Total No. of Printed Pages: 04

SUBJECT CODE NO:- 2002
FACULTY OF SCIENCE & TECHNOLOGY
B.Sc. F.Y (Sem-I)
Examination June / July 2022
Chemistry Paper-II

(Organic Chemistry)

[Time: 1:53 Hours] **[Max. Marks:50]**

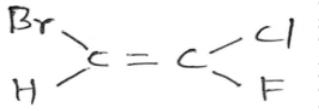
Please check whether you have got the right question paper.

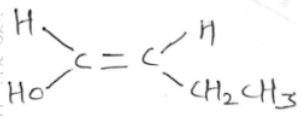
N.B
1) Attempt all questions.
2) Use blue or black pen only.

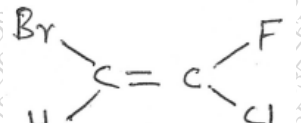
Q.1 a)

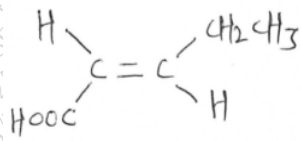
i) Explain Inductive effect with examples. 5 M
ii) Differentiate electrophiles and nucleophiles with example. 5M

b) Assign E – Z nomenclature to the following organic compounds 10 M

i)


ii)


iii)


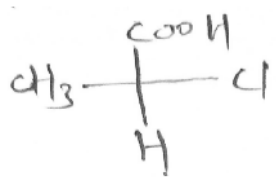
iv)


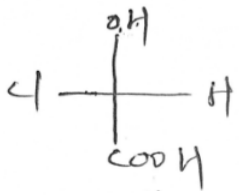
OR

a)

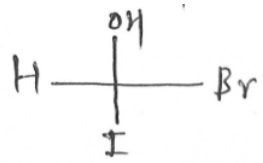
i) Describe charge transfer spectra. 5 M
ii) Explain any two types of organic reactions with examples. 5 M

b) Assign R and S nomenclature to the following 10 M

i) 

ii) 

iii) 

iv) 

Q.2 a)

i) Explain corey – house reaction of preparation of alkanes. 5 M

ii) Discuss saytzeff's rule with example. 5 M

b)

i) Explain Nitration reaction with mechanism of benzene. 5 M

ii) Give any two methods of preparation of any halides. 5 M

OR

20 M

Write a note on (any four)

1) Chlorination of alkanes.
2) Addition of HBr to alkene with mechanism.
3) Fridel craft's alkylation.
4) Any two method of preparation of carbon tetrachloride.
5) Structure and stability of carbonium ion.
6) Markownikoff's rule with examples.

Q.3 Choose and write the correct answer of the following 10 M

1) In stable organic compounds, carbon will always form
   a) 2 bonds
   b) 3 bonds
   c) 4 bonds
   d) 5 bonds

2) Which alkyl free radical is most stable?
   a) Methyl
   b) Primary
   c) Secondary
   d) Tertiary

3) Which of the following is not a nucleophile?
   a) NH_3
   b) $HSO_{\bar{3}}$
   c) $Alcl_3$
   d) $H\bar{O}$

4) Optical isomers that are mirror image are called
   a) Tautomers
   b) Diastereomers
   c) Enantiomers
   d) Metamers

5) Which of the following compounds will show geometrical isomerism
   a) $CH_2 = CHCl$
   b) $CH_3\text{-}C{=}CH.CH_3$
   c) $ClCH = CHBr$
   d) $Cl_2C = CBr_2$

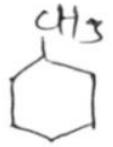
6) Which of the following is a trihalogen derivative of alkane
   a) Carbon tetrachloride
   b) Methyl chloride
   c) Chloroform
   d) Ethyl chloride

7) The carbon atoms involved in the double bond of an alkene are
   a) sp hybridized
   b) sp^2 hybridized
   c) sp^3 hybridized
   d) none of these

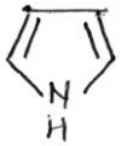
8) 2 . Butene reacts with HBr to give
   a) 1 – Bromobutane
   b) 2 ,3 – Dibromobutane
   c) 2 – Bromobutane
   d) 2 ,2 – Dibromobutane

9) Which of the following compounds is not an aromatic compound?

   a) 

b) 

c) 

d) 

10) Alkyl halides undergo
   a) Electrophilic substitution reactions
   b) Electrophilic addition reactions
   c) Nucleophilic substitution reactions
   d) Nucleophilic addition reactions

Total No. of Printed Pages:2

SUBJECT CODE NO:- 2008
FACULTY OF SCIENCE AND TECHNOLOGY
B.Sc. F.Y (Sem-II)
EXAMINATION JUNE/JULY 2022
Chemistry Paper- V
Inorganic Chemistry

[Time: 1:53 Hours] **[Max.Marks:50]**

Please check whether you have got the right question paper.

N.B 1) Attempt all questions.
2) Illustrate your answer with suitable labeled diagram

Q.1 a) Give the structure and bounding in xeF6 10
b) Explain the formation of water molecule with the help of VSEPR theory 10

OR

a) Discuss the different types of hybridization with examples
b) Explain the formation of SF_6 10
10

Q.2 a) What is radioactivity? Discuss the properties of ∝- particles 10
b) Explain in detail redox titration with suitable example. 10

OR

Write short notes of any two of the following 20
a) Calibration of Burette
b) Electronic configuration of noble gases
c) Hydrogen bonding
d) Isotopes & isobar

Q.3 Select the correct option for each of the following 10

1) The atomic number of helium atom is ----------
a) 2 b) 1
c) 10 d) 5

2) The electronic configuration of noble gases is --------
a) ns^2np^6 b) np^6
c) ns^2 d) $d^{(n-1)}\ ns^2$

3) The hybridized state of xeF_4 is ---------
a) Sp b) Sp^2
c) Sp^3 d) Sp^3d^2

4) $KMnO_4$ act as ----------agent
a) Oxidizing b) Reducing
c) Chelating d) None of these

5) The bond order of CO is ---------
a) Zero b) One
c) Two d) Three

6) VSEPR theory was proposed by ----------
   a) Haitler & London
   b) Pauling & slater
   c) Gillespie & Nyholm
   d) Sidwick & Powell

7) The bond which is formed by the transfer of electron from one atom to other is called-----
   a) Covalent
   b) Ionic
   c) Coordinate
   d) Hydrogen

8) ---------indicator is used in acid base titration
   a) Ferroin
   b) $KMnO_4$
   c) Methylene blue
   d) Phenolpthalien

9) EDTA is ----------ligand.
   a) Monodentate
   b) Bidentate
   c) Tridentate
   d) Hexadentate

10) The shape of ClF_3 molecule is
   a) Triangular planar
   b) T-shaped
   c) V-shaped
   d) See-saw

Total No. of Printed Pages:2

SUBJECT CODE NO: - 2007
FACULTY OF SCIENCE AND TECHNOLOGY
B.Sc. F.Y (Sem-II)
EXAMINATION JUNE/JULY 2022
Chemistry Paper-IV
(Physical Chemistry)

[Time: 1:53 Hours] **[Max.Marks:50]**

Please check whether you have got the right question paper.

N.B 1) Attempt all questions.
2) Illustrate your answer with suitable labeled diagram

Q.1 Derive Kinetic gas equation Deduce Boyle's and Charles's law 20

OR

Discuss in detail laws of crystallography. Differentiate between amorphous and crystalline solids.

Q.2 Derive integrated rate equation for second order reaction having equal concentration. Give characteristics of catalyst 20

OR

Write short notes on any four

a) Calculate distance between two points lying on the straight line
   i) (5,2) and (3,2)
   ii) (2,7) and (-4,3)
b) Using logarithm calculate
   i) 226 ×119
   ii) 426 ÷109
c) Differentiate between solid and liquid.
d) Nematic and cholesteryl liquid crystal
e) Application of colloids
f) Gel and its classification

Q.3 Multiple choice questions 10

1) The average kinetic energy of molecule is directly proportional to ----------
   a) Temperature b) Pressure
   c) Volume d) Absolute temperature

2) $V\alpha\frac{1}{P}$ is ----------law
   a) Boyle's b) Charles Law
   c) Avogadro's law d) None of these

3) $K_o = x/t$ represents ----------order reaction.
   a) Zero b) First
   c) Second d) Pseudo

4) The rate of reaction increases with ----------of concentration
   a) Increase
   b) Decreases
   c) Both a & b
   d) None of these

5) Thread like liquid crystals are called --------
   a) Nematic
   b) Cholesteryl
   c) Smectic
   d) None of these

6) The example of emulsion is ----------
   a) Paint
   b) Smoke
   c) Milk
   d) Curd

7) Amorphous solids are ----------
   a) Isotropic
   b) Anisotropic
   c) Monotropic
   d) None of these

8) HF is a good example of ----------bond
   a) Co-ordinate
   b) Hydrogen
   c) Covalent
   d) None of these

9) Log of 200--------.
   a) 3.00
   b) 2.00
   c) 1.00
   d) None of these

10) The slope of intercept of the line 2y=-yx+2 is ----------
   a) (1,-2)
   b) (2,1)
   c) (-2,1)
   d) (1,2)

Total No. of Printed Pages: 02

SUBJECT CODE NO:- 2001
FACULTY OF SCIENCE AND TECHNOOGY
B.Sc. F.Y Sem. I
EXAMINATION JUNE / JULY 2022
Chemistry Paper-I(Inorganic Chemistry)

[Time: 1:53 Hours] **[Max. Marks:50]**

Please check whether you have got the right question paper.

N.B
1. Attempt all the questions.
2. All questions carry equal marks.
3. Illustrate your answer with suitable labeled diagram.

Q.1 a. What are quantum number? Explain principle quantum number and Arimuthal quantum number. 10

b. What is Ionisation potential? Explain it's trend in periodic table. 10

OR

c. Define electronic configuration? Explain electronic configuration of alkali and alkaline earth metal elements? 10

d. What are interhalogen compounds? Explain in detail Ax_3 and Ax_7 type of pnterhalogen compounds . 10

Q.2 a. State and explain Heisenberg's uncertainty principle and hund's rule of maximum multiplicity 10

b. i. Explain why size of anion is bigger than it's parent atom 10

b. ii. Define electronegativity and explain it's trend in periods in periodic table.

OR

Write notes on any four of the following 20

a. Solvation tendercy of 'S' block elements.
b. Hydrides of group 13^{th} elements
c. Diagonal relationship between boron and silicon.
d. Oxidation state of carbon family
e. Bohr's atomic theory
f. Oxides of Nitrogen and phosphorous

Q.3 Attempt the following 10

1. Magnetic quantum number describe---
   a. Shape of orbital
   b. Spin of electron
   c. Size of orbital
   d. Orientation of suborbitals
2. The element having largest atomic size----------
   a. Na
   b. Cs
   c. Rb
   d. Br

3. In Bunsen flame beryllium shows ----------colour
    a. Crimson red
    b. Violet
    c. Golden yellow
    d. None of these
4. The D- orbital which does not have four lober is --------
    a. $dx^2 - Y^2$
    b. dz^2
    c. dyz
    d. dxy
5. Among the following the strongest base is _____
    a. NH_3
    b. PH_3
    c. AsH_3
    d. SbH_3
6. The nature of $CO_2$is _____
    a. Amphoteric
    b. Basic
    c. Natural
    d. Acidic
7. Shape of D- orbital is _____
    a. Double dumb bell
    b. Umb bell
    c. Spherical
    d. None of these
8. Alkones are the hydrides of _____
    a. Si
    b. N
    c. C
    d. Se
9. The importanant element in biological process 'sodium pump' is _____
    a. Ca
    b. K
    c. Mg
    d. Be
10. Alumina is _____
    a. Al_3N_3
    b. $Alcl_3$
    c. $Al(oH)_3$
    d. Al_2O_3

Total No. of Printed Pages:2

SUBJECT CODE NO: - 2012
FACULTY OF SCIENCE & TECHNOLOGY
B.Sc. S.Y (Sem-IV)
EXAMINATION JUNE/JULY 2022
Chemistry Paper-XI (Physical Chemistry-II)

[Time: 1:53 Hours] **[Max.Marks:50]**

Please check whether you have got the right question paper.

N.B. i) Attempt all questions.
ii) Figures to the right indicate full marks.
iii) Use of non-programmable calculator is allowed.

Q.1 a) What is phase rule? Explain the terms involved in it. 10
b) Explain Arrhenius theory of electrolytic dissociation and give its limitations. 10
OR
c) Explain effect of dilution on specific and equivalent conductance. Calculate equivalent conductance when 0.5N solution of a salt is placed between two platinum electrodes 2.0 cm apart and area of cross section 4.0 cm^2 has a resistance of 25 ohms. 10
d) Describe construction and working of standard hydrogen electrode. 10

Q.2 a) Discuss phenol-water and nicotine-water system. 10
b) What is buffer solution? Explain in brief the mechanism of acidic and basic buffer 10
OR
Write short notes on (any four) 20
1) Advantages of conductometric titrations.
2) Ostwald's dilution law
3) Raoult's law and Henry's law
4) Desilverisation of lead
5) Electrochemical Series
6) Conventional representation of electro-chemical cells.

Q.3 Choose and write the correct answer of the following 10

1. The phase rule was first discovered by…….
(a) Gibbs (b) Nernst
(c) Arrhenius (d) Ostwald

2. Number of phases present in water system are …….
(a) 1 (b) 2
(c) 3 (d) 0

3. For one component system the phase rule is …….
(a) F=4-P (b) F=3-P

(c) F=2-P (d) F=1-P

4. The eutectic temperature of silver-lead system is …….
   (a) 300°C (b) 290°C
   (c) 305°C (d) 303°C

5. For strong electrolytes, the degree of dissociation is …….
   a) nearly equal to one
   b) nearly equal to two
   c) nearly equal to zero
   d) nearly equal to infinity

6. In Hittorf's method for determination of transport number we make use of a ……
   (a) H-tube (b) U-tube
   (c) V-tube (d) L-tube

7. Kohlrausch's law can be expressed as ……
   (a) $\lambda_\alpha = \lambda_a - \lambda_c$ (b) $\lambda_\alpha = \lambda_c - \lambda_a$
   (c) $\lambda_\alpha = \lambda_a + \lambda_c$ (d) $\lambda_\alpha = \lambda_a \times \lambda_c$

8. The pH of 0.01M KOH Solution will be ……
   (a) 1 (b) 2
   (c) 14 (d) 12

9. The cell which converts electrical energy into chemical energy is …….
   (a) electrolytic cell (b) electrochemical cell
   (c) both a & b (d) none of these

10. The Henderson equation for an acidic buffer is …….
    a) $\text{pH=pKa} - \log\frac{[\text{Salt}]}{[\text{acid}]}$
    b) $\text{pH=pKa} + \log\frac{[\text{Salt}]}{[\text{acid}]}$
    c) $\text{pH=pKa} - \log\frac{[\text{acid}]}{[\text{Salt}]}$
    d) $\text{pOH=pKa} + \log\frac{[\text{Salt}]}{[\text{acid}]}$

Total No. of Printed Pages:02

SUBJECT CODE NO: - 2011
FACULTY OF SCIENCE AND TECHNOLOGY
B.Sc. S.Y (Sem-IV)
EXAMINATION JUNE/JULY 2022
Chemistry Paper-X
(Inorganic Chemistry)

[Time: 01:53 Hours] **[Max.Marks: 50]**

Please check whether you have got the right question paper.

N.B 1) All questions are compulsory.

Q.1 a) What are transition elements? Give the electronic configuration of first transition series. 10

b) Explain Arrhenius concept of acids and bases with suitable example & discuss its limitations. 10

OR

c) What are Actinides? Explain oxidation states of actinides. 10

d) What is isomerism? Discuss any two types of isomerism with suitable example? 10

Q.2 a) Discuss in detail valence bond theory with its limitations and applications. 10

b) Explain ammonolysis and redox reactions in liquid ammonia. 10

OR

c) Write short notes on (any four) 20

1) General features of d-block elements
2) Lanthanide contraction
3) Acid-base reaction in liquid SO_2
4) Postulates of Werner's theory
5) Bronsted-Lawry concept of acids and bases
6) Types of ligands

Q.3 Multiple Choice Questions 10

1) The oxidation states of Ni in $[Ni(Co)_4]$is
   a) 0 b) +1 c) +2 d) +3

2) Which of the following is a Lewis acid?
   a) NH_3 b) NCl_3 c) $AlCl_3$ d) PCl_3

3) Lanthanides are called
   a) 5f series elements
   b) 4f series elements
   c) 3d series elements
   d) 4d series elements

4) Which of the following is non protic solvent
   a) H_2O b) CH_3COOH c) H_2SO_4 d) SO_2

5) General electronic configuration of first transition series
   a) $3d^{1-10}\ 4s^2$ b) $4d^{1-10}5s^2$
   c) $3d^{1-5}\ 4s^2$ d) $4f^{1-14}6s^2$

6) Ethylene diamine is
   a) Monodentate ligand b) Tridentate ligand
   c) Bidentate ligand d) Hexadentate ligand

7) According to Werner's theory, primary valency is
   a) Ionisable valency b) Non ionisable valency
   c) Variable valency d) Additive valency

8) The conjugate acid of NH_2^- is
   a) NH_3 b) NH_2OH c) NH_4^+ d) N_2H_4

9) Which of the following element shows $+1$ oxidation state
   a) Zn b) Mn c) Cr d) V

10) The hybridization of $[FeF_6]^{3-}$ is
   a) dsp^2 b)sp^3 c) d^2sp^3 d) sp^3d^2

Total No. of Printed Pages:02

SUBJECT CODE NO:- 2005
FACULTY OF SCIENCE AND TECHNOOGY
B.Sc. S.Y Sem. III
EXAMINATION JUNE/JULY 2022

Chemistry Paper-VII
(Organic Chemistry)

[Time: 1:53 Hours] **[Max. Marks: 50]**

Please check whether you have got the right question paper.

N.B
1. Attempt all questions.
2. Use blue or black pen only.

Q.1 A) 1. Explain Reimer-Tieman reaction with suitable mechanism 06
2. Give any two methods of preparation of ethylene glycol. 04

B) 1. Explain Hell-volhard zeilinstcy reaction with mechanism. 06
2. Pina col-pina colone rearrangement, Explain. 04

OR

C) Explain with Mechanism of Baeyervilleger oxidation of cyclie ketone. 10

D) How will you prepare acetic acid from 10
1) CO_2
2) Nitrile
3) Ester
4) Amide
5) Acid Chloride

Q.2 A) Explain the reduction of Nitrobenzene in acidic, basic and natural media. 10

B) Explain with mechanism Hoffmannbromide reaction. 10

OR

C) Write short note on (any four) 20
1) Intermolecular fries rearrangement
2) Acidic Nature of alcohols
3) Reaction of amine with Nitrous acid
4) Decorboxylation of carboxylic acid
5) Ndol condensation
6) Mannish reaction

Q.3 Choose and Write the correct answer of the following questions. (answer all questions) 10

1) Which of the following having maximum Pka value

a. $CH_3 - CH_2 - CH_2 - CH_2 - OH$ b. $CH_3 - CH_2 - CH_2 - OH$

c. $H_3C - CH_2 - \underset{\underset{OH}{|}}{CH} - CH_3$

d. $H_3C - CH_2 - \overset{\overset{CH_3}{|}}{\underset{\underset{OH}{|}}{C}} - CH_3$

2) The product of fries reaction is _____

a. O- Hydroxy b. O-Hydroxy acid
c. P- Hydroxy acid d. M- Hydroxy acid

3) The carbon atom of carbonyl compound is _____

a. $SP^2 - Hybridized$ b. $SP^3 - Hybridized$
c. $SP - Hybridized$ d. $SP^3\,d - Hybridized$

4) Which of the following is the strongest acid.

a. Benzoic acid b. P-Methoxy benzoic acid
c. P-Nitro benzoic acid d. P- methyl benzoic acid

5) The carboxylic acid that under goes decarboxylation most readily under mild conditions is

a. Acetic acid b. Benzoic acid
c. $\beta - keto$ carboxyylic acid d. All of these

6) Claisen rearrangement is carried out in presence of _____

a. Base b. Acid
c. Heat d. All of above

7) $\beta - amino$ carbonyl compound is the product of _____

a. Mannich reaction b. Benzoin condensation
c. Knoerengel condensation d. Gatlerman reaction

8) Which of the following doesnot given HVZ reaction ?

a. Acetic acid b. Phenyl acetic acid
c. Benzoic acid d. Butyric acid

9) Vicinal diols can be prepared by _____

a. Oxidation of alkanes with O_5O_4 b. Oxidation of alkene with O_5O_4
c. Reduction of alkanes with O_5O_4 d. Reduction of alkenes with O_5O_4

10) Which of the following does not show aldol condensation?

a. Mono –chloro acetaldehyde b. Tri –chloro acetaldehyde
c. Acetal dehyde d. Acetone

Total No. of Printed Pages: 03

SUBJECT CODE NO:- 2006
FACULTY OF SCIENCE & TECHNOLOGY
B.Sc. S.Y Sem-III
EXAMINATION JUNE / JULY 2022
Chemistry Paper-VIII
(Physical Chemistry)

[Time: 1 : 53 Hours] **[Max. Marks:50]**

Please check whether you have got the right question paper.

N.B
1) Attempt all questions.
2) Illustrate year answer with suitable diagram

Q.1 a) What is Gibb's energy function? Give its variation with respect to temperature and pressure. 10

b) Define the terms open, closed, isolated, homogeneous and Heterogeneous systems. When 2 moles of an ideal gas expands isothermally and reversibly at constant temperature 300 k from $10dm^3$ to $20\ dm^3$. calculate $\triangle E$, q and W. (Given : R = 8.314 JK^{-1} $mol.^{-1}$ 10

OR

c) Write any five statements of second law of thermodynamics. Calculate the efficiency and amount of heat supplied to carnot cycle operating between temperatures 300k and 423k , if maximum work obtained is 575 J. 10

d) State and explain Hess's law of heat summation. Give its applications. 10

Q.2 a) Define entropy. Explain how entropy can be used as criteria of spontaneity and equilibrium. 10

b) Define Clapeyron – Clausius equation. Give its applications. 10

OR

Write short notes on (any four) 20
a) Reversible and irreversible processes.
b) First law of thermodynamics.
c) Helmholtz free energy function.
d) Carnot theorem.
e) Reaction isochore.
f) Le – chatelier's principle.

Q.3 Multiple choice questions. 10
1. Which out of the following is not an intensire property?
   a) Viscocity

b) Density
c) Energy
d) Surface tension

2. An isochoric process takes place at constant……
   a) Volume
   b) Pressure
   c) Temperature
   d) Heat

3. The amount of heat required to raise the temperature of one mole of the substance by 1k is called …….
   a) Molar heat
   b) Molar capacity
   c) Heat capacity
   d) Molar heat capacity

4. Change in enthalpy in reversible isothermal expansion of an ideal gas is ……
   a) Zero
   b) One
   c) Less than zero
   d) Greater than zero

5. Which is the correct unit for entropy.
   a) KJ mol.
   b) Cal deg^{-1} mol^{-1}
   c) JK^{-1} mol.
   d) Cal deg^{-1} mol.

6. The efficiency of heat engine operating 200K to 100K is ….
   a) 1.0
   b) 0.25
   c) 0.75
   d) 0.50

7. In an irreversible process the entropy is ……
   a) Increases
   b) Decreases
   c) Zero
   d) None of these

8. The work function (A) is defined as ……..
   a) A = E + TS
   b) A = H + TS
   c) A = E – TS
   d) A = H – TS

9. $\frac{dp}{dt} = \frac{\triangle H_v}{T(v_2 - v_1)}$ is a …..
   a) Vant hoff isotherm
   b) Gibbs equation
   c) Clapeyron equation
   d) Helmoholtz equation

10. According to Le-chatelier's principle. Increase in pressure shifts the equilibrium towards the direction in which the ……
   a) No. of moles increases
   b) No. of moles decreases
   c) Equal no. of moles
   d) None of these

Total No. of Printed Pages:2

SUBJECT CODE NO:-2009
FACULTY OF SCIENCE AND TECHNOLOGY
B.Sc. Third Year Sixth Semester
EXAMINATION JUNE/JULY2022
Chemistry Paper –XVI
(Inorganic Chemistry)

[Time: 1.53 Hours] **[Max.Marks:50]**

Please check whether you have got the right question paper.

N.B i) Attempt all questions
ii) Draw neat and labeled diagrams wherever necessary.

Q.1 a) Discuss the splitting of d- orbitals in tetrahedral metal complexes. 10
b) Give two methods of preparation, properties and uses of organotitanium compounds. 10

OR

c) Discuss the biological importance of ca++ and Mg++ ions. 10
d) What is chromatography? Discuss the technique of ascending paper chromatography. 10

Q.2 a) What are metal carbonyls? Discuss the nature of bonding in metal carbonyls. 10
b) Explain i) Types of Electronic transitions 10
ii) Spin selection rule

OR

c) Write short notes (any four) 20
1) $\Delta t = 4/9\ \Delta_o$ explain it
2) Applications of Thin layer chromatography
3) Biological importance of K^+ ions
4) Spectro chemical series
5) Metal ethylenic complexes
6) Orgel energy level diagram of d' system

Q.3 Multiple choice questions 10

1) The strong field ligand is
a) F^- b) Cl^- c) I^- d) CN^-

2) C.F.S.E of d^3 system in strong field octahedral complex is
a) +6Dq b) -4 Dq c) -12 Dq d) +12 Dq

3) The ground term symbol for d^6 system is
a) 5_D b) 6_S c) 4_F d) ^{2}D

4) laporte allowed transition is
a) $\Delta l = 0$ b) $\Delta l = \pm 1$ c) $\Delta s = 0$ d) $\Delta s = 1$

5) The central metal ion present in chlorophyll is
a) Fe^{++} b) Mg^{++} c) Ni^{++} d) Cu^{++}

6) The role of hemoglobin in bio system is
a) Transport of O_2 b) Store O_2 c) store CO_2 d) None of these

7) Paper chromatography is an example of
a) Adsorption chromatography
b) Partition chromatography
c) Gas chromatography
d) All of these

8) In descending paper chromatography the solvent flows in
a) Upward direction b) Downward direction c) circular direction d) None of these

9) IUPAC name of $-(CH_3)_2$ Zn is
a) Methyl zinc b) diethyl zinc c) dimethyl zinc d) ethyl methyl zinc

10) For polymerizing ethylene to form polythene by
a) Organo Al compounds b) Organo Hg compounds
c) Organo Zn compounds d) none of these

Total No. of Printed Pages:2

SUBJECT CODE NO: - 2010
FACULTY OF SCIENCE AND TECHNOLOGY
B.Sc. T.Y (Sem-VI)
EXAMINATION JUNE/JULY 2022
Chemistry Paper –XVII (Organic Chemistry)

[Time: 1:53 Hours] **[Max.Marks:50]**

Please check whether you have got the right question paper.

N.B 1) Attempt all questions.
2) Figures to the right indicate full marks.

Q.1 a) What are heterocyclic compounds? Give the skraup synthesis of Quinoline. 10
b) Give conversion of glucose into fructose. Fructose into glucose. 10

OR

c) What are carbohydrates? Explain mutarotation with mechanism.
d) Explain with mechanism the nitration and sulphonation of pyrrole. 10
10

Q.2 a) What are dyes? Describe the synthesis of congo red and malachite green. 10
b) Explain addition and condensation polymers with suitable examples. 10

OR

c) Write short notes on (any four) 20
i) Fisher indole synthesis
ii) Lactose
iii) Synthesis of polystyrene
iv) Properties of Ideal drugs
v) Synthesis of polyvinyl chloride
vi) Synthesis of sulphaguanidine

Q.3 Multiple choice questions: 10

1) Milk sugar is chemically known as
a) Glucose b) Fructose
c) Lactose d) Maltose

2) -------is non-reducing sugar.
a) Lactose b) Sucrose
c) Fructose d) Glucose

3) The carbon atoms in pyrrole are
a) Sp^3 hybridized b) Sp^2 hybridized
c) Sp hybridized d) None of these

4) The product of Bischler-Napieralski reaction is ----------
a) Quinoline b) Isoquinoline
c) Pyridine d) Pyrrole

5) What is used to a free radical polymerization?
   a) Benzyl chloride
   b) Styrene
   c) Benzoyl peroxide
   d) Phthalic acid

6) The example of condensation polymer is ----------
   a) Nylon -66
   b) Nylon - 6
   c) PVC
   d) Polyethylene

7) Phenolphthalein shows pink colour in -------
   a) Acid solution
   b) Alkali solution
   c) Phenolic solution
   d) Neutral solution

8) Paracetamol drug is used as ----------
   a) Analgesic
   b) Hyphotic
   c) Sedative
   d) None of above

9) A chemical substance which reduces temperature of body in fever is ----------
   a) Anti-inflammatory
   b) Pyretic
   c) Antipyretic
   d) Antiseptic

10) Pyrrole couples with benzene diazonium chloride to give----------
   a) 2-phenylazo pyrrole
   b) 3- phenylazo pyrrole
   c) 2-phenyl pyrrole
   d) 2-amino pyrrole

Total No. of Printed Pages: 02

SUBJECT CODE NO:- 2003
FACULTY OF SCIENCE AND TECHNOOGY
B.Sc. T.Y Sem. V
EXAMINATION JUNE / JULY 2022

Chemistry Paper – XIII
(Physical Chemistry)

[Time: 1:53 Hours] **[Max. Marks:50]**

Please check whether you have got the right question paper.

N.B
i. Attempt all questions.
ii. Figures to the right indicate full marks.

Q.1 a) State the postulates of Bohr's theory. Give its defects. 10

b) Discuss the rotational spectra of rigid diatomic molecule. Calculate the moment of inertia of HCL molecule it its bond length is 1.27 A^0 10
(Atomic mass of H=1.008
Atomic mass of cl = 35.5
N = 6.023×10^{23})

OR

c) Explain radiative transitions with the help of Jablonski diagram. When the substance was exposed to light 0.002 moles of it reacted in 30 minutes. Calculate quantum yield if it absorbs 2.3×10^6 photons per second. 10

d) Explain diamagnetic and paramagnetic substances. How magnetic property is measured by Guoy balance method? 10

Q.2 a) What is rigid rotator? Derive an expression for energy of rigid rotator. 10

b) State the explain Heisenberg's uncertainty principle. Calculate the uncertainty in velocity of an electron if uncertainty in position is 0.1 A^0. 10
(mass of $e = 9.1 \times 10^{-31}\ kg$,
$h = 6.626 \times 10^{-34}$ Jsec)

OR

Write short notes on any four of the following: 20
a) Photoelectric effect
b) Electromagnetic radiation
c) Photosensitized reactions
d) Application of dipole moment in structure determination

e) Physical vapor deposition method
f) Synthesis of nanomaterial by using plant extract

Q.3 Select and write correct answer of the following multiple choice questions 10

1) In Compton effect the change in wavelength is given by ----------
   a) $\Delta\lambda = \frac{2h}{mc}\ sin\theta$
   b) $\Delta\lambda = \frac{2h}{mc}\sin^2\theta$
   c) $\Delta\lambda = \frac{2h}{mc}\ cos\theta$
   d) $\Delta\lambda = \frac{2h}{mc}\cos^2\theta$

2) De Broglie's wavelength is given by ----------
   a) $\lambda = \frac{h}{m\vartheta}$
   b) $\lambda = \frac{h^2}{m\vartheta}$
   c) $\lambda = \frac{h}{m\vartheta^2}$
   d) $\lambda = \frac{h^2}{m^2\ \vartheta^2}$

3) In which region rotational energy changes are studies
   a) Ultraviolet
   b) Visible
   c) Microwave
   d) Infrared

4) In spectrometer the radiation sourse in UV region is ----------
   a) Tungsten lamp
   b) Hydrogen discharge lamp
   c) Heating filament
   d) None of these

5) Photochemical reactions are ----------
   a) Selective
   b) Non selective
   c) Both a and b
   d) None of these

6) Rate of photochemical reactions depend upon ----------
   a) Intensity of light
   b) Frequency of light
   c) Amplitude of light
   d) Velocity of light

7) Racemic mixture is ---------
   a) Leavo rotatory
   b) Dextro rotatory
   c) Optically inactive
   d) None of these

8) Dipole moment in betronuclear diatomic molecule arises due to difference in ----------
   a) Ionization potential
   b) Electro negativity
   c) Atomic size
   d) None of these

9) 1 nanometer is equal to ---------
   a) $0.10\ A^0$
   b) 1 millimicron
   c) 0.1 micro centimeter
   d) All of these

10) Which of the following approach is used in high energy ball milling method ----------
   a) Top to bottom
   b) Bottom to top
   c) Horizontal
   d) None of these

Total No. of Printed Pages: 03

SUBJECT CODE NO:- 2004
FACULTY OF SCIENCE AND TECHNOOGY
B.Sc. T.Y Sem. V
EXAMINATION JUNE / JULY 2022

Chemistry Paper –XIV
(Organic Chemistry)

[Time: 1:53 Hours] **[Max. Marks:50]**

Please check whether you have got the right question paper.

N.B a. All questions are compulsory

Q.1 A. A compound having molecular formula $C_9H_{11}\,Br$ showed the following signals in PMR data. 10
$\delta 2.25\ (M, 2H), \delta\ 2.75\ (t, 2H), \delta 3.38(t, 2H), \delta 7.22\ (s, 5H)$
Assign the structure of the compound.

B. How will you synthesize the following from ethyl acetoacetate 10
1. Succinic acid
2. N-Butyric acid
3. Crotonic acid

OR

A. Predict the following compounds on the basis of ^{1}H NMR spectroscopy. 10
1. Ethyl alcohol
2. Acetaldehyde.

B. Discuss the manufacture of soyaben oil by solvent extraction method. 10

Q.2 A. Discuss the synthesis of glycine, propionic acid and barbuturic acid from diethyl malonate. 10

B. How will you prepare the following from methyl magnesium bromide. 10
1. t-butyl alcohol
2. Propane
3. Acetic acid.

OR

A. Write a short notes on (any four)
1. ^{1}H NMR spectrum of toluene 20
2. Coupling constant
3. Organizine compound
4. Keto-enol tautomerism
5. Claisen condensation with mechanism
6. Iodine value.

Q.3 Chose the correct option for the following. 10
1. Ethyl bromide molecule shows----------
   a. Two types of PMR peaks.
   b. One type of PMR peaks

c. Both ‘a’ and ‘b’ 10
d. None of these

2. The proton (s) with similar environment known as----------
   a. Equatorial protons
   b. Equivalent protons
   c. Axial protons
   d. None of these
3. When external magnetic field is opposed by induced magnetic field this effect is known as _____
   a. Deshielding effect
   b. Shielding effect
   c. Mesomeric effect
   d. Inductive effect
4. Chemical shift of promatic proton is _____
   a. $\delta 3.7\ to 4.3$
   b. $\delta 3\ to\ 4$
   c. $\delta 1\ to\ 3.6$
   d. $\delta 6\ to\ 9$
5. When methyl magnesium bromide on the reaction with sylphur gives _____
   a. Ethanethiol
   b. Ethylalcohol
   c. Diethyl thioether
   d. None of these
6. The product formed during Reformatsky reaction is _____
   a. $\alpha - hydroxy\ ester$
   b. $\beta - hydroxy\ ester$
   c. Both ‘a’ and ‘b’
   d. None of these
7. Acetoacetic ester on heating with urea gives_____
   a. 4- methyl uracil
   b. Uric acid
   c. Acetone
   d. Benzophenone
8. The acidity of active $\alpha - -hydroxy$ atom in ethyl acetoacetate is due to _____
   a. Mesomeric effect
   b. Resonance effect
   c. –I effect
   d. +I effect
9. Oil on reaction with alcoholic KoH give _____
   a. Glycerol and soap
   b. Glycerol and fatty acid
   c. Ethanol and fatty acid
   d. None of these
10. Detergent in made up of two groups they are_____
   a. Hydrophobic and hydrobiotic
   b. Hydrophobic and hydrophilic

c. Hydrophobic and hydrophilic
d. None of these.