sm³⁺, Ho³⁺, Lu³⁺
 - c) Ce³⁺, Eu³⁺, Yb³⁺
 - d) La³⁺, Gd³⁺, Eu³⁺
 - vii) Acetylacetonate (Ac.ac) is a-----, Ligand.
 - a) Monodentate
 - b) Bidentate
 - c) Quadridentate
 - d) Hexadentate
 - viii) The structure of IF₇ is.
 - a) octahedral
 - b) Pentagonal bipyramidal
 - c) square pyramidal
 - d) TrigonalPrismatic
 - ix). Which of the following has the least bond angle
 - (a) NH₃
 - (b) BeF₂
 - (c) H₂O
 - (d) CH₄
 - x) The %age of U²³⁵ in naturally occurring uranium is,
 - a. 0.50%
 - b. 0.71%
 - c. 2.0%
 - d.5.0%



UNIVERSITY OF THE PUNJAB

Roll No.

Sixth Semester - 2017

Examination: B.S. 4 Years ProgrammePAPER: Organic Chemistry
Course Code: CHEM-317TIME ALLOWED: 30 mins.
MAX. MARKS: 10*Attempt this Paper on this Question Sheet only.*

Note: Attempt all questions

Q. NO. 1. Tick the most suitable option. (10)

- I. Phenylbenzoate can be prepared from Benzophenone using peracid by?
- a) Oppenauer oxidation b) Swern oxidation
c) Baeyer-Villiger oxidation d) Jones oxidation
- II. Secondary alcohol can be converted to ketone by which of the following reaction?
- a) Oppenauer oxidation b) Swern oxidation
c) Baeyer-Villiger oxidation d) OsO₄ oxidation
- III. Alkynes can be converted to *trans*-alkenes by which of the following method?
- a) KMnO₄/OsO₄ Method b) LiAlH₄ Reduction
c) Lindlar's Catalyst d) Na in Liq. NH₃
- IV. Which reagent will be used to prepare aldehyde from an ester?
- a) DIBAL-H b) NaBH₄
c) LiAlH₄ d) H₂/Pd
- V. Benzoic acid on treatment with excess of LiAlH₄ under reflux would yield?
- a) Benzaldehyde b) Benzyl alcohol
c) Phenol d) Benzene
- VI. Tri-substituted alkenes on reaction with borane (BH₃) and AcOH would produce?
- a) Secondary alcohol b) Tertiary alcohol
c) Aldehyde d) Alkane
- VII. IR spectrum of cyanide compound will have a sharp peak around----- cm⁻¹?
- a) 1250 b) 2250
c) 3250 d) 1750
- VIII. Lowest energy excitation of electrons in UV/Vis. Spectroscopy are referred to?
- a) Sigma to sigma star b) Pi to pi star
c) n to sigma star d) n to pi star
- IX. Birch reduction of benzene will produce?
- a) Cyclohexane b) Cyclohexene
c) Cyclohexadiene d) Phenol
- X. Among the following which radical is Least stable?
- a) Benzyl b) Methyl
c) Ethyl d) Propyl



UNIVERSITY OF THE PUNJAB

Sixth Semester - 2017

Examination: B.S. 4 Years Programme

Roll No.

PAPER: Organic Chemistry
Course Code: CHEM-317

TIME ALLOWED: 2 hrs. & 30 mins.
MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

Q. NO. 2. Give the short answer of the following questions. ($4 \times 5 = 20$)

- I. Name different types of UV/Vis. transitions possible in Benzamide and Ethyl benzoate?
- II. Why conjugation of C=O with C=C lowers its stretching frequency?
- III. Describe Birch reduction with example and mechanism?
- IV. Write a brief note on Wolf-Kishner reduction with example and mechanism.
- V. Describe Oppenauer oxidation of secondary alcohols. Give example and mechanism.

Q. NO. 3. Describe the following reactions with suitable examples and mechanism. (10)

- (i) Ozonolysis of Alkenes (ii) Hydroboration of Alkenes

Q. NO. 4. Discuss in detail the various types of vibrations and factors influencing these vibrations in IR Spectroscopy. (10)

Q. NO. 5. Write a detailed note on the followings? (10)

- (i) Applications of UV/Vis. Spectroscopy in Chemistry
- (ii) Factors affecting stability of free radicals



UNIVERSITY OF THE PUNJAB

Roll No.

Sixth Semester - 2017

Examination: B.S. 4 Years Programme

PAPER: Applied Chemistry
Course Code: CHEM-321

TIME ALLOWED: 30 mins.
MAX. MARKS: 10

Attempt this Paper on this Question Sheet only.

(OBJECTIVE TYPE)

- Q. 1 Encircle the most suitable answer from the given options. 10
- i) ----- glass is used for lenses & prisms
 - a) Soft
 - b) Jena
 - c) Pyrex
 - d) Flint
 - ii) Float glass was developed by
 - a) William
 - b) Pilkington
 - c) Planck
 - d) Randolph
 - iii) Industrially acetic acid is prepared from
 - a) Formaldehyde
 - b) Acetaldehyde
 - c) Both of these
 - d) None of these
 - iv) Substitution halogenation of alkanes takes place usually by a mechanism of
 - a) Addition
 - b) Replacement
 - c) Free radical
 - d) derivatives
 - v) mild oxidizing agents are.....
 - a) K_2CrO_4
 - b) $KMnO_4$
 - c) Both a & b
 - d) None of the above
 - vi) Alkali silicates are known as _____
 - a) Sodalime glass
 - b) Optical glass
 - c) Water glass
 - d) Colored glass
 - vii) Chemically soaps are
 - a) Salts of silicates
 - b) Esters of heavy fatty acids
 - c) Na salts of heavy fatty acids
 - d) Mixture of glycerol & alcohol
 - viii) ----- is an intermediate
 - a) acetaldehyde
 - b) ethylene
 - c) toluene
 - d) methane
 - ix) Safety glass is used in
 - a) Car wind screen
 - b) Offices' windows
 - c) Laboratory for chemical handling
 - d) Cooking utensils
 - x) ----- is used in post-surgical management
 - a) Lead oxide
 - b) Lead dioxide
 - c) Lead oleate
 - d) Both a & c



UNIVERSITY OF THE PUNJAB

Sixth Semester - 2017

Examination: B.S. 4 Years Programme

Roll No.

PAPER: Applied Chemistry
Course Code: CHEM-321

TIME ALLOWED: 2 hrs. & 30 mins.
MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

(SUBJECTIVE TYPE)

Q.2 Short Questions

2x10 = 20

- i. What is OPAL glass? Where it is used?
- ii. Discuss the cleansing action of SOAP.
- iii. What are METALLIC SOAPS? Where they are used?
- iv. During CONTACT process, why SO_3 is not directly dissolved in water?
- v. Give two industrial applications of NITRATION?
- vi. Discuss oxidation of AMINES.
- vii. Differentiate between CATIONIC and ANIONIC surfactants.
- viii. Differentiate between homogeneous & heterogeneous CATALYSTS.
- ix. Write down properties and uses of phenol.
- x. Draw the flowsheet diagram of manufacturing of STYRENE.

Q.3 Extensive Questions

6 x 5 = 30

- a) How soap is manufactured in kettle process?
- b) Give a detailed classification of DETERGENTS.
- c) How NITRATION of BENZENE is carried out in industry?
- d) How ACETIC ACID is produced in industry?
- e) Discuss the manufacturing of special GLASS.
- f) Explain some applications of SULPHONATION in chemical industry.



UNIVERSITY OF THE PUNJAB

Sixth Semester - 2017
Examination: B.S. 4 Years Programme

Roll No.

PAPER: Bio Chemistry
Course Code: CHEM-323

TIME ALLOWED: 2 hrs. & 30 mins.
MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

(SUBJECTIVE TYPE)

Q.2 Short Questions **2x10 = 20**

- i. What are the main types of lipids?
- ii. Write two roles of PROSTAGLANDINS.
- iii. What is the importance of enzymes for living beings?
- iv. Why do fats have thermal insulation properties?
- v. Differentiate between COENZYME and PROSTHETIC GROUP.
- vi. What are ISOENZYMES? Give Example.
- vii. What is the importance of R-group in an amino acid molecule?
- viii. Why Amino Acids are Optically Active?
- ix. What is an oligopeptide? How it is different from a polypeptide?
- x. What is the main source and form of energy?

Q.3 Extensive Questions **30**

- a) Write a note on PHOSPHOLIPIDS. (8)
- b) What is the Biological importance of lipids? (5)
- c) What is the basis of Classification of amino acids? Give one example for each class amino acids. (6)
- d) What is Collagen? What are its types? (6)
- e) Explain different FACTORS effecting ENZYME ACTIVITY. (5)



PAPER: Bio Chemistry
Course Code: CHEM-323

TIME ALLOWED: 30 mins.
MAX. MARKS: 10

Attempt this Paper on this Question Sheet only.

(OBJECTIVE TYPE)

1. Encircle the most suitable answer from the given options. 10
- i) Triacylglycerol are:
 - a) Soluble in water
 - b) Insoluble in water
 - c) Soluble in water at elevated Temperature
 - d) Partially soluble in water
 - ii) All are essential fatty acids except:
 - a) Linoleic acid
 - b) Linolenic acid
 - c) Stearic acid
 - d) Oleic acid
 - iii) Which out of the following is not a conjugated protein:
 - a) Albumin
 - b) Low density lipoprotein
 - c) Glycoprotein
 - d) Visual Purple
 - iv) Lipids provide insulation against cold and hot weather to the exoskeleton of insects in the form of:
 - a) Cutin
 - b) waxes
 - c) Cholesterol
 - d) Oil
 - v) LECITHINS are also known as
 - a) Phosphatidylinositol
 - b) Phosphatidylcholine
 - c) Phosphatidylethanolamine
 - d) None of these
 - vi) Proteins contain
 - a) Only L- α - amino acids
 - b) Only D-amino acids
 - c) DL-Amino acids
 - d) Both (a) and (b)
 - vii) The Optically inactive Amino Acid is
 - a) Glycine
 - b) Serine
 - c) Valine
 - d) Threonine
 - viii) Which one of the following is an Essential Fatty Acid?
 - a) Linoleic acid
 - b) Linolenic acid
 - c) Arachidonic acid
 - d) All of these
 - ix) Which one of the following is a Plant Protein?
 - a) Glutelin
 - b) Protamines
 - c) Sclero
 - d) Prolamine
 - x) Enzymes are:
 - a) Proteins
 - b) Amino acids
 - c) Nucleic acids
 - d) Carbohydrates



PAPER: Environmental Chemistry
Course Code: CHEM-401

TIME ALLOWED: 30 mins.
MAX. MARKS: 10

Attempt this Paper on this Question Sheet only.

(OBJECTIVE TYPE)

Q.1 Encircle the most suitable answer from the given options.

10

- i) A Polluted water contain dissolved oxygen below
 - a) 10ppm
 - b) 08ppm
 - c) 15ppm
 - d) 04ppm
- ii) Which of the following is a Green House gas?
 - a) CH₄
 - b) CO₂
 - c) O₃
 - d) All of these
- iii) Foul Smell of water is removed by
 - a) Coagulation
 - b) Aeration
 - c) Chlorination
 - d) Boiling
- iv) Detergents are considered less environmental friendly than Soaps because they
 - a) Contains additives
 - b) Are non-biodegradable
 - c) Contains surfactants
 - d) Are biodegradable
- v) Temperature in the Troposphere with altitude _____
 - a) Increases
 - b) Decreases
 - c) Remains Constant
 - d) None
- vi) Which one of the following belong to the class of Secondary Pollutants
 - a) Carbon monoxide
 - b) Methane
 - c) Ozone
 - d) Nitrogen dioxide
- vii) Natural Ozone cycle is running in
 - a) Ionosphere
 - b) Troposphere
 - c) Mesosphere
 - d) None of these
- viii) Fresh water contains total percentage of Earth's water
 - a) 1 %
 - b) 2 %
 - c) 3 %
 - d) 4 %
- ix) The colloidal particles are removed from water by
 - a) Filtration
 - b) Coagulation
 - c) Distillation
 - d) Activated Sludge process
- x) Harnessing of Earth's Heat energy can be used as a
 - a) Renewable energy resource
 - b) Non-renewable energy resource
 - c) Alternative to Oil only
 - d) Nuclear energy



UNIVERSITY OF THE PUNJAB

Seventh Semester 2017
Examination: B.S. 4 Years Programme

Roll No.

PAPER: Environmental Chemistry
Course Code: CHEM-401

TIME ALLOWED: 2 hrs. & 30 mins.
MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

(SUBJECTIVE TYPE)

Q.2 Short Questions

2x10 = 20

- i. What is the effect of CO on Humans?
- ii. Differentiate between Primary and Secondary Pollutants.
- iii. What do you mean by Primary Water Treatment?
- iv. What do you mean by Ozone Hole? How it is created?
- v. Describe Lead Poisoning.
- vi. How acid rain affects the quality of buildings?
- vii. What are Point and Non-point sources of pollution?
- viii. Discuss Methane as a green house gas.
- ix. What is Reducing Smog?
- x. Give the significance of Environmental Education.

Q.3 Extensive Questions

6 x 5 = 30

- a) What is Acid Rain? Explain its Causes and Environmental impact.
- b) Explain the Environmental Consequences related to the burning of Fossil fuels.
- c) Briefly explain the Potential impact of Global Warming on the Climate Change.
- d) Discuss how Soaps and Detergents contribute Water Pollution?
- e) What are heavy metals? Explain their sources and effects on Humans
- f) Explain the Sources of Primary Pollutants in Air.



UNIVERSITY OF THE PUNJAB

Seventh Semester 2017
Examination: B.S. 4 Years Programme

Roll No.

PAPER: Physical Chemistry (Sp. Theory-I)
Course Code: CHEM-403

TIME ALLOWED: 2 hrs. & 30 mins.
MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

SUBJECTIVE

Section I

Q.2- Attempt all Short questions

(2x10=20)

- How a catalyst effect the energy of activation?
- What is catalytic poisoning?
- What are promoters? Give examples.
- Differentiate between gel and emulsion.
- Describe a method for purifying colloidal solution?
- What is electrophoresis?
- What is the effect of surface area on adsorption?
- Define heterogeneous catalysis and give examples.
- Write any two postulates of Langmuir adsorption isotherm.
- Differentiate between physical and chemical adsorption.

Section II

Attempt all questions:

(3 x10)

Q. No. 3

- What is adsorption? Discuss adsorption phenomena. (4)
- Explain Michaelis-Menton mechanism for enzyme catalysis. (6)

Q. No. 4

- What are sols? Give its types. (3)
- Discuss the kinetic properties of sols in detail. (7)

Q. No. 5

- Name different methods for molar mass determination of colloids, explain one method in detail. (5)
- Discuss heterogeneous kinetics of single system reactions. (5)



UNIVERSITY OF THE PUNJAB

Roll No.

Seventh Semester 2017
Examination: B.S. 4 Years Programme

PAPER: Physical Chemistry (Sp. Theory-I)
Course Code: CHEM-403

TIME ALLOWED: 30 mins.
MAX. MARKS: 10

Attempt this Paper on this Question Sheet only.

OBJECTIVE

Q.1.MCQS

(1x10=10)

- (i) A catalyst can be described as a substance that:
- (a) undergoes change to accelerate the rate of the reaction
 - (b) increases the kinetic energy of the reactants
 - (c) provides a path of lower activation energy for the reaction
 - (d) lowers the potential energy of the products with respect to the energy of the reactants
- (ii) All of the following are true statements concerning catalysis except
- (a) a catalyst will speed the rate-determining step
 - (b) a catalyst will be used up in a reaction
 - (c) a catalyst may induce steric strain in a molecule to make it react more readily
 - (d) a catalyst will lower the activation energy of a reaction
- (iii) Which of the following will lower the activation energy for a reaction?
- (a) increasing the concentrations of reactants
 - (b) raising the temperature of the reaction
 - (c) adding a suitable catalyst
 - (d) there is no way to lower the activation energy of a reaction
- (iv) Which one of the following statements is not true?
- (a) enzymes require optimum temperature
 - (b) enzymes required optimum pH
 - (c) enzymes increase activation energy
 - (d) enzymes are highly specific in nature
- (v) The intermediate compound formation theory generally applies to

P.T.O.

- (a) homogeneous catalytic reactions
 - (b) heterogeneous catalytic reactions
 - (c) auto catalytic reactions
 - (d) all of these
- (vi) The phenomenon of negative catalysis is also known as
- (a) auto catalysis
 - (b) self catalysis
 - (c) inhibition
 - (d) enzyme catalysis
- (vii) The continuous rapid zig-zag movement executed by a colloidal particle in the dispersion medium is called
- (a) Tyndall effect
 - (b) Brownian movement
 - (c) electrophoresis
 - (d) peptization
- (viii) The explanation of Brownian movement was given by
- (a) Robert Brown
 - (b) Robert Boyle
 - (c) Albert Einstein
 - (d) Tyndall
- (ix) The movement of the dispersion medium under the influence of applied potential is known as
- (a) osmosis
 - (b) diffusion
 - (c) electro-osmosis
 - (d) electrophoresis
- (x) The precipitating effect of an ion in dispersed phase of opposite charge _____ with the valence of the ion
- (a) decreases
 - (b) increases
 - (c) no effect
 - (d) none of these



UNIVERSITY OF THE PUNJAB

Seventh Semester 2017

Examination: B.S. 4 Years Programme

Roll No.

PAPER: Inorganic Chemistry (Sp. Theory-I)
Course Code: CHEM-406

TIME ALLOWED: 2 hrs. & 30 mins.
MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

Q. 2. Answer following short questions.

(2 × 10 = 20)

- (i) Draw correlation diagram for d^2 and d^8 octahedral and tetrahedral complexes.
- (ii) Write two points of differences between VBT and MOT.
- (iii) Describe classification of organic reagents used in inorganic analysis.
- (iv) What is $3c - 4e$ electron bond? Give one example.
- (v) What is diagonal relationship? Give two similarities between Li and Mg.
- (vi) What is $s -$ inert pair effect?
- (vii) Why BF_3 is more stable than BH_3 ?
- (viii) Describe application of organic reagents in chromatographic analysis as locating agents.
- (ix) Why does fluorine show peculiar behavior in group VIIA?
- (x) Why PF_3 exists whereas NF_3 does not?

Q. 3. Answer all of the following questions

(3 × 10 = 30)

- (i) How is correlation diagram approach is applied for triatomic molecules to determine the shape of the molecules? (10)
- (ii) Describe some methods to increase the specificity of the organic reagents? (10)
- (iii) a) Discuss periodic anomalies of nonmetals (5)
b) Write diagonal relationship between boron and silicon. (5)



UNIVERSITY OF THE PUNJAB

Roll No.

Seventh Semester 2017
Examination: B.S. 4 Years Programme

PAPER: Inorganic Chemistry (Sp. Theory-I)
Course Code: CHEM-406

TIME ALLOWED: 30 mins.
MAX. MARKS: 10

Attempt this Paper on this Question Sheet only.

Note: Attempt all the questions on a separate sheet. Don't mark your question paper except with your Roll Number. Cutting, overwriting and removers are not allowed.

Objective

(1 × 10 = 10)

Note: Cutting, overwriting, use of pencil, ink removers and Blanko are not allowed.

Q. 1. Select the suitable option.

(10)

- (1) Arbusov reaction is due to formation of
(a) C=O (b) M=C=O (c) N=O (d) P=O
- (2) In reduction of halides with Zn and HCl in group 14 of the periodic table Ge resembles
(a) Sn (b) C (c) Si (d) None
- (3) Which has $d\pi - p\pi$ bond:
(a) $(\text{CH}_3)_3\text{PO}$ (b) $(\text{CH}_3)_3\text{NO}$ (c) PCl_5 (d) SF_4
- (4) Diborane cannot be methylated beyond:
(a) $(\text{CH}_3)_4\text{B}_2\text{H}_2$ (b) $(\text{CH}_3)_3\text{B}_2\text{H}_3$ (c) $(\text{CH}_3)_2\text{B}_2\text{H}_4$ (d) $(\text{CH}_3)\text{B}_2\text{H}_5$
- (5) Picric acid is an indicator of _____ type
(a) Acidic adsorbent (b) Basic adsorbent (c) Normal salt forming (d) Complex salt forming
- (6) The weakest oxyacid of chlorine is
(a) HClO_2 (b) HClO_3 (c) HClO_4 (d) HClO
- (7) The element that can make trivalent positive ion is _____
(a) Boron from group IIIA (b) Tin from group IVA
(c) Bismuth from group VA (d) Selenium from group VIA
- (8). The mode of hybridization of "P" atom in H_3PO_4 is _____
(a) sp (b) sp^2 (c) sp^3 (d) dsp^2
- (9). Aluminium is rendered to be _____
a. Passive (b) active (c) neutral (d) None
- (10) Tartaric acid is used in analysis of _____
(a) Ni^{2+} (b) Mn^{2+} (c) Fe^{2+} (d) Co^{2+}



UNIVERSITY OF THE PUNJAB

Seventh Semester 2017
Examination: B.S. 4 Years Programme

Roll No.

PAPER: Inorganic Chemistry (Sp. Theory-II)
Course Code: CHEM-407

TIME ALLOWED: 2 hrs. & 30 mins.
MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

Q. No. 2: Short Questions

(2x 10=20)

Answer the following:

- (i) What are the precautionary measures to use liq. HF as solvent?
- (ii) How molten salt systems can be classified? Give examples.
- (iii) What is Saddy-Fajans and Russel group displacement law?
- (iv) What are spinels?
- (v) Explain any one artificial radioactive series.
- (vi) Discuss the role of two metal oxides as superconductors?
- (vii) Give examples of such molten salt systems that can be used at room temperature.
- (viii) What is the difference between isobars and isotones?
- (ix) What are projectile accelerators? Give example.
- (x) What are the limitations of using water as solvent?

Q. No. 3: Long Questions

(5 x 6=30)

Answer the following:

- (i) Define electromotive force. How electrode potential is measured?
- (ii) Discuss the chemistry of metals in liquid ammonia?
- (iii) Describe redox and complexation occurring in liq. HF.
- (iv) Discuss the role of metal oxides as high temperature superconductors.
- (v) How reactions in molten salt systems can be investigated?
- (vi) How the radioactivity of a sample can be measured? Explain any one method.



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Roll No.

Seventh Semester 2017
Examination: B.S. 4 Years Programme

PAPER: Inorganic Chemistry (Sp. Theory-II)
Course Code: CHEM-407

TIME ALLOWED: 30 mins.
MAX. MARKS: 10

Attempt this Paper on this Question Sheet only.

Q.No.1: Objective

(1x10=10)

Encircle the correct option:

- During a bombardment reaction, the particles colliding with target nuclei are
 - small and traveling very fast.
 - small and traveling slow.
 - large and traveling very fast.
 - large and traveling slow.
- The most recently produced synthetic elements have half-lives of the order of
 - years.
 - days.
 - hours.
 - seconds.
- Which intermediate in the uranium-238 decay series constitutes the major source of radiation exposure for the average American?
 - thorium-234
 - radon-222
 - lead-214
 - lead-210
- In which of the following pairs of chemical species are both members of the pair free radicals that are often produced by ionizing radiation?
 - H_2O^+ and H_3O^+
 - OH and OH^-
 - H_2O^+ and OH
 - H_3O^+ and OH^-
- Which of the following statements concerning the penetrating power into matter of various types of radiation is *correct*?
 - Alpha and beta particles penetrate equally.
 - Alpha particles penetrate deeper than beta particles.
 - Alpha particles and gamma radiation penetrate equally.
 - Gamma radiation penetrates deeper than alpha particles.
- Which of the following would produce the most *ion pairs* as it interacts with matter?
 - alpha particle
 - beta particle
 - gamma radiation
 - neutron
- The term *nuclear energy* is most closely associated with which one of the following processes?
 - nuclear fusion
 - nuclear fission
 - radioactive decay
 - bombardment reactions
- Liquid HF undergoes self ionization to give a liquid that contains:
 - $[\text{H}_2\text{F}]^+$
 - $[\text{HF}_2]^-$
 - H^+
 - F^-
- Oxide used to treat indigestion and relieve pain is
 - magnesium oxide (MgO)
 - magnesium hydroxide ($\text{Mg}(\text{OH})_2$)
 - potassium oxide (K_2O)
 - both A and B
- Example for magnetic material used in data storage devices
 - 45 Permalloy
 - CrO_2
 - Cunife
 - Alnico



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Seventh Semester 2017
Examination: B.S. 4 Years Programme

Roll No.

PAPER: Analytical Chemistry (Sp. Theory-I)
Course Code: CHEM-412

TIME ALLOWED: 2 hrs. & 30 mins.
MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

Short Question

(2x10=20)

1. What is a thermobalance ?
2. What is meant by evolved gas detection?
3. Differentiate between WCOT and SCOT columns in GC .
4. Differentiate between DSC and DTA.
5. What are precolums in HPLC.
6. Define and explain electrode potential
7. Give Nernst equation.
8. What is step wise elution.
9. What are standard columns in HPLC.
10. Give the equation for pH merriment in glass electrode.

Long Question

Q1: (a) Give applications of thermal methods of analysis.

(b) Give Nernst equation for potentiometer .

(2x5=10)

Q2: Give in detail the interfacing of Gas Chromatography with

(a) Mass spectrometry

(b) infrared spectroscopy

(2x5=10)

Q3: Give detailed note on any two detector of HPLC.

(10)



UNIVERSITY OF THE PUNJAB

Roll No.

Seventh Semester 2017
Examination: B.S. 4 Years Programme

PAPER: Analytical Chemistry (Sp. Theory-I)
Course Code: CHEM-412

TIME ALLOWED: 30 mins.
MAX. MARKS: 10

Attempt this Paper on this Question Sheet only.

MCQs

(1x10)

- Curie point is the temperature at which
 - ferro magnetic material becomes para magnetic
 - para magnetic become ferro magnetic material
 - ferro magnetism retains
 - para magnetism retain
- TGA can not identify the
 - species
 - loss in mass
 - loss in weight
 - temperature change
- In heat flux DSC we can right the total heat flow as
 - dH/dt
 - dt/dH
 - dH/dq
 - dq/dH
- Capillary columns in GC are constricted of
 - fused silica
 - alumina
 - stainless steel
 - glass
- Precolumn derivatization is carried out before
 - separation
 - sampling
 - detection
 - adsorption
- In isocratic elution mobile phase throughout experiment is
 - unchanged
 - volume ratio changed
 - changed
 - volume changed
- change in temperature in HPLC causes changes in
 - retention times
 - degrees of freedom
 - accuracy
 - column packing
- In heat flux DSC the constantan disk is made of
 - nickel and copper
 - copper and chromium
 - chromium and cadmium
 - cadmium and copper
- Which is not a reference electrode
 - ion selective electrode
 - glass electrode
 - hydrogen electrode
 - calomel electrode
- In thermal conductivity detectors which metal is used as filament
 - tungsten
 - copper
 - iron
 - lead



UNIVERSITY OF THE PUNJAB

Seventh Semester 2017
Examination: B.S. 4 Years Programme

Roll No.

PAPER: Analytical Chemistry (Sp. Theory-II)
Course Code: CHEM-413

TIME ALLOWED: 2 hrs. & 30 mins.
MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

SUBJECTIVE

Section I

Q.2- Attempt all Short questions (2x10=20)

- (i) - Give the advantages of Fourier transform IR over dispersive IR?
- (ii) - Distinguish between internal conversion and fluorescence.
- (iii) - Name various vibrational modes of CO₂ and indicate which are IR active and which are Raman active.
- (iv) - How will you distinguish between rotational and vibrational Raman spectroscopy?
- (v) - What is the role of solvent in UV spectroscopy?
- (vi) Which gas is used to make plasma in ICP and what are advantages of this gas?
- (vii) - What are the steps in ICP analysis?
- (viii) Give some advantages of IR over Raman spectroscopy?
- (ix) Define quantum yield of fluorescence and give its characteristics
- (x) Why grating is preferred over prism in UV/Visible spectroscopy?

Section II

Attempt all questions

Q.3(a)-Discuss radiation filters used in UV/Visible spectroscopy (5)

(b)-Explain the phenomenon of metal isotope spectroscopy (5)

Q.4-(a) Explain the types of emitted Raman radiations (5)

(b). Discuss radiation sources of Infrared spectroscopy (5)

Q.5- (a) Explain the purpose and operation of nebulizer in ICP. (5)

(b)- Discuss the applications of fluorescence. (5)



UNIVERSITY OF THE PUNJAB

Roll No.

Seventh Semester 2017
Examination: B.S. 4 Years Programme

PAPER: Analytical Chemistry (Sp. Theory-II)
Course Code: CHEM-413

TIME ALLOWED: 30 mins.
MAX. MARKS: 10

Attempt this Paper on this Question Sheet only.

OBJECTIVE

i- Which type of cuvette is used for UV spectroscopy

- (a) Glass (b) Quartz (c) Plastic (d) All a,b,c

ii- Which is not the sample introduction part of ICP

- (a) Nebulizer (b) Centre tube (c) Pump (d) Radiofrequency power generator

iii- What is the absorbance if $\log_{10}(T)$ is 0.1875

- (a) 0.125 (b) 0.812 (c) 0.25 (d) None

iv- The temperature of plasma in ICP-AES is

- (a) 6000-10,000°C (b) 4000-7000°C (c) 2000-5,000°C (d) 10,000-14,000°C

v- What is the life time of fluorescence ?

- (a) $10^{-5} - 10^{-2}$ sec (b) $10^{-9} - 10^{-6}$ sec (c) $10^{-7} - 10^{-6}$ sec (d) $10^{-2} - 10^{-1}$ sec

vi- Which statement is wrong about Raman Spectroscopy

- (a) Water can be used as solvent (b) Lenses are made up of quartz or glass
(c) Destructive technique (d) It may be vibrational or rotational

vii Which is the most common source of radiation in Raman spectroscopy

- (a) Laser (b) Xe arc lamp (c) H₂ lamp (d) D₂ lamp

viii- Which of the following transition represents phosphorescence

- (a) S₁ to T₁ (b) T₁ to S₀ (c) S₁ to S₀ (d) S₂ to S₁

ix- What occurs when a molecule absorbs radiation in near IR region ?

- (a) molecule rotates (b) It vibrates faster (c) It spins faster (d) All, a,b,c

x- Which is not the continuum source of IR molecular absorption

- (a) Xenon arc lamp (b) Tungsten lamp (c) Nichrome wire (d) Nernst glower



UNIVERSITY OF THE PUNJAB

Seventh Semester 2017

Examination: B.S. 4 Years Programme

Roll No.

PAPER: Applied Chemistry (Sp. Theory-I)
Course Code: CHEM-415

TIME ALLOWED: 2 hrs. & 30 mins.
MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

Short Questions

Briefly answer following question?

10 × 2 = 20

1. What is the role of sweetening process in crude oil refining?
2. Describe the chemistry of platforming?
3. Name four raw materials for paper industry.
4. Why phosphorus is considered as macro nutrient?
5. Write down applications of potash fertilizers.
6. Discuss the function of urea as fertilizer.
7. Why isomerization of light naphtha is carried out?
8. Why desalting of crude oil is important.
9. Briefly explain the significance of beating in pulping process.
10. What is abiogenic theory of petroleum origin?

Subjective Part

10 × 3 = 30

- | | | | |
|------|-----|---|---|
| Q 1. | (a) | Describe sulphate process of pulp manufacturing. | 5 |
| | (b) | Explain paper making in Fourdrinier machine. | 5 |
| Q 2. | (a) | Discuss C ₄ alkylation process with the help of flow sheet diagram | 6 |
| | (b) | What is Octane number and how it can be improved. | 4 |
| Q 3. | (a) | Write down urea production on industrial scale? | 5 |
| | (b) | Discuss Calcium superphosphate manufacturing. | 5 |



UNIVERSITY OF THE PUNJAB

Roll No.

Seventh Semester 2017

Examination: B.S. 4 Years Programme

PAPER: Applied Chemistry (Sp. Theory-I)

TIME ALLOWED: 30 mins.

Course Code: CHEM-415

MAX. MARKS: 10

Attempt this Paper on this Question Sheet only.

Objective Part

10 × 1 = 10

- Which of the following is a basic digestion process?
(a) Sulfitte (b) Sulfate
(c) Soda process (d) both b and c
- Which of the following fertilizer can be classified as complex fertilizer?
(a) Urea (b) Ammonim hydrogen phosphate
(c) Calcium cyanide (d) Triple phosphate
- Which of the following is not a micronutrient for plants?
(a) Chlorine (b) Copper
(c) Iron (d) Zinc
- Which of the following can be used as anti-chlor during pulp bleaching
(a) Sodium sulphite (b) Sodium sulphide
(c) Sodium thiosulphate (d) Sodium sulphate
- Sulfate process of pulp manufacturing is also known as
(a) Sulphation process (b) NSSC process
(c) Kraft process (d) Haber process
- Presence of porphyrins in crude oil is explained by
(a) Biogenic theory (b) Abiogenic theory
(c) Carbide theory (d) Both b and c
- Which of the following solid fertilizer contains highest contents of Nitrogen?
(a) Ammonium nitrate (b) Ammonia
(c) Calcium cyanide (d) Urea
- Which of the following process was developed in order to avoid the use of TEL
(a) Catalytic cracking (b) Catalytic reforming
(c) MEL addition (d) TML addition
- Newspaper can be recycled maximum
(a) Two times (b) four times
(c) Three times (d) Five times
- Among following, in which form, plants can incorporate Nitrogen?
(a) NO_2^{-1} (b) NO_3^{-1}
(c) N_2 (d) Urea



UNIVERSITY OF THE PUNJAB

Seventh Semester 2017
Examination: B.S. 4 Years Programme

Roll No.

PAPER: Applied Chemistry (Sp. Theory-II)
Course Code: CHEM-416

TIME ALLOWED: 2 hrs. & 30 mins.
MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

SUBJECTIVE TYPE

Q No. 2:- Give short answers to the following questions:- (2 x 10 = 20 marks)

- What are the DIFFERENT BASIC OPERATIONS involved in DYEING?
- What are ACID AZO DYES?
- What is HEAT TREATMENT of STEEL?
- What are BATHOCHROMIC and HYPISOCHROMIC groups?
- Give different uses of THIN LAYER CHROMATOGRAPHY.
- What is ROUGHING in STEEL?
- Give the preparation of NITRO DYES?
- How is a FLAME PHOTOMETER used to determine SODIUM and POTASSIUM in GLASS?
- What are BASIC DYES?
- What is the general principle of ELECTROPLATING?

LONG QUESTIONS

- Q No. 3:- (a) Explain the BESSEMER PROCESS for the MANUFACTURE of STEEL. (5)
(b) How is NICKEL PLATING carried out? (5)
- Q No. 4:- (a) Write a note on any two theories of RUSTING? (6)
(b) What are the different applications of AAS? (4)
- Q No. 5:- (a) Give the different applications of HPLC? (4)
(b) How are different DYES selected for different FABRICS? (6)



UNIVERSITY OF THE PUNJAB

Roll No.

Seventh Semester 2017

Examination: B.S. 4 Years Programme

PAPER: Applied Chemistry (Sp. Theory-II)
Course Code: CHEM-416

TIME ALLOWED: 30 mins.
MAX. MARKS: 10

Attempt this Paper on this Question Sheet only.

OBJECTIVE TYPE

1. For bright NICKEL PLATING the pH of the solution is maintained between
(a) 4 to 5 (b) 3 to 5 (c) 4 to 4.5 (d) 3.5 to 4.5
2. Silica as an impurity of ORES should not exceed in flux:-
(a) 1-2% (b) 2-3% (c) 3-4% (d) 4-5%
3. Which ACID is used as a RETARDER for WOOL?
(a) Acetic (b) Nitric (c) Methanoic (d) Sulphuric
4. The average composition of CAST IRON has the following percentage of iron:-
(a) 85-87 (b) 87-89 (c) 91-93 (d) 93-95
5. What is the formula of Thomas Slag:-
(a) $MnSiO_3$ (b) $Ca_3(PO_4)_2$ (c) $CaSiO_3$ (d) $FeSiO_3$
6. Which of the following has no CHROMOPHORE and is usually COLOURLESS?
(a) Hydro-benzene (b) Turkey red (c) Mauve (d) Magenta
7. The percentage of CARBON in WROUGHT IRON is:-
(a) 0.1 – 0.75 (b) 0.12 – 0.25 (c) 0.2 – 0.50 (d) 0.3 – 0.45
8. The substance which is added to remove the impurities in the IRON industry is
(a) Slag (b) Flux (c) Ore (d) Gangue
9. ACID DYES usually contain salts of SODIUM
(a) sulphonic acid (b) phenolic compound (c) amino compounds (d) both a & b
10. POLYMER RESIN produced by coating of glass beads for separation of CATION in HPLC is:-
(a) Melamine resin (b) Acetal Resin (c) Zipax resin (d) Polyurethane resin



UNIVERSITY OF THE PUNJAB

Seventh Semester - 2017
Examination: B.S. 4 Years Programme

Roll No.

PAPER: Bio Chemistry (Sp. Theory-I)
Course Code: CHEM-418

TIME ALLOWED: 2 hrs. & 30 mins.
MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

Subjective type

Q #2: Questions with short answers: 2 x 10 = 20

1. Briefly explain the mechanism of absorption of glucose?
2. What is the difference between gluconeogenesis and glycogenesis?
3. What is the basic purpose of HMP?
4. Define the intact organism and tissue slice in metabolic pathway?
5. Write the name of electron carriers with arrangement?
6. Briefly explain lipolysis?
7. What is the oxidation of fatty acid?
8. How would you explain mitochondrial pathway for fatty acid synthesis?
9. Write the features of parathyroid hormone?
10. What is the neuro-transmitter?

Q #3 Questions with brief answers: 30

1. (a) Write a note on isotopic and chemical labeling techniques? (5)
(b) Describe the glycolysis pathway? (5)
2. (a) What is HMP and write its cycle? (7)
(b) Write absorption of lipids? (3)
3. (a) Elaborate the β - oxidation of fatty acid synthesis? (6)
(b) Give function of thyroid Glands? (4)



UNIVERSITY OF THE PUNJAB

Roll No.

Seventh Semester - 2017

Examination: B.S. 4 Years Programme

PAPER: Bio Chemistry (Sp. Theory-I)
Course Code: CHEM-418

TIME ALLOWED: 30 mins.
MAX. MARKS: 10

Attempt this Paper on this Question Sheet only.

Objective type

➤ Cutting will be considered zero.

Q #1 Mark the possible correct answer of the following MCQs:

1. Glucose transport requires insulin in;
a) RBC b) Adipose Tissue c) Brain d) Liver
2. The coenzyme utilized for hexose monophosphate shunt is;
a) NADP⁺ b) NAD⁺ c) FAD d) B₆-Po₄
3. Slow intestinal absorption occurs for one of the following monosaccharide;
a) fructose b) glucose c) galactose d) mannose
4. Pyruvate kinase deficiency leads to;
a) cirrhosis b) renal failure c) cardiac failure d) hemolytic anemia
5. β - Oxidation of fatty acids occurs in the following tissue except;
a) brain b) liver c) kidney d) heart
6. What is the level of ketone bodies in blood;
a) 5 -7 mg/dl b) 7-9 mg/dl c) less than 2 ml/dl d) 9-11 ml/dl
7. The common precursor for cortisol and aldosterone synthesis is;
a) progesterone b) testosterone c) estrone d) cortisone
8. Secretion of androgens are stimulated by;
a) CRF b) FSH c) LH d) ACTH
9. Name the compound with the greatest standard free energy:
a) ATP b) phosphocreatine c) cyclic AMP d) phosphoenolpyruvate
10. The electron transport chain is located in;
a) cytoplasm b) Golgi bodies c) outer mitochondrial membrane
d) inner mitochondrial membrane



UNIVERSITY OF THE PUNJAB

Seventh Semester 2017
Examination: B.S. 4 Years Programme

Roll No.

PAPER: Bio Chemistry (Sp. Theory-II)
Course Code: CHEM-419

TIME ALLOWED: 2 hrs. & 30 mins.
MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

Subjective Type

Q #2: Questions with short answers: 2 x 10 = 20

- 1) Write any three uses of vitamin D
- 2) What is the composition of normal urine
- 3) Differentiate leucocytes and macrophages
- 4) What is relation between Vitamin D and Calcium in body
- 5) Why immune system is important for human beings?
- 6) What is the principle of ion-exchange chromatography?
- 7) What is difference between dry and wet beriberi?
- 8) Write any three abnormalities of immune system?
- 9) How blood can coagulate?
- 10) Enlist the vitamins present in B-complex.

Q #3 Questions with brief answers: 30

- 1- a) What is importance of hemoglobin and describe briefly the biosynthesis and metabolism of hemoglobin. (2+4+4)
b) Write a note on chromatography. (5)
- 2- a) What is the chemistry, metabolism, occurrence, and physiological functions of Vitamin C. (2+2+2+5)
b) What is means by water soluble and fat soluble vitamins? (4)



UNIVERSITY OF THE PUNJAB

Roll No.

Seventh Semester 2017
Examination: B.S. 4 Years Programme

PAPER: Bio Chemistry (Sp. Theory-II)
Course Code: CHEM-419

TIME ALLOWED: 30 mins.
MAX. MARKS: 10

Attempt this Paper on this Question Sheet only.

Objective Type

Tick the most appropriate answers

(1X10)

- 1) The action of Vitamin K in formation of clotting factor is through
 - a) Post transcription
 - b) Post translation
 - c) Golgi complex
 - d) Endoplasmic reticulum
- 2) The tocopherols prevent the oxidation of -----
 - a) Vitamin A
 - b) Vitamin D
 - c) Vitamin K
 - d) Vitamin C
- 3) Immunoglobulins are characterized by their
 - a) Heavy chains
 - b) Molecular weight
 - c) Light chains
 - d) Electrophoretic behavior
- 4) IgE has a tendency to attach to
 - a) Basophils
 - b) Mast Cells
 - c) Both (a) and (b)
 - d) None of above
- 5) pH of healthy human blood is -----
 - a) 7.0
 - b) 7.4
 - c) 8.0
 - d) 8.4
- 6) ELISA is used to determine the -----
 - a) Antigen
 - b) Carbohydrates
 - c) Vitamin C
 - d) None of them
- 7) Vitamin D can be created from a natural substance under skin called as
 - a) Estrogen
 - b) Ergosterol
 - c) Pellegra
 - d) Pernicious
- 8) Major constituent of hemoglobin receives iron from
 - a) Liver
 - b) Chyme
 - c) Bulus
 - d) Lungs
- 9) HPLC stands for -----
 - a) High pressure liquid chromatography
 - b) High performance liquid chromatography
 - c) High placed liquid chromatography
 - d) Both "a" and "b"
- 10) Calcium deficiency in body occurs in the absence of
 - a) Vitamin A
 - b) Vitamin C
 - c) Vitamin E
 - d) Vitamin D



UNIVERSITY OF THE PUNJAB

Seventh Semester 2017
Examination: B.S. 4 Years Programme

Roll No.

PAPER: Organic Chemistry (Sp. Theory-I)
Course Code: CHEM-409

TIME ALLOWED: 2 hrs. & 30 mins.
MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

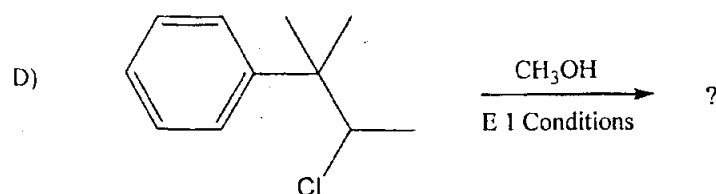
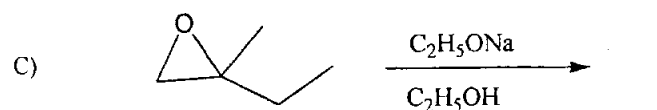
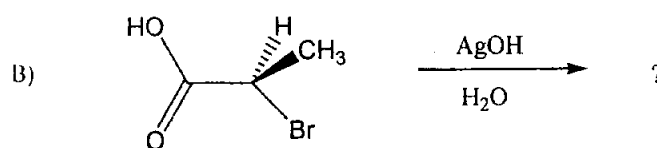
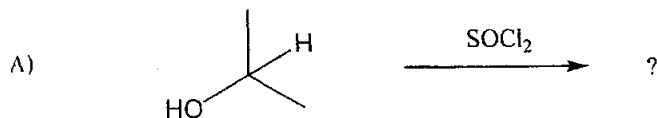
Q. No. 2. Answer the following questions.

[4x5=20]

- I) Why NH_3 is better nucleophile than H_2O ?
- II) How can you explain the fact that rate of $\text{S}_{\text{N}}2$ reaction involving a negatively charged nucleophile will be greater in an aprotic polar solvent than in a protic polar solvent?
- III) Why phenoxide ion is better leaving group than alkoxide ion?
- IV) What is solvolysis? Give one example.
- V) What is Zaitsev's rule? Give one example.

Q. No. 3.

- I) What product would you expect to obtain from $\text{S}_{\text{N}}2$ reaction of NaOH with (*R*)-2-bromobutane? Show the complete mechanism and stereochemistry of the reaction. [8]
- II) What is E1cB elimination reaction? Give one example with complete mechanism. [5]
- III) How the isotopic labeling method can be used for determining reaction mechanism? [5]
- IV) Complete the following reactions and draw their mechanisms. [3 x 4 = 12]





UNIVERSITY OF THE PUNJAB

Roll No.

Seventh Semester 2017
Examination: B.S. 4 Years Programme

PAPER: Organic Chemistry (Sp. Theory-I)
Course Code: CHEM-409

TIME ALLOWED: 30 mins.
MAX. MARKS: 10

Attempt this Paper on this Question Sheet only.

Note: All questions are compulsory.

Q. No. 1. Select the correct option in the given MCQs.

[1 x 10]

- I) Among the following which alkyl halide has highest rate of S_N2 reactions?
- Methyl bromide
 - Isopropyl bromide
 - Isobutyl bromide
 - Neopentyl bromide
- II) Among the following which is the most reactive in S_N1 reaction?
- Alkyl fluoride
 - Alkyl chloride
 - Alkyl bromide
 - Alkyl iodide
- III) Among the following which is the best nucleophile?
- Fluoride ion
 - Chloride ion
 - Bromide ion
 - Iodide ion
- IV) In which solvent rate of S_N1 reaction will be highest?
- Water
 - Ethyl acetate
 - Hexane
 - Ethanol
- V) The major product of elimination reaction of 2-bromo-2-methylbutane with hydroxide is
- 1-Butene
 - 2-Methyl-1-butene
 - 2-Methyl-2-butene
 - 2-Butene

P.T.O.

- VI) Among the following which is most reactive in an E1 reaction?
- A tertiary benzylic halide
 - A Primary allylic halide
 - Methyl halide
 - Isobutyl halide
- VII) Rearrangement is not possible in
- S_N1 reaction
 - E1 reaction
 - E2 reaction
 - All of above
- VIII) S_N2 reaction is a
- Zero order reaction
 - Second order reaction
 - Third order reaction
 - Fourth order reaction
- IX) Aryl halides and Vinylic halides
- Do not undergo S_N1 reactions but undergo S_N2 reactions
 - Do not undergo S_N2 reactions but undergo S_N1 reactions
 - Do not undergo either S_N1 or S_N2 reactions
 - undergo both S_N1 and S_N2 reactions
- X) When an ester containing a β-hydrogen is heated about 400°C, elimination of carboxylic acid occurs, resulting in the formation of
- An alkane
 - An alkene
 - An alkyne
 - A cycloalkane



UNIVERSITY OF THE PUNJAB

Seventh Semester 2017
Examination: B.S. 4 Years Programme

Roll No.

PAPER: Organic Chemistry (Sp. Theory-II)
Course Code: CHEM-410

TIME ALLOWED: 2 hrs. & 30 mins.
MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

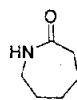
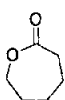
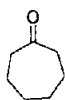
Q. No. 2. Answer the following questions.

[4 x 5 = 20]

- I) Explain why aryl groups have far greater migratory aptitude than alkyl groups and hydrogen in Wagner-Meerwein rearrangement?
- II) Explain why nitration of phenol is much faster than benzene?
- III) Why acylation of bromobenzene gives ortho and para nitrochlorobenzene?
- IV) Why Friedel-Craft alkylation of benzene is not restricted to monoalkylation?
- V) Describe the Hantzsch synthesis of Pyridine.

Q. No. 3.

- I) How will you synthesize the following compounds from cyclohexanone? Write complete mechanism for each step involved. [9]

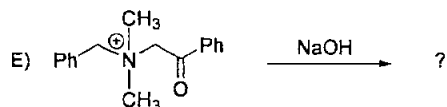
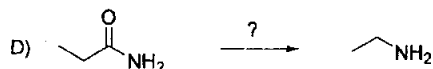
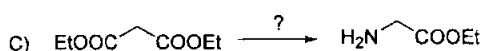
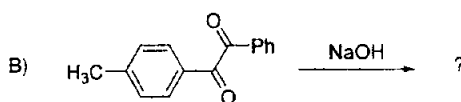
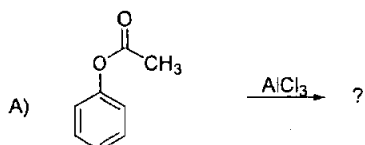


- II) At which position does the substitution occur for the following reaction? Explain your answer. [6]

- a) Electrophilic substitution reaction of Pyrrole.
- b) Electrophilic substitution reaction of Pyridine.
- c) Nucleophilic substitution reaction of Pyridine.

III) Complete the following reactions and draw their mechanisms.

[3 x 5 = 15]





UNIVERSITY OF THE PUNJAB

Roll No.

Seventh Semester 2017
Examination: B.S. 4 Years Programme

PAPER: Organic Chemistry (Sp. Theory-II)
Course Code: CHEM-410

TIME ALLOWED: 30 mins.
MAX. MARKS: 10

Attempt this Paper on this Question Sheet only.

Note: All questions are compulsory.

Q. No. 1. Select the correct option in the given MCQs.

[1 x 10]

- I) Which aromatic compound is most reactive for electrophilic aromatic substitutions?
- Benzene
 - Iodobenzene
 - Nitrobenzene
 - Phenol
- II) Which aromatic compound is most reactive for nucleophilic aromatic substitutions?
- Bromobenzene
 - Phenol
 - 2, 4-Dinitrochlorobenzene
 - 2, 4-Dimethylchlorobenzene
- III) Which is most reactive for halogenation of benzene?
- F₂
 - Cl₂
 - Br₂
 - I₂
- IV) Which rearrangement involves migration to electron deficient nitrogen?
- Pinacol rearrangement
 - Baeyer-Villiger rearrangement
 - Favorskii rearrangement
 - Hofmann rearrangement
- V) Which rearrangement involves migration to electron deficient oxygen?
- Pinacol rearrangement
 - Bayer-Villiger rearrangement
 - Favorskii rearrangement
 - Hofmann rearrangement

P.T.O.

VI) Which rearrangement converts carboxylic acids into amines?

- a) Schmidt rearrangement
- b) Curtius rearrangement
- c) Hofmann rearrangement
- d) All of the above

VII) Which rearrangement converts oximes to amides under acidic conditions?

- a) Beckmann rearrangement
- b) Bayer-Villiger rearrangement
- c) Favorskii rearrangement
- d) Hofmann rearrangement

VIII) Among the following which has most aromatic character?

- a) Thiophene
- b) Pyrrole
- c) Furan
- d) Benzene

IX) Which is the most reactive as diene for Diels-Alder reaction?

- a) Furan
- b) Thiophene
- c) Pyrrole
- d) Benzene

X) Heating of acetylene with ammonia yields

- a) Pyridine
- b) Aniline
- c) Pyrrole
- d) None of the above



Attempt this Paper on this Question Sheet only.

OBJECTIVE TYPE

Q.1 MCQS (1x10=10)

(i). PCBS are

- a. poly chlorinated biphenyls
- b. poly carbonated biphenyls
- c) poly chlorinated butane
- d) poly corrosive biphenyls

(ii). The chemical formula for Toxaphene is

- a. $C_{10}H_{10}Cl_6$
- b. $C_{10}H_9Cl_9$
- c) $C_{10}H_{10}Cl_8$
- d) $C_{10}H_9Cl_{10}$

(iii). Detergents are considered more detrimental than soaps due to

- a. Non-biodegradability
- b. Biodegradability
- c. Less additives
- d. Natural source

(iv). Major source of chromium

- a. $FeCr_2O_4$
- b) Fe_2CrO_4
- c) $FeCrO_3$
- d) $FeCrO_4$

(v). DDE is metabolite of

- a. PCBS
- b) DDT
- c) HCB
- d) Toxaphene

(vi). Exchange of gases within soil is referred to as

- a. Soil respiration
- b. Soil photocatalysis
- c) soil aeration
- d) ion exchange

(vii). The toxic compounds produced by fungi are

- a. Aflatoxins
- b. Herbicides
- c) fungicides
- d) polychlorinated biphenyls

(viii). Aflatoxins has to lead to _____ disease in dogs

- a. Kidney
- b) nervous
- c) liver
- d) heart

(ix). Arsenic in drinking water samples is most efficiently measured using

- a. GC-MS
- b. Flame-AAS
- c) Cold vapor - AAS
- d) hydride generator- AAS

(x). Acidic soil has pH in range _____

- a. 4-5
- b) 5-6
- c) 5-6.5
- d) 6-6.5



UNIVERSITY OF THE PUNJAB

Roll No.

Eighth Semester - 2017

Examination: B.S. 4 Years Programme

PAPER: Physical Chemistry (Sp. Theory-I)
Course Code: CHEM-422

TIME ALLOWED: 30 mins.
MAX. MARKS: 10

Attempt this Paper on this Question Sheet only.

OBJECTIVE

Q.1 Each question has four possible answers, Encircle the right answer. (1x10=10)

- i. Most commonly used moderator in nuclear reactors is
(a) Ordinary water (b) heavy water (c) graphite water (d) helium
- ii. Just _____ naturally occurring elements are considered stable.
(a) 274 (b) 284 (c) 294 (d) 264
- iii. Osmotic pressure can be measured by an instrument _____
(a) monometers (b) osmometer (c) nanometer (d) barometer
- iv. The Vant Haff equation for n moles of solute dissolved in V liters of solution is
(a) $\pi=nRT$ (b) $V=nRT$ (c) $P=nRT$ (d) $P=nRV$
- v. _____ nuclei are least stable.
(a) even-even (b) odd-odd (c) even-odd (d) odd-even
- vi. Which one is fluorescent Emulsion?
(a) o/w (b) w/o (c) w/o/w (d) all of these
- vii. _____ is unit of radiation that is used to measure biological damage.
(a) pascal (b) roentgen (c) radion (d) nucleon
- viii. 3. How old is a fossil bone whose ^{14}C content is a 15.0 percent that of living bone?
(a) 25400 yr (b) 15600 yr (c) 380 yr (d) 6810 yr
- ix. 2. The osmosis taking place from solution to pure water by application of pressure greater than osmotic pressure on the solution is called
(a) equilibrium osmosis (b) irreversible osmosis (c) reversible osmosis
(d) reverse osmosis
- x. Most efficient moderator used in nuclear reactor is
(a) Helium (b) graphite (c) heavy water (d) ordinary water



UNIVERSITY OF THE PUNJAB

Eighth Semester - 2017

Examination: B.S. 4 Years Programme

Roll No.

PAPER: Physical Chemistry (Sp. Theory-I)
Course Code: CHEM-422

TIME ALLOWED: 2 hrs. & 30 mins.
MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

SUBJECTIVE SECTION-I

Q.2 Attempt all questions:

(2x10)

- a) What is meant by Reverse osmosis?
- c) What is function of Moderator in nuclear reactor?
- d) Derive an equation to calculate the half life of radioactive substances.
- e) State Van't Hoff's law of osmosis for solution.
- i) What is CMC?
- j) Give one method for the preparation of emulsions.
- k) What is nuclear fission? Give examples.
- l) Define thixotropy.
- i) Write three applications of tracers in chemistry.
- j) How can you differentiate oil in water & water in oil emulsion.

SECTION-II

(10X3) = 30

Q. 3 (a) How the gas law are applied on dilute solutions? Derive. (6)

(b) A solution of glycol containing 1.821g per litre has an osmotic pressure of 5.18 cm of mercury at 10 °C. What is the molar mass of glycol. (4)

Q.4 (a) Differentiate b/w emulsions & Gels (6)

(b) Explain orientation wedge theory of emulsion. (4)

Q.5 (a) Write a detail note on Nuclear reactor. (7)

(b) What is Hydrogen bomb? Give its preparation mechanism. (3)



UNIVERSITY OF THE PUNJAB

Roll No.

Eighth Semester - 2017
Examination: B.S. 4 Years Programme

PAPER: Inorganic Chemistry (Sp. Theory-I)
Course Code: CHEM-425

TIME ALLOWED: 30 mins.
MAX. MARKS: 10

Attempt this Paper on this Question Sheet only.

Objective

Q. No.1 Choose the most suitable answer in the following MCQs. (10×1=10)

- i. The upper limit of linear calibration for ICP-OES is usually _____ times the detection limit
(a) $10^4 - 10^6$ (b) $10^3 - 10^4$ (c) $10^2 - 10^3$ (d) $10^6 - 10^7$
- ii. The _____ element is introduced in the form of volatile hydride in ICP.
(a) Sb (b) Ti (c) W (d) None
- iii. Plasma temperature ranges from _____.
(a) 5000-6000 K (b) 2000-5000 K (c) 6000-10000 K (d) 10000-12000K
- iv. The absorbance "A" in Beer-Lambert law can have any values between
(a) 0 and 2 (b) 0 and 5 (c) 0 and 100 (d) 0 and infinity
- v. _____ flame has the highest temperature.
(a) Acetylene- O_2 (b) Acetylene- N_2O (c) Acetylene-Air (d) Propane-Air
- vi. _____ is a mixture of polymeric metaphosphates.
(a) Garnets (b) Apatites (c) Graham's salt (d) Spinel
- vii. Huckel rule says that there should be _____ number of π -electrons in an aromatic compound
(a) $4n+4$ (b) $4n$ (c) $4n+2$ (d) $4n-2$
- viii. Which one of these is called the "Inorganic Benzene"?
(a) Graphite (b) Borazine (c) Boroxine (d) Phosphazene
- ix. _____ is more stable to disproportionation.
(a) AuF (b) AuCl (c) AuBr (d) AuI
- x. The most powerful fluorinating agent is
(a) CsF (b) HgF_2 (c) AgF (d) KF



UNIVERSITY OF THE PUNJAB

Eighth Semester - 2017

Examination: B.S. 4 Years Programme

Roll No.

PAPER: Inorganic Chemistry (Sp. Theory-I)
Course Code: CHEM-425

TIME ALLOWED: 2 hrs. & 30 mins.
MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

Subjective

SECTION I

Q. No. 2 Give short answers to the following questions.

(10×2=20)

- i. Describe different zones of the plasma.
- ii. Describe dispersion and detection methods in ICP.
- iii. Briefly describe the cold vapour technique in AAS.
- iv. What are criteria of spontaneity of a reaction?
- v. What is Born-Mayer equation?
- vi. How can you evaluate Lattice energy experimentally?
- vii. Describe the total types of interactions among the ions in NaCl crystal lattice?
- viii. What are ultramarines?
- ix. Give different examples of Homocatenation and Heterocatenation.
- x. Describe chemical bonding in Phosphazene.

SECTION II

Q. No. 3 Give adequate answers to the following questions.

(6×5=30)

- i. Write a note on sample introducing system in flame photometer.
- ii. Write down the agricultural, biological and geological applications of ICP.
- iii. Describe the role of thermodynamics in interpretative chemistry with examples.
- iv. Derive the Kapustinskii equation for the calculation of Lattice energy.
- v. Elaborate some applications of Zeolites.
- vi. Compare the physical and chemical properties of borazines with benzene.



UNIVERSITY OF THE PUNJAB

Roll No.

Eighth Semester - 2017

Examination: B.S. 4 Years Programme

PAPER: Inorganic Chemistry (Sp. Theory -II)

TIME ALLOWED: 30 mins.

Course Code: CHEM-426

MAX. MARKS: 10

Attempt this Paper on this Question Sheet only.

Q. 1 OBJECTIVE (10 marks)

Note: Encircle the correct answer. Cutting, overwriting or fluid use is not allowed.

1. Porphyrin ring in hemoglobin molecules have in center an atom of
(a) magnesium (c) hydrogen
(b) iron (d) nickel
2. Lead pipes are not safe for carrying drinking water because
(a) Water containing dissolved air attacks lead forming soluble hydroxide. (c) They are corroded by air and moisture.
(b) They are covered with a coating of lead carbonate. (d) Both a and b
3. Cytochromes are electron.....
a) acceptors c) carriers
b) donors d) all of the above
4. To form one glucose molecule ($C_6H_{12}O_6$), number of water molecules required are
(a) six (c) ten
(b) eight (d) twelve
5. Haemerythrin is
a) oxygen transport protein occurring in certain non-segmented worms c) oxygenated hemoglobin
b) oxygen transport proteins occurring in arthropods d) All of above
6. Trans effect has been explained by
a) electrostatic polarization theory c) Both of the above
b) π bonding theory d) None of the above
7. Effect of concentration of reagent on rate of reaction is determines
(a) order of reaction (c) concentration of reactants
(b) concentration of products (d) energy of activation
8. Rate of reaction is increased with increase in
(a) concentration of reactant (c) pressure
(b) temperature (d) both A and B
9. Chlorophyll molecule has unique property of
a) Extensive conjugation c) Fluorescence
b) Phosphorescence d) Both a & b
10. Which of the following σ -bonded alkyl groups can undergo β -hydrogen elimination?
a) CH_2CH_3 c) CH_3
b) CH_2Ph d) CH_2SiMe_3



UNIVERSITY OF THE PUNJAB

Eighth Semester - 2017
Examination: B.S. 4 Years Programme

Roll No.

PAPER: Inorganic Chemistry (Sp. Theory -II)
Course Code: CHEM-426

TIME ALLOWED: 2 hrs. & 30 mins.
MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

Q. 2 SHORT QUESTIONS (2x10=20 marks)

- (i) What is the role of chromium and zinc in living things?
- (ii) d^5 octahedral complexes are inert or labile? Explain
- (iii) What is the main difference between cytochromes and hemoglobin/myoglobin?
- (iv) What is the by-product of hydroformylation reaction?
- (v) How IR spectra help in characterization of organometallic compound?
- (vi) What do you mean by cyanide poisoning? How it can be cured?
- (vii) Give an example of reductive elimination reaction.
- (viii) What do you mean by ionophore antibiotics?
- (ix) Give some examples of η^3 -allylic organometallic compounds.
- (x) What is SN_1CB mechanism?

Q.3 Long Questions 10x3=30

- (i) How substitution reactions occurred in octahedral complexes? (10)
- (ii) Discuss the chemistry of η^6 -allylic organometallic compounds? (10)
- (iii) What is the role of metalloporphyrine in photosynthesis and respiration? (10)



UNIVERSITY OF THE PUNJAB

Roll No.

Eighth Semester - 2017

Examination: B.S. 4 Years Programme

PAPER: Organic Chemistry (Sp. Theory-I)

TIME ALLOWED: 30 mins.

Course Code: CHEM-428

MAX. MARKS: 10

Attempt this Paper on this Question Sheet only.

- Q. No. 1. Encircle the correct answers (1 x 10 = 10)
- Which of the following peaks is never observed in a mass spectrum?
a). $M + 2$ b). $M - 2$ c). $M - 8$ d). $M - 18$
 - The $M + 2$ peak is observed only in the mass spectrum of a compound containing:
a). Fluorine b). Iodine c). Sulphur
d). Phosphorus
 - The $M - 2$ peak is not observed only in the mass spectrum of a compound containing:
a). Chlorine b). Bromine c). Iodine d). Sulphur
 - What kind of sample can be studied in a mass spectrometer?
a). A gas b). A liquid c). A solid d). All of these
 - Cis and trans alkene can easily be distinguish by
a). NMR b). Mass spectroscopy c). Both NMR and Mass spectroscopy
 - The difference in energy (ΔE) of the α and β spin states of a nucleus depends on
a). Applied magnetic field b). Magnetogyric ratio c). Both of these
d). None of these
 - Which one of the following atomic nuclei does not spin?
a). ^1H b). ^2D c). ^{12}C d). ^{14}N
 - Which one of the following types of magnets is insensitive to the change in temperature?
a). Permanent magnet b). Superconducting magnet c). Electromagnet
d). All of these
 - Which of the following is not a terpenoid
a). Quinine b). Androgen c). α Amyrin
d). Cholesterol
 - Nicotine contain following skeleton in its structure
a). piperidine b). pyrrolidine c). pyridine d). both
pyridine and pyrrolidine



UNIVERSITY OF THE PUNJAB

Eighth Semester - 2017
Examination: B.S. 4 Years Programme

Roll No.

PAPER: Organic Chemistry (Sp. Theory-I)
Course Code: CHEM-428

TIME ALLOWED: 2 hrs. & 30 mins.
MAX. MARKS: 50

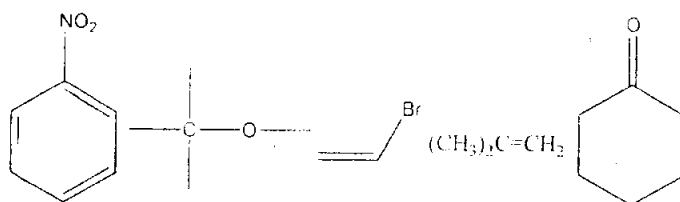
Attempt this Paper on Separate Answer Sheet provided.

Q. No.2. Answer the following questions (5+5+5+5)

- Define ionization. Briefly explain at three modes of ionization in mass spectrometry.
- Define coupling constant and what are the different factors influencing the chemical shift and coupling constant values in $^1\text{H-NMR}$ spectrum.
- Predict the appearance of the $^1\text{D-NMR}$ spectrum of propyl bromide.
- What are the main differences between $^1\text{H-NMR}$ and $^{13}\text{C-NMR}$ spectroscopy?

Q. No.3. Answer the following questions (10 + 10 + 10)

- Write a short note on alkaloids. Briefly explain at least 5 different classes of alkaloids.
- How many signals would you expect in the $^1\text{H-NMR}$ and $^{13}\text{C-NMR}$ spectrum of each of the following compounds? Justify your answer.



- What fragments are expected as a result of McLafferty rearrangement in the following compounds?
 - 5-Methyl hexanal,
 - 4-Methyl-2-pentanone,
 - 2-Butylcyclohexanone,
 - Butyl 2,2-dimethylpropanoate,
 - 2-Ethylhexanoic acid.



PAPER: Organic Chemistry (Sp. Theory-II)
Course Code: CHEM-429

TIME ALLOWED: 30 mins.
MAX. MARKS: 10

Attempt this Paper on this Question Sheet only.

Q. NO. 1. Give the answer of the following questions. [1 X 10 = 10]

- Alcohols are protected by
a) Ester b) Acetals c) both of these d) none of these
- CBr_2 have angle of
a) 104 b) 100 c) 110 d) 111
- Dies Alder reaction are
a) Stereoselective b) Regioselective c) both these d) none of these
- Aliphatic Diazo compounds decompose thermally to give
a) Nitrene b) Carbene c) Benzyn d) none of these
- 1,3 hexadiene on heating give
a) 1,5 Heptadiene b) 1,3 Heptadiene c) 1,4 heptadiene d) 1,2 heptadiene
- In synthesis of Paracetamol Amines are protected by
a) by forming tertiary Amines b) by forming dioxane c) by forming amide
d) none of these
- Woodwards Hoffmann rules can be applied on the following
a) Elimination b) Sigmatropic c) Pericyclic d) both b and c
- In Electrocyclic reaction 1,3,5 hexatriene on heating undergo to give
a) 1,3 cyclohexadiene b) 1,2 cyclohexadiene c) 1,4 cyclohexadiene
d) none of these
- Which of the following species is most stable
a) CH_3 b) CH_2CH_2 c) $(\text{CH}_3)_2\text{CH}$ d) $(\text{CH}_3)_3\text{C}$
- CO show the properties like
a) Carbene b) Nitrene c) Cabanion d) none of above



UNIVERSITY OF THE PUNJAB

Eighth Semester - 2017
Examination: B.S. 4 Years Programme

Roll No.

PAPER: Organic Chemistry (Sp. Theory-II)
Course Code: CHEM-429

TIME ALLOWED: 2 hrs. & 30 mins.
MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

Q. NO. 2. Give the short answer of the following questions.

[4 X 5 = 20]

- Describe the electronic structure of singlet carbenes and triplet carbenes.
- What are electrocyclic reactions? Give two examples.
- How can you explain crown ethers as phase transfer catalysts?
- What is disconnection approach in organic synthesis? Give one example.
- Write one method for the protection and deprotection of carbonyl group in organic synthesis.

Q. NO. 3.

Explain the following reactions. Give two examples for each.

[5 + 5]

- Insertion reactions of nitrenes.
- Cycloaddition reactions of nitrenes.

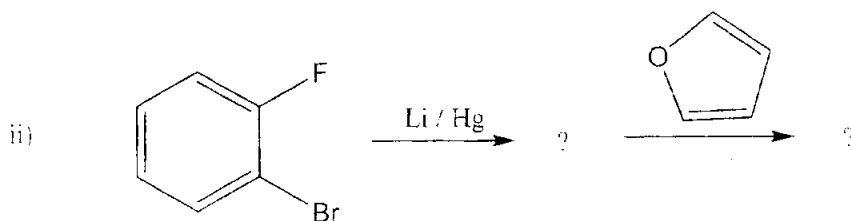
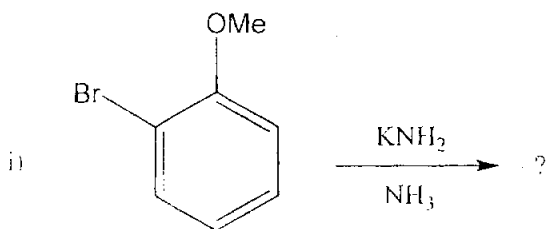
Q. NO. 4.

By using frontier molecular orbital (FMO) approach how can you explain the followings? [5 + 5]

- Thermal and photochemical [1, 5] sigmatropic migration of hydrogen
- Thermal and photochemical [1, 3] sigmatropic migration of hydrogen

Q. NO. 5.

i) Complete the following reactions with mechanisms. [3 + 3]



ii) Write one method for the protection and deprotection of hydroxyl group in organic synthesis. [4]



UNIVERSITY OF THE PUNJAB

Roll No.

Eighth Semester - 2017
Examination: B.S. 4 Years Programme

PAPER: Analytical Chemistry (Sp. Theory-I)
Course Code: CHEM-431

TIME ALLOWED: 30 mins.
MAX. MARKS: 10

Attempt this Paper on this Question Sheet only.

OBJECTIVE

i- Which of the following ions possesses the highest conduction ?

- (a) H^+ (b) K^+ (c) Cl^- (d) OH^-

ii- Qualitative analysis in polarography is obtained from

- (a) Limiting current (b) Halfwave potential (c) Diffusion current (d) Residual current

iii- Which statement is wrong about glow discharge

- (a) Argon gas is used (b) Sputtering occurs (c) pressure is 100-200 torr (d) none

iv- Control loop, which is a mean of process control instrument, consists of

- (a) sensor (b) controller (c) operator (d) all

v- The unit of specific conductance is

- (a) $S\ m^{-1}$ (b) $mho.m$ (c) $Ohm\ m^{-1}$ (d) $S\ cm^2$

vi- Which substance is used for cell constant determination

- (a) NaBr (b) KCl (c) NaCl (d) KBr

vii- In polarography which gas is bubbled through the solution to remove the interference of O_2

- (a) N_2 (b) CO_2 (c) He (d) none

viii- Under which conditions, glow discharge occurs ?

- (a) Low current and low voltage (b) Low current and high voltage
(c) High current and high voltage (d) Highcurrent and low voltage

ix- Which enzyme is used in glucose biosensor

- (a) glucose anhydrase (b) glucose reductase (c) glucose hydrogenase (d) glucose oxidase

x- Which equation represents the Ilkovic equation showing average current

- (a) $i_d = 708nD^{2/3}Cm^{1/3}t^{1/6}$ (b) $i_d = 607nD^{1/2}Cm^{2/3}t^{1/6}$
(c) $i_d = 607nD^{1/2}Cm^{1/3}t^{1/6}$ (d) $i_d = 708nD^{1/2}Cm^{2/3}t^{1/6}$



UNIVERSITY OF THE PUNJAB

Eighth Semester - 2017
Examination: B.S. 4 Years Programme

Roll No.

PAPER: Analytical Chemistry (Sp. Theory-I)
Course Code: CHEM-431

TIME ALLOWED: 2 hrs. & 30 mins.
MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

SUBJECTIVE

Section I

Q.2- Attempt all Short questions (2x10=20)

- (i) – What is meant by arc and spark ablation?
- (ii) - . What are the advantages of amperometric titrations?
- (iii) –What do you know about polarographic maxima.
- (iv) – How oxygen interferes in polarographic analysis? How the problem is overcome?
- (v) How sputtering takes place in glow discharge cells?
- (vi) Describe briefly the two steps in stripping voltametry?
- (vii) –Describe the two factors that contribute to the electrochemical reactions in polarography.
- (viii) What are the advantages of conductometric titrations over ordinary titrations?
- (ix) How conductance of solution changes under the influence of temperature and concentration of ions?
- (x) Give difference between Specific conductance and molar conductance.

Section II

Attempt all questions

Q.3(a)-. Explain the following conductometric titrations

(i) Mixture of strong acid and weak acid with strong base

(ii) Precipitation titration..

(5)

(b)- Discuss the types of amperometric electrode system.

(5)

Q.(4)-(a) Explain instrumentation in polarography.

(5)

(b). Discuss glow discharge mechanism and give it's applications

in chemistry

(5)

Q.5- (a) Explain How conductance is measured?

(5)

(b)- Discuss the applications of anodic stripping votametry

(5)



PAPER: Analytical Chemistry (Sp. Theory-II)
Course Code: CHEM-432

TIME ALLOWED: 30 mins.
MAX. MARKS: 10

Attempt this Paper on this Question Sheet only.

(objective)

Q 1: Each of following question has been provided with four answers .select the correct answers .No credit for cutting ,over cutting and rewriting.

- 1) In ruby laser ruby crystal consist of .
a) Cr_2O_3 b) Al_2O_3 c) SiO_2 d) all
- 2) To acquire pulses in 10^{-8} s the technique used is .
a) Mode locking b) Q switching c) harmonic generation d) laser cavity modes
- 3) Which of the following is used as a diagnostic test for an exchange able proton.
a) HCl b) NaOH c) D_2O d) H_2O
- 4) The operating wave length of nitrogen laser is .
a) 336nm b) 337nm c) 337pm d) 335 nm
- 5) What kind of sample can be studied in a mass spectrometer .
a) A gas b) A liquid c) A solid d) all of these
- 6) Which of the following atomic nuclei does not spin.
a) ^1H b) ^2H c) ^{14}N d) ^{12}C
- 7) The intensity of NMR signal is proportional to gyro magnetic ratio .
a) r^1 b) r^2 c) r^3 d) r^4
- 8) A signal to noise ratio is 16 the number of scans are.
a) 64 b) 128 c) 32 d) 256
- 9) In pulsed fourier transform spectrometry the intensity of radio frequency RF pulses is .
a) 0.1- 50 s b) 1- 100 s c) 1-50 s d) 10- 100 s
- 10) The most abundant isotope of carbon has spin quantum number.
a) $1/2$ b) $-1/2$ c) 0 d) 1



UNIVERSITY OF THE PUNJAB

Eighth Semester - 2017

Examination: B.S. 4 Years Programme

Roll No.

PAPER: Analytical Chemistry (Sp. Theory-II)

TIME ALLOWED: 2 hrs. & 30 mins.

Course Code: CHEM-432

MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

Part 2 (subjective)

Section 1

Question 2: short questions

2x10=20

- 1) Name the different methods available for ionization of sample in mass spectrometry.
- 2) What is tandem mass spectrometry?
- 3) What is meant by chemical shift?
- 4) Why four laser system is better than three system.
- 5) What is the principle of FT NMR spectroscopy?
- 6) What is meant by stimulated emission?
- 7) What is nitrogen rule? Give its significance?
- 8) Differentiate spin lattice relaxation and spin spin relaxation.
- 9) Why TMS is used as standard in NMR spectroscopy?
- 10) Draw NMR spectra of pure anhydrous ethanol?

Section 2(long question)

Q 3 (a): Describe the basic principle of mass spectrometry. (6)

(b) What are the characteristics of laser light? (4)

Q 4 (a): Define chemical shift ,explain factors affecting chemical shift values in NMR spectroscopy. (6)

(b) Explain different mass analyzers used in mass spectrometry. (4)

Q 5 (a): Explain construction and working of ruby laser. (5)

(b) Explain principle and instrumentation of NMR spectroscopy. (5)



UNIVERSITY OF THE PUNJAB

Roll No.

Eighth Semester - 2017

Examination: B.S. 4 Years Programme

PAPER: Applied Chemistry (Sp. Theory-I)

TIME ALLOWED: 30 mins.

Course Code: CHEM-434

MAX. MARKS: 10

Attempt this Paper on this Question Sheet only.

(OBJECTIVE TYPE)

Q.1 Encircle the most suitable answer from the given options.

10

- i) Good quality of beet root contains sucrose:
 - a) 18-20%
 - b) 21-23%
 - c) 24-26%
 - d) 16-20%

- ii) Which is not a source of table sugar
 - a) Sugar cane
 - b) Beet root
 - c) Palm
 - d) Potato

- iii) Middle oil obtained from distillation of coal tar is also called
 - a) Anthracene
 - b) Naphthlene
 - c) Creosote
 - d) Tar

- iv) Quick method to estimate sucrose and invert sugar is by
 - a) Galvanometer
 - b) Calorimeter
 - c) Polarimeter
 - d) Hydrometer

- v) Masecuite is
 - a) Raw Sugar
 - b) Brown Sugar
 - c) Pure white Sugar
 - d) Crystalline sugar syrup

- vi) Which of the following is polymer formed by chain polymerization
 - a) Terylene
 - b) Polyester
 - c) Nylon 6,6
 - d) Polystyrene

P.T.O.

- vii) Bagasse is usually digested by
- a) Na_2CO_3
 - b) NaHCO_3
 - c) NaOH
 - d) KOH
- viii) The purest but irregular polymer is obtained when polymerization is done by
- a) Suspension polymerization
 - b) Emulsion polymerization
 - c) Bulk Polymerization
 - d) Solution polymer
- ix) During fraction distillation of Coal tar, the fraction obtained at $300\text{-}350^\circ\text{C}$ contains _____ as major content
- a) Naphthalene Oil
 - b) Anthracene Oil
 - c) Carbazole
 - d) Benzene
- x) The lowest rank of coal is
- a) Anthracite
 - b) Lignite
 - c) Bituminous
 - d) Polyvinyl chloride



UNIVERSITY OF THE PUNJAB

Eighth Semester - 2017

Examination: B.S. 4 Years Programme

Roll No.

PAPER: Applied Chemistry (Sp. Theory-I)
Course Code: CHEM-434

TIME ALLOWED: 2 hrs. & 30 mins.
MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

(SUBJECTIVE TYPE)

Q.2 Short Questions

2x10 = 20

- i. How Producer gas is produced?
- ii. What is coking of coal? Why it is carried out?
- iii. Why polysaccharides are called 'non sugars'?
- iv. Give classification of polymers on the basis of Tacticity.
- v. Describe the term Imbibition in Sugar Industry
- vi. What is Free radical polymerization?
- vii. What are the main applications of polystyrene?
- viii. Discuss the Composition and Physical states of LPG under different pressures.
- ix. What does defecation means in sugar industry?
- x. Write down three examples of each natural and synthetic polymer.

Q.3 Extensive Questions

6 x 5 = 30

- a) Describe the structure of sugar and explain its chemistry.
- b) Describe the conversion of raw sugar into white sugar.
- c) How gaseous fuels is classified?
- d) Compare low temperature and high temperature carbonization.
- e) Discuss any Emulsion and Suspension polymerization techniques.
- f) Compare thermo- and thermosetting plastics.



UNIVERSITY OF THE PUNJAB

Roll No.

Eighth Semester - 2017
Examination: B.S. 4 Years Programme

PAPER: Applied Chemistry (Sp. Theory-II)
Course Code: CHEM-435

TIME ALLOWED: 30 mins.
MAX. MARKS: 10

Attempt this Paper on this Question Sheet only.

(OBJECTIVE TYPE)

Q.1 Encircle the most suitable answer from the given options. 10

- i) The raw sugar is converted into white crystalline sugar by
 - a) Defecation
 - b) Sulphonation
 - c) Refining
 - d) Carbonation

- ii) Which is not a source of sucrose
 - a) Sugar cane
 - b) Beet root
 - c) Potato
 - d) Palm

- iii) LPG mainly contain hydrocarbon
 - a) C₃-C₄
 - b) C₅-C₆
 - c) C₇-C₈
 - d) C₉-C₁₀

- iv) Polymer of Chloroethene is called
 - a) Nylon
 - b) Acrylic fiber
 - c) PVC
 - d) PVA

- v) The destructive distillation of coal is also termed as
 - a) Decomposition
 - b) Coking
 - c) Demethylation
 - d) Combustion

- vi) Which of the following is an addition polymer
 - a) Epoxy resins
 - b) Teflon
 - c) Nylon 6,6
 - d) Polyethene

P.T.O.

- vii) In Sugar industry, the mixture of mother liquor and sugar crystals is also called
- a) Molasses
 - b) Masecuite
 - c) Strike
 - d) Raw sugar
- viii) The purest but irregular polymer is obtained when polymerization is done by
- a) Suspension polymerization
 - b) Emulsion polymerization
 - c) Bulk Polymerization
 - d) Solution polymer
- ix) During fraction distillation of Coal tar, the fraction obtained at 300-350°C contains _____ as major content
- a) Naphthalene Oil
 - b) Anthracene Oil
 - c) Carbazole
 - d) Benzene
- x) The temperature used during low temperature carbonization of coke production is
- a) 900-1200°C
 - b) 1400-1600°C
 - c) 450-700°C
 - d) 320-440°C



UNIVERSITY OF THE PUNJAB

Eighth Semester - 2017
Examination: B.S. 4 Years Programme

Roll No.

PAPER: Applied Chemistry (Sp. Theory-II)
Course Code: CHEM-435

TIME ALLOWED: 2 hrs. & 30 mins.
MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

(SUBJECTIVE TYPE)

Q.2 Short Questions

2x10 = 20

- i. How Water gas is produced?
- ii. What is Destructive distillation of coal?
- iii. Write any four advantages of gaseous fuels.
- iv. Give classification of polymers on the basis of Tacticity.
- v. How crystallization of sugar is carried out from syrup?
- vi. What is Free radical polymerization?
- vii. How PVC is produced? Give its uses.
- viii. Discuss the Composition and Physical states of LPG under different pressures.
- ix. How Sugar is estimated and tested?
- x. Differentiate between co-polymers and terpolymers.

Q.3 Extensive Questions

6 x 5 = 30

- a) Explain the different methods for the extraction of Sugar cane juice.
- b) How Clarification of Sugar cane juice is carried out? Why it is necessary?
- c) Explain Coking of Coal in detail.
- d) Discuss Distillation of Coal Tar?
- e) Discuss any Bulk and Suspension polymerization techniques.
- f) Explain the mechanism of Condensation Polymerization by using Suitable example.



UNIVERSITY OF THE PUNJAB

Roll No.

Eighth Semester - 2017

Examination: B.S. 4 Years Programme

PAPER: Bio Chemistry (Sp. Theory-I)

TIME ALLOWED: 30 mins.

Course Code: CHEM-437

MAX. MARKS: 10

Attempt this Paper on this Question Sheet only.

Objective type

Q.1. Multiple Choice Questions: (1X10)

Choose the correct answer:

- The serum calcium normal range is:
(a) 5-7 mgs% (b) 7-9 mgs% (c) 9-11 mgs% (d) 11-13 mgs%
- Protein are digested by all the enzymes except:
(a) Tyrosinase (b) Chymotrypsin (c) Lipase (d) Aminopeptidase
- Amino acid are absorbed at:
(a) jejunum and ileum (b) duodenum (c) stomach (d) colon
- All the following can depend on purine salvage, except
(a) RBC (b) Brain (c) WBC (d) Kidney
- Pyrimidine nucleus carbon atoms are contribute by:
(a) CO₂ and aspartate (b) CO₂ and glutamate
(c) CO₂ and glutamine (d) CO₂ and asparagine
- The commonly used varieties of vinegar in acetic acid fermentation contain about
(a) 6% (b) 4% (c) 8% (d) 2%
- Saccharine materials contain
(a) Fermentable sugars (b) Alcoholic sugars
(c) Non fermentable sugars (d) Reducing sugars
- The bone calcium is present in the form of
(a) Calcium phosphate (b) Calcium chloride
(c) Calcium carbonates (d) Calcium hydroxide
- Histidine is important for
(a) Two carbon unit (b) Four carbon unit (c) Three carbon unit (d) One carbon unit
- The normal concentration of uric acid in the serum of adult is:
(a) 10-15 mg/dl (b) 4-9 mg/dl (c) 3-7 mg/dl (d) 1-3 mg/dl



UNIVERSITY OF THE PUNJAB

Eighth Semester - 2017

Examination: B.S. 4 Years Programme

Roll No.

PAPER: Bio Chemistry (Sp. Theory-I)
Course Code: CHEM-437

TIME ALLOWED: 2 hrs. & 30 mins.
MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

Subjective type

Q.2. Answer the following short questions (2X10)

1. What is the role of Pyridoxal phosphate in transamination?
2. Write the name of enzymes use in Urea Cycle?
3. What is salvage pathway for purine metabolism?
4. Describe the disorders of pyrimidine metabolism?
5. Elaborate the views about classification of minerals?
6. Write factors which inhibits the Ca absorption?
7. What are bio chemicals function of Fluorine?
8. What is fermentation?
9. Write the raw materials use in production of lactic Acid?
10. What is mean by word splicing?

Q.3. Answer the following long Question (30)

1. (a) Briefly describe the Urea Cycle? (6)
(b) Write the disorders of purine metabolism? (4)
2. (a) Write a note on Iron? (5)
(b) Draw a chemical reaction of transamination? (3)
(c) Write any two biochemical function of Ca? (2)
3. (a) Write a note on the industrial preparation of lactic acid? (6)
(b) Describe the metabolism of pyrimidine? (4)



Attempt this Paper on this Question Sheet only.

1. MULTIPLE CHOICE QUESTIONS

- 1 All the statement are true for genetic code accept
 - (a) It is degenerative
 - (b) it is un-ambiguous
 - (c) it is over lapping
 - (d) it is without punctuation

- 2 What role does messenger RNA play in the synthesis of proteins?
 - a. It catalyses the process
 - b. It provides the genetic blueprint for the protein
 - c. It translates the genetic code to a specific amino acid
 - d. It modifies messenger RNA molecules prior to protein synthesis

- 3 Which of the following statements concerning the action potentials of nerve cells is correct?
 - a. They result from a large increase in the membrane permeability to sodium ions
 - b. They can summate one with another
 - c. They may vary considerably in amplitude
 - d. They become larger as stimulus strength increases

- 4 Activate vitamin D stimulate the absorption
 - a. Ca
 - b. Mg
 - c. Na
 - d. K

- 5 Anticancer drugs weaken host defense by:
 - a. Damaging respiratory and gut epithelia
 - b. Inducing granulocytopenia
 - c. Altering resident microbial flora
 - d. Both " A and B' are correct

P.T.O.

- 6 Practically all antineoplastic drugs can produce the following toxic effects except:
- Depression of leukocyte count
 - Mucositis
 - Cardiomyopathy
 - Oligozoospermia
- 7 Which one is the first phase of bacterial growth
- Stationary phase
 - Log phase
 - Lag phase
 - decline phase
- 8 Which of the following is NOT true concerning control of gene expression in eukaryotic cells?
- Transcriptional control is the most important factor.
 - Transcription factors help RNA polymerase bind to a promoter.
 - Transcription activators binding to enhancers can speed up transcription.
 - Part of transcriptional control includes the processing of mRNA before it leaves the nucleus.
- 9 In bacterial promoters, which of the following describes the "Prinbow Box"?
- The 5' Untranslated region
 - The -10 box
 - The -35 box
 - the termination sequence
- 10 A mixture that consists of different components is called:
- Heterogeneous mixture
 - Homogeneous mixture
 - Simple Mixture
 - None of the above



UNIVERSITY OF THE PUNJAB

Eighth Semester - 2017

Examination: B.S. 4 Years Programme

Roll No.

PAPER: Bio Chemistry (Sp. Theory-II)
Course Code: CHEM-438

TIME ALLOWED: 2 hrs. & 30 mins.
MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

2. Questions with short answers

2x10

1. What do you understand by Nerve conduction?
2. Define Drug Metabolism and Chemotherapy?
3. Name some Weak acids and Weak bases?
4. What do you understand by Plectonemic coiling?
5. Write down the names of the factors required for the growth of microbes?
6. Write down steps involved in RNA processing?
7. What is the difference between cosmid and plasmids?
8. What is the function of liver?
9. Define Mutations and Fusion?
10. How water is ionized?

3. Questions with Brief answers?

1. (a) How genes are regulated in Eukaryotes? (5)
(b) Difference between transformation and transduction? (5)
2. Describe the structure of kidney with special reference of excretion and detoxification function? (10)
3. What do you understand by antimalarials? Also write their mode of action and drug resistance to certain strains? (10)