Total No. of Printed Pages:2

SUBJECT CODE NO:- L-2001
FACULTY OF SCIENCE
B.Sc. T.Y. (Sem-V) Examination Oct/Nov 2018
Chemistry Paper – XIII
(Physical Chemistry)

[Time: 1:30 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 side indicate full marks .

Q.1 a) What do you understand by the dual character of electron? Derive de- Broglie's equation? Calculate the wave length of an electron having kinetic energy equal to $4.55 \times 10^{-25} J$. ($h = 6.626 \times 10^{-34} kgm^2 \sec^{-1}$ and mass of electron $= 9.1 \times 10^{-31} kg$) 10

b) Derive Schrodinger's wave equation. How this equation led to quantization of energy? 10

OR

c) State and explain Einstein law of photochemical equivalence. Calculate the quantum yield of the reaction when a substance A was exposed to light, 0.002 mole of it reacted in 20 minutes and 4 seconds. In the same time substance A absorbed 2.0×10^6 photons of light per second. (Avogadro number $N = 6.023 \times 10^{27}$) 10

d) What is dipole moment? Give its applications for molecular structure determination? 10

Q.2 a) Describe how the bond lengths of diatomic molecules can be determined from the rotation spectra? Calculate the reduced mass and moment of inertia of HCl having bond length 1.27 A^o. The atomic weights are 1.008 and 34.98 for H and Cl respectively. ($N = 6.023 \times 10^{23}$). 10

b) Explain the regions of the spectrum with the range of visible, UV and IR regions. Calculate the uncertainty in position of an electron . If the uncertainty in velocity is $5.7 \times 10^5 msec^{-1}$.(Mass of electron $=9 \times 10^{-31} kg$) 10

OR

Write short notes on any four of the following. 20

a) Distinguish between photochemical and thermal reactions.
b) Optical activity
c) Quantum yield.
d) Born – Oppenheimer approximation
e) Chemical vapour deposition method
f) High energy ball milling method.

Q.3 Multiple choice questions 10

1) According to de- Broglie's equation the momentum of a particle in motion is ---------- proportional to wavelength.
   a) Inversely b) directly c) not d) none of these

2) The relation $\Delta x.\Delta p = \frac{h}{4\pi}$
   a) Heisenberg's uncertainty principle b) Schrodinger wave equation
   c)de Broglie equation d) Pauli's exclusion principle

3) The wavelength of UV and visible regions of electromagnetic spectrum is ----------
   a) Less than 2000A^o b) more than 8000 A^o
   c) 2000 A^o to 8000 A^o d) none of these.

4) For UV radiation most commonly used radiation source is
   a) Hydrogen lamp b) deuterium c) both d) none

5) The paramagnetism is due to the presence of
   a) Paired electrons b) unpaired electrons
   c) both paired and unpaired electrons d)none of these

6) Optical activity is
   a) An additive property b) a constitutive property
   c) additive and constitutive property d)none of these.

7) The equation for Lambert's law is
   a) $In\left(\frac{Io}{I}\right) = -kx$ b) $In\left(\frac{I}{Io}\right) = \in Cx$ c) $In\left(\frac{I}{Io}\right) = -\in Cx$
   d) $In\left(\frac{I}{Io}\right) = -kx$

8) A species which can both absorb and transfer radiant energy for activation of the reactant molecule is called
   a) Radioactive substance b) an ioniser
   c) a photochemical substance d)a photosensitizer

9) The size of nanoparticles is between ------- nm.
   a) 100 to 1000 b) 0.1 to 10 c) 1 to 100 d) 0.01 to 1

10) Nanoparticles of which substance were found on the surface of the sword of Tipu Sultan?
   a) Gold b) lead c) carbon d) silicon

Total No. of Printed Pages:2

SUBJECT CODE NO:- L-2002
FACULTY OF SCIENCE
B.Sc. T.Y. (Sem-V) Examination Oct/Nov 2018
Chemistry Paper – XIV
(Organic Chemistry)

[Time: 1:30 Hours] **[Max.Marks:50]**

Please check whether you have got the right question paper.

N.B 1. All questions are compulsory.

a) Assign the structure to the compound with molecular formula C_8H_8O which exhibits the following spectral data. 10
$'HNMR\ data:\ \delta 2.8\ (d, 2H), \delta\ 7.2-7.6\ (m, 5H), \delta\ 9.8\ (t, 1H)$

b) How will you synthesize the following from ethyl acetoacetate 10
i) Butan -2-one
ii) Pentane – 2, 4- dione

OR

a) How will you distinguished following compounds on the basis of $'HNMR$ spectroscopy? 10
i) Acetone
ii) Ethyl acetate
iii) Toluene

b) Explain the manufacture of soya bean oil by solvent extraction method. 10

Q.2 a) How can you prepare 2 – methyl butanoic acid & succinic acid starting from diethyl malonate? 10

b) How can you prepare the following from methyl magnesium bromide? 10
i) 2- methyl -2-propanol
ii) 2- propanol

OR

a) Write short note on (any four) 20
1) Coupling constant
2) Equivalent & nonequivalent protons
3) Organo zinc compounds
4) Keto – enol tautomerism
5) Active methyl compounds
6) Iodine value

Q.3 Choose the appropriate option for the following multiple choice questions. 10

1) How many NMR signals would be given by the compound 2,2 -di methyl propane ?
   a) 4 b) 2 c) 1 d) 3

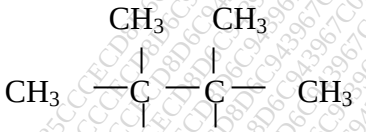
2) Which of the following compound has most deshielded proton?
   a) CH_3-I b) CH_3 – Br c) CH_3-Cl d) CH_4

3) Chemical shift of carboxylic proton is
   a) 10 to 12 b) 4 to 5 c) 1 to 3 d) 7 to 8

4) Ethyl acetoacetate can be prepared by
   a) Rosenmund's reaction b) kolbe's electrolytic reaction c) claisen condensation
   d)Grignard reagent

5) Acetoacetic enter in enol form condenses with Urea gives
   a) 4- methyl uracil b) crotonic acid c) uric acid d) succinic acid

6) How many set of equivalent protons are present in the following compound?



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

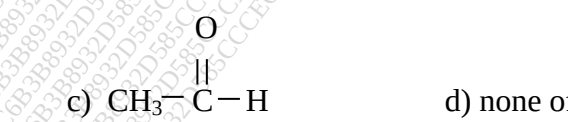
7) Saponification of a fat produce
   a) Glycerol b) lactic acid c) soap d) both a & c

8) Soap in the presence of calcium & magnesium salt form
   a) Insoluble salts b) soluble salt c) highly soluble d) none of these

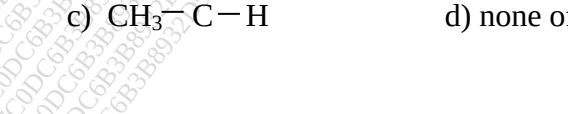
9) Ethyl magnesium bromide is reacted with solid carbon dioxide gives
   a) Acetic acid b) formic acid c) propionic acid d) carbonic acid

10) Which of the following given tertiary alcohol when treated with Grignard reagent?

   a)



   b)



   c)

   d) none of these

Total No. of Printed Pages:02

SUBJECT CODE NO:- L-2007
FACULTY OF SCIENCE
B.Sc. F.Y (Sem-I) Examination Oct/Nov 2018
Chemistry Paper-I
(Inorganic Chemistry)

[Time: 1:30 Hours] **[Max.Marks:50]**

Please check whether you have got the right question paper.

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

Q.1 a) What are quantum numbers? Explain Magnetic quantum number and Spin quantum number. 10

b) What is electronegativity? Explain the trend in periodic table. 10

OR

c) What are s-block elements? Discuss the role of alkali metals in biological system. 10

d) What are inter halogen compounds? Explain its types with suitable examples. 10

Q.2 a) Explain the hydrides and oxides of 15^{th} or VA group elements. 10

b) State and explain Pauli's Exclusion Principle and Hund's rule of maximum multiplicity. 10

OR

Write short notes on <u>any four</u> of the following. 20
a) Diagonal relationship of Boron with Silicon.
b) Trends of Electron Affinity in periodic table.
c) Aufbau Principle
d) Electronic Configuration of IIA group elements.
e) Oxides of IVA or 14^{th} group elements.
f) Postulates of Bohr's theory.

Q.3 Attempt the following:- 10

1) Which pair of atomic number belongs to p-block elements?
a) 7,8 b)3,4 c)11,12 d)19,20

2) The two electrons present in an orbital are distinguished by ----------
   a) Principle Quantum Number b)Azimuthal Quantum Number
   c)Magnetic Quantum Number d)Spin Quantum Number

3) Highly reactive elements are
   a) s-block b) p-block c) d- block d) f- block

4) Which of the following is most electronegative element?
   a) F b) Cl c) Br d)I

5) Which of the following has lowest ionization potential?
   a) Li b) Na c) K d)Rb

6) In a group, top to bottom electron affinity----------
   a) Increases b) Decreases
   c)Remains constant d) None of these

7) Number of electrons in outermost orbital of Alkali metals are ----------
   a) 4 b) 2 c) 1 d) 3

8) Which of the following element has zero electronegativity value
   a) Oxygen b) Fluorine
   c)Carbon d) Neon

9) Principle quantum number is represented as:
   a) n b) l c) m d) s

10) Which of the following metal is present in bone
   a) Li b) Na c) Mg d) Ca

Total No. of Printed Pages:02

SUBJECT CODE NO:- L-2008
FACULTY OF SCIENCE
B.Sc. F.Y. (Sem-I) Examination Oct/Nov 2018
Chemistry Paper – II
(Organic Chemistry)

[Time: 1:30 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) What is hyperconjucation? With its help, explain which of the following carbocation is most stable. 10
i) Ethyl carbocation ii) isopropyl carbocation

b) Explain the concept of localized and delocalized chemical bond with suitable examples. 10

OR

a) What is hydrogen bonding? Explain its types. 10

b) Classify the following into electrophiles and nucleophiles and give regions? 10
1) H_2O 2) NH_3 3) CO_2 4) Methyl carbocation

Q.2 a) What is mean by optical Activity? Predict whether following compounds optically active or not. 10
1) 2-chloro butane 2) 1- chloro butane 3) isochloro butane
4) tert-Butyl chloride 5) Glucose

b) What is the action following reagent on propene. 10
1) dil. H_2SO_4 2) Bromine in acetic acid
3)HBr, H_2O_2 4) HB_r in absence of peroxide.

OR

Write a short note on <u>any four</u> of the following. 20
1) Sigma and pi(π) M.O. diagram of Benzene
2) Synthesis of chloroform
3) Corey-House reaction
4) Threo and erythro di tereomers
5) Suphonation of Benzene
6) D and L isomers.

Q.3 Choose the correct alternative for the following multiple choice questions. 10

1) Dimethyl ethers and Ethanol are ---------- isomers.
   a) Position b) chain c) functional group d) Metamers

2) The instrument use for measuring optical activity is
   a) Conductometers b) polarimeters c) Lactometer d)Spectrometer

3) Marsh gas contains----------
   a) H_2S b) $CHCl_3$ c) C_2H_4 d) CH_4

4) Bayer's reagent is
   a) HI b) $Br_2 - CH_3COOH$ c) $KmnO_4$ d) CH_3mgBr

5) Which of the following compound obeys Huckel Rule
   a) Naphthalene b) n- Hexane c) Cyclohexane d) All of these

6) Chloroform is ---------- derivative of alkane.
   a) Monohalogen b) Dihalogen c)Trihalogen d)Tetrahalogen

7) Order of stability of carbocation is
   a) $1° > 2° > 3°$ b) $2° > 3° > 1°$ c) $3° > 1° > 2°$ d) $3° > 2° > 1°$

8) Reaction bet^n ethene and hydrogen chloride is
   a) Electrophilic addition b) Nucleophilic addition
   c)Electrophilic substitution d)Nucleophilic substitution

9) The hybridization of carbon atom in carbanion is
   a) SP b) SP^2 c) SP^3 d) SP^3d

10) Which of the following shows higher negative Inductive effect?
   a) Cl b) F c) – OH d) $-NO_2$

Total No. of Printed Pages:3

SUBJECT CODE NO:- L-2013
FACULTY OF SCIENCE
B.Sc. S.Y (Sem-III) Examination Oct/Nov 2018
Chemistry Paper-VII
(Organic Chemistry)

[Time: 1:30 Hours] **[Max.Marks:50]**

Please check whether you have got the right question paper.

N.B i) Attempt all questions.
ii) Use blue or black pen only.

Q.1 a) How is phenol prepared from? 10
i) Chlorobenzene.
ii) Benzene sulphonic acid
iii) Cumene.

b) i) Explain pinacol –pinacolone rearrangement with mechanism. 06
ii) How will you prepare glycerol from propene? 04

OR

c) Explain Aldol condensation with mechanism. 10

d) With the help of suitable example, explain the mechanism of 10
i) Benzoin condensation
ii) Hell – volhard – Zelinsky Reaction.

Q.2 a) Explain nitration of benzene in acidic, neural and basic medium. 10

b) How will you prepare amines from 10
i) Amide
ii) Nitrile
iii) Nitro compound.

OR

c) Write short notes on (any four) 20
i) Acidic nature of phenol
ii) Oxidation of glycol using lead tetra-acetate
iii) Use of acetals as protecting group
iv) Methods of formation of Acrylic acid
v) Quaternary ammonium salts as PTC
vi) Mannich Reaction.

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

1) Which of the following is weakest base in water?
   a) Aniline
   b) P-nitroaniline
   c) Trimethyl aniline
   d) Ammonia

2) Primary amine reacts with an aldehyde to give
   a) Amide
   b) Imine
   c) Nitrile
   d) Nitro compound

3) Which of the following is weakest acid?
   a) CH_3COOH
   b) $Cl_2CHCOOH$
   c) $ClCH_2COOH$
   d) HCOOH

4) Which of the following does not contain carboxyl group?
   a) Benzoic acid
   b) Aspirin
   c) Picric acid
   d) Ethanoic acid

5) The base catalyzed Adol reaction between two molecules of acetaldehyde gives.
   a) A dialdehyde
   b) β –hydroxyaldehyde
   c) $\propto$ - hydroxyaldehyde
   d) $\propto - \beta$, dihydroxyaldehyde

6) Aldehydes are oxidized by chromic acid to give
   a) No reaction
   b) Ketones
   c) Alcohols
   d) Acids

7) Picric acid is
   a) 2,4,6 tribromo phenol
   b) 2,4,6 trinitrophenol
   c) 2,4,6 trinitrotoluene
   d) Para nitrophenol

8) Iso propyl benzene on air oxidation in the presence of dilute acid gives.
   a) c_6H_5COOH
   b) $c_6H_5COCH_3$
   c) c_6H_5CHO
   d) c_6H_5OH

9) Glycerol is a by product of which industry?
   a) Soap
   b) Detergent
   c) Polymers
   d) Plastics

10) Diols are synthesized by reaction of alkene with
   a) Water
   b) Borane
   c) Ozone
   d) Osmium tetraoxide

Total No. of Printed Pages:3

SUBJECT CODE NO:- L-2014
FACULTY OF SCIENCE
B.Sc. S.Y. (Sem-III) Examination Oct/Nov 2018
Chemistry Paper-VIII
(Physical Chemistry)

[Time: 1:30 Hours] **[Max.Marks:50]**

Please check whether you have got the right question paper.

N.B i) Attempt all Questions.
ii) Illustrate your answer with suitable diagram.

Q.1 a) What is Helmholtz free energy function? Give its variation with respect to temperature and volume. 10

b) Give the various statements of first law of thermodynamics. With the help of this law show that 10
i) Heat absorbed by a system at constant volume
ii) Heat absorbed by a system at constant pressure
iii) Heat absorbed by a system at constant temperature

OR

c) What do you understand by molar heat capacity at constant pressure and constant volume? 10
An engine operating between 150°C and 25°C takes 500 J heat from a high temperature reservoir. Assuming that there is no frictional loss, Calculate the work that can be done by this engine.

d) Explain entropy in an ideal gas when pressure and temperature are independent variables. 10
Two models of an ideal gas undergo isothermal reversible expansion from 15 liter to 30 liter at 300 K. Calculate the work done and change in entropy.
(Given R= 2 cal/deg/mole)

Q.2 a) Derive the integral of clausius – Clapeyron equation in the form— 10

$$log\frac{P_2}{P_1} = \frac{\Delta H}{2.303R}\left[\frac{(T_2 - T_1)}{(T_1T_2)}\right]$$

At 373.6K and 372.6K the vapor pressure of $H_20_{(1)}$ are 1.018 atm and 0.982atm respectively. What is the heat of vaporization of water? (R=2 cal) (1 cal =4.184 J)

b) State Carnot's theorem and explain second law of thermodynamics on the basis of thermodynamic efficiency. 10

OR

c) Write short notes on any four of the following. 20
a) Thermodynamic processes
b) Reversible and irreversible processes.
c) Entropy and its change with change of phase
d) Reaction isotherm.
e) Le - Chatelier's Principle.
f) Hess's law of constant heat summation.

Q.3 1) Multiple choice questions. 10

Zinc granules reacting with dilute hydrochloric acid in an open beaker constitutes.

a) An isolated system b) an open system
c) a closed system d) a heterogeneous system

2) Which out of the following is not an intensive property?

a) Pressure b) concentration
c) density d) volume

3) For a cyclic process, the change in internal energy of the system is……

a) Always positive b) always negative
b) equal to Zero d)equal to infinity

4) Mixing of two or more gases is a ------

a) spontaneous process b) reversible process
c) Non- spontaneous process d) none of these.

5) A machine that can do work by using heat which flows out spontaneously from a high temperature source to a low temperature sink is called….

a) Carnot machine b) cyclic machine
c) heat machine d) heat engine

6) The free energy function (G) is defined as……..

a) $G + H + TS$ b) $G = H - TS$
c) $G = TS - H$ d) none of these

7) The Clausius – Clapeyron equation helps to calculate…..

a) Latent heat of vaporization
b) Boiling or freezing point
c) Vapor pressure at one temperature, if at another temperature is given
d) All of the above.

8) A chemical system is at equilibrium when the……

a) Rate of forward reaction becomes zero
b) Rates of forward and reverse reactions are equal
c) All reactants have been completely used.
d) Rates of forward and the reverse reactions are both zero

9) What is the expression for Keq for the reaction –

$$2N_2O_{(g)} + O_{2(g)} + 4\,NO_{(g)}$$

a) $[N_2][O_2]/[NO]$ b) $[NO]^4/\,[N_2O]^2$

b) $[N_2O^2]\,[O_2]/[NO]^4$ d) $[NO]^4/[N_2O]^2[O_2]$

10) The entropy of the system increases in the order.

a) gas<liquid<solid b)solid<liq < gas

b) gas<solid<liquid d) none of these.

Total No. of Printed Pages:2

SUBJECT CODE NO:- L-2048
FACULTY OF SCIENCE AND TECHNOLOGY
B.Sc. T.Y. (Sem-VI) Examination Oct/Nov 2018
Chemistry Paper –XVI
(Inorganic Chemistry)

[Time: 1:30 Hours] **[Max.Marks:50]**

Please check whether you have got the right question paper.

N.B
1. Attempt all question .
2. Illustrate your answer with suitable diagram.

Q.1 a) Explain the splitting of d- orbitals in square planar metal complexes. 10
b) Give any two methods of preparation, properties and uses of organotin compounds. 10

OR

c) Explain the orgel energy diagram for d^9 system in octahedral complexes. 10
d) What is 10Dq parameter? Discuss the different factors affecting on 10Dq. 10

Q.2 a) Give comparative account between paper and thin layer chromatography. 10
b) Explain the role of alkali & alkaline earth metals in bio system. 10

OR

c) Write short notes on any four of the following 20
i) Shapes of d-orbitals
ii) Classification of chromatography
iii) Nitrogen fixation
iv) Types of electronic transitions
v) Properties and uses of organo Aluminum compounds
vi) Assumptions of crystal field theory.

Q.3 Multiple choice question 10

1) The strong field ligand is
a) Cl^- b) F^- c) H_2O d) CO

2) The energy of eg orbital in tetrahedral complex decreases by
a) – 6Dq b) +4Dq c) +6Dq d) – 4 Dq

3) The ground state term symbol for d' system is
a) ^{4}F b)^{2}D c) ^{3}F d) ^{6}S

4) The colour of $[Ti(H_2O)_6]^{3+}$ ion is
   a) Blue b) Green c) Black d) Purple

5) The oxidation state of Fe in $Fe(CO)_5$ is
   a) 5 b) 2 c) 0 d) 3

6) In ascending paper chromatography the solvent flows
   a) Upward direction b) downward direction c) circular d) all of these

7) Δt is equal to
   a) $\frac{4}{9}\Delta_o$ b) $\frac{3}{5}\Delta_o$ c) $\frac{4}{5}\Delta_o$ d) $\frac{1}{4}\Delta_o$

8) The compounds used for polymerization of ethylene to polyethylene
   a) Organo Al compounds b) Organo Li compounds
   c) Organo Ti compounds d) Organo Zn compounds

9) $\Delta\ell = \pm 1$ are
   a) Laporte allowed b) Laporte forbidden c) Both of these d) None of these

10) The value of 10Dq increases from
   a) IIIrd to Ist transition metals series b) I to IIIrd transition metals series
   c) No change d) All of these

Total No. of Printed Pages:2

SUBJECT CODE NO:- L-2049
FACULTY OF SCIENCE AND TECHNOLOGY
B.Sc. T.Y. (Sem-VI) Examination Oct/Nov 2018
Chemistry Paper -XVII
(Organic Chemistry)

[Time: 1:30 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 carbohydrates? Explain the open chain structure of glucose 10
b) What are heterocyclic compounds? Explain with mechanism the nitration & sulphonation of furan. 10

OR

a) What is mutarotation? Explain the mutarotation of D- glucose 10
b) Give the synthesis of Isoquinoline by Bischler- Napirlasky method & Indole by Fisher indole method. 10

Q.2 a) What are synthetic dyes? Explain colour & constitution of dye 12
b) What are synthetic polymers? Give the synthesis of 08
a)Polystyrene b) polyacrylonitrile

OR

Write short notes on (any four) 20
a) Molecular orbital picture of pyridine
b) Synthesis of Quinoline by skraup's method
c) Lactose
d) Synthesis of paracetamol
e) Synthesis of swphaguanidine
f) Buna-N-rubber

Q.3 Multiple choice question 10

1) Which of the following carbohydrate is not a reducing suger --------
a) Starch b) sucrose c) fructose d) Lactose

2) Lactose on hydrolysis yield -----
a) Fructose b) Glucose c) Galactose d) maltose

3) Number of π electrons in isoquinoline is -----
a) $2\pi\ \bar{e}$ b) $4\pi\ \bar{e}$ c) $6\pi\ \bar{e}$ d) $10\pi\ \bar{e}$

4) The Nitrogen atom in pyridine is ------
   a) SP^3 hybridized b) SP^2 hybridized c) SP hybridized d) none of these

5) Which of the following reagent will react with furan to form 2 – furan sulphonic acid
   a) SO_3^{--} in pyridine at 100°c b) dil . $H_2\ SO_4\ at\ 200^o c$ c) $SO_2 at\ 100^o c$
   d) dil . $H_2SO_4 at\ 100^o c$

6) Which of the following is not a^- chromophore ---------
   a) –N=N- b) –N = O c) – NO_2 d) – NH_2

7) Colour of the compound is best explained by ---------
   a) Molecular orbital Theory b) Valence bond Theory c) Witt's theory d) None of these

8) A substance which appears orange absorbs the radiation in the range (nm)------
   a) 400-435 b) 480-490 c) 500-560 d) 605 – 750

9) Nylon – 6 is obtained from------
   a) $\in -$ caprolactum b) Adipic acid c) Hex methylene diamine d) None of these

10) Which of the following polymer contains 'Nitrogen' --------
   a) PVC b) Teflon c) Nylon d) Terrylene

Total No. of Printed Pages:2

SUBJECT CODE NO:- L-2143
FACULTY OF SCIENCE AND TECHNOLOGY
B.Sc F.Y. (Sem-II) Examination Oct/Nov 2018
Chemistry Paper-IV
(Physical Chemistry)

[Time: 1:30 Hours] **[Max.Marks:50]**

Please check whether you have got the right question paper.

N.B i) Attempt all questions.
ii) Illustrate your answer with suitable labeled diagram.

Q.1 Derive kinetic gas equation. 20

OR

Explain laws of crystallography. 20

Q.2 Derive rate equation for second order reaction for equal concentration of reactants & give its characteristics. 20

OR

Write short notes on any four of the following (Five marks each) 20

a) Calculate the distance between two points lying on the straight line.
   i) (-1,2) and (3,-4)
   ii) (2,4) and (-3,2)

b) Using logarithms solve
   i) 242×784
   ii) $772 \div 112$

c) Dipole –Dipole Interaction
d) Write difference between liquids and gases
e) Hardy –Schulze law
f) Explain emulsions and their types.

Q.3 Multiple choice questions. 10

1. The change of liquid to gas is----------
   a) Freezing b) Sublimation c) Fusion d) Vaporization

2. Ammonium chloride is an example of
   a) Crystalline b) Amorphous c) Mesomorphous d) None

3. Rate of reaction ---------- with concentration.
   a) Decreases b) Increases c) Remains constant d) Both a & c

4. Half-life of first order reaction is
   a) $t_{1/2} = \frac{1}{K.a}$ b) $t_{1/2} = \frac{1.5}{k.a^2}$ c) $t_{1/2} = \frac{0.693}{K}$ d) $t_{1/2} = \frac{a}{2K}$

5. Dipole =Dipole forces exist in----------
   a) cl_2 b) O_2 c) HCl d) C_2H_6

6. Charle's law can be represented as
   a) $V \propto P$ b) $V \propto T$ c) $V \propto C$ d) All of these

7. Tyndall effect is due to ---------- of light
   a) Scattering b) Reflection c) Refraction d) None of these

8. Ink is an example of ----------
   a) Emulsion b) Sol c) Gel d) none

9. Log of 200 is
   a) 0.3010 b) 0.6020 c) 2.3010 d) 2.6020

10. What is slope and intercept of the line $2x - y - 3 = 0$
    a) (2,3) b) (2,-3) c) (-2,-3) d) (-2,3)

Total No. of Printed Pages:2

SUBJECT CODE NO:- L-2144
FACULTY OF SCIENCE AND TECHNOLOGY
B.Sc. F.Y. (Sem-II) Examination Oct/Nov 2018
Chemistry Paper- V
Inorganic Chemistry

[Time: 1:30 Hours] **[Max.Marks:50]**

Please check whether you have got the right question paper.

N.B i) Attempt all questions.
ii) Illustrate your answer with suitable labeled diagram.

Q.1 a) Discuss the structure and bonding of xeF_4 10

b) Explain the formation of ammonia molecule with the help of VSEPR theory 10

OR

a) What is hybridization? Explain SP hybridization with suitable example. 10

b) Explain the molecular orbital diagram of co molecule. (MOT) 10

Q.2 a) What is radioactivity? Discuss the properties of $\beta - particles$. 10

b) Write the electronic configuration of noble gases. 10

OR

Write short notes on (any four) 20

a) Bonding in IF_7
b) Calibration of pipette.
c) Carbon dating
d) N/Z ratio
e) External and internal indicators
f) Metallic bonding

Q.3 Attempt the following 10

1) In XeF_6, the hybridisation of xenon atom is----------

a) sp^3d^2 b) sp^3d c) sp^3 d) sp^2

2) The atomic number of helium is ----------

a) 18 b) 36 c) 54 d) 2

3) The outer most electronic configuration of noble gas is----------

a) ns^2np^6 b) ns^2np^3 c) ns^2np^5 d) ns^2

4) Repulsion is maximum in----------
a) $bp - bp$ b) $lp - lp$ c) $lp - bp$ d) $none\ of\ these$

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

6) ---------- Indicator is most commonly used in acid-base titrations.
a) Phenolphthalein b) Eriochrome black-T c) Ferroin d) Methyl red

7) The bond angle of water molecule is----------
a) 90° b) 105° c) 120° d) 180°

8) The following molecule show sp^2 hybridisation

a) BF_3 b) KCL c) H_2O d) $Becl_2$

9) Potassium permanganate is ---------- agent.

a) Oxidizing b) Reducing c) Complexing d) All of these

10) EDTA is----------
a) Ethyl diammine tetra acetic acid b) Ethylene diammine tetra acetic acid
c) Ethylene diamino triacetic acid d) All the above

Total No. of Printed Pages:2

SUBJECT CODE NO:- L-2149
FACULTY OF SCIENCE AND TECHNOLOGY
B.Sc. S.Y. (Sem-IV) Examination Oct/Nov 2018
Chemistry Paper-X
(Inorganic Chemistry)

[Time: 1:30 Hours] **[Max.Marks:50]**

Please check whether you have got the right question paper.

N.B 1) All questions are compulsory.

Q.1 a) Explain the structure of $CoCl_3$. $6NH_3$ on the basis of Werner's theory. 10

b) What are d-block elements? Discuss the trends of following properties in the first transition series element 10
   i) Atomic and ionic size
   ii) Ionization potential

OR

c) What are actinides? Explain the method of separation of Np, Pu and Am from uranium. 10

d) Explain the following reaction in liq. NH_3. 10
   i) Ammonolysis
   ii) Complex formation reaction

Q.2 a) What is lanthanide contraction? Discuss the causes of lanthanide contraction. Give the consequences of lanthanide contraction. 10

b) How are acids and bases defined in terms of 10
   i) Arrhenius concept and
   ii) Bronzed- Lowry concept?
   Give suitable examples.

OR

Write short note on: (any four) 20
   i) General features of first transition series
   ii) EAN rule
   iii) Position of lanthanide in the periodic table
   iv) Oxidation states of actinides
   v) Lux-flood concept of acids and bases
   vi) Classification of solvents

Q.3 Multiple choice questions: 10

1) The IUPAC name of $K_2[Ni(CN)_4]$ is
   a) Potassium tetracynatonickelate (II)
   b) Potassium tetracynonickelate (II)
   c) Potassium cynonickel (II)
   d) Tetracynonickel (II) potassium

2) The electronic configuration of chromium is
   a) $[Ar]3d^4\ 4s^2$
   b) $[Ar]3d^6\ 4s^0$
   c) $[Ar]3d^5\ 4s^1$
   d) $[Ar]3d^3\ 4s^2$

3) The oxidation state of CO in $[Co(NH_3)_3\ Cl_3]$ is
   a) +2 b) +4 c) +3 d) 0

4) Which of the following general electronic configuration of lanthanides
   a) $[Xe]4f^{0-14}\ 5d^{0-1}\ 6s^2$
   b) $[Xe]4f^{1-14}\ 5d^{1-2}\ 6s^2$
   c) $[Xe]4f^{1-14}\ 5d^{0-1}\ 6s^2$
   d) $[Xe]4f^{1-14}\ 5d^{0-1}\ 6s^{1-2}$

5) The atomic number of uranium is
   a) 92 b) 93 c) 91 d) 90

6) The colour of lanthanide (III) ion due to
   a) d-d transition
   b) f-f transition
   c) d-f transition
   d) none of these

7) Mark the species which can act both as an acid and as a base
   a) SO_3^{2-} b) H_3O^+ c) HCO_3^- d) Cl^-

8) Which of the following is /are non protonic solvent
   a) CCl_4 b) C_6H_6 c) Liq. So_2 d) All of these

9) The atomic number of Mn is
   a) 26 b) 27 c) 28 d) 25

10) The compound that is not a Lewis acid is
   a) $Alcl_3$ b) BF_3 c) NH_3 d) $FeCl_3$

Total No. of Printed Pages:2

SUBJECT CODE NO:- L-2150
FACULTY OF SCIENCE AND TECHNOLOGY
B.Sc. S.Y. (Sem-IV) Examination Oct/Nov 2018
Chemistry Paper-XI
(Physical Chemistry-II)

[Time: 1:30 Hours] **[Max.Marks:50]**

Please check whether you have got the right question paper.

N.B
1) Attempt all questions.
2) Figure to the right indicates full marks.
3) Use of nonprogrammable calculator is allowed.

Q.1 a) What is phase rule? Discuss the application of phase rule to water system. 10

b) What is reversible electrode? Discuss the different types of reversible electrodes with suitable example. 10

OR

a) Define pH and pka. Derive Henderson Hassel Balch equation. 10

b) Explain conductance, specific conductance and equivalent conductance. 10
Calculate the equivalent conductance of 0.02N salt solution whose resistance is found to be 200 ohms between two electrodes which are 1cm apart and having area of cross section $2cm^2$.

Q.2 a) State reduced phase rule. Describe (Mg-Zn) system on the basis of phase rule. 10

b) What is transport number? Describe moving boundry method for determination of transport number. 10

OR

Write short notes: (any four) 20
i) Eutectic point
ii) Pattinson's process of desilverisation of lead
iii) Ostwald's dilution law
iv) Advantages of conductometric titration
v) Dry corrosion
vi) Raoult's law and Henry's law

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

1) The number of phases in a mixture of water and benzene are ----------
   a) 1 b) 2 c) 3 d) 4

2) The maximum degree of freedom for one component system is----------
   a) 0 b) 1 c) 2 d) 3

3) The reduced phase rule equation is ----------
   a) $F = C - P + 2$ b) $F + C = P + 2$
   c) $F = C - P + 1$ d) $F + 1 = C - P$

4) The equivalent conductance is expressed as
   a) $1000\frac{k}{c}$ b) $1000\frac{k}{v}$
   c) Both a and b d) None

5) On dilution specific conductance ----------
   a) Increases b) Decreases c) Remains constant d) None

6) The transport number of nitrate ion in silver nitrate is 0.68. the transport number of silver ion will be ----------
   a) 0.32 b) 0.68 c) 1 d) 0

7) The pH of 0.1 N Nad solution will be ----------
   a) 0 b) 7 c) 14 d) None

8) A cell which converts chemical energy into electrical energy is
   a) Electrolytic b) Electrochemical c) Both d) None

9) The element in emf series will displaced another element present ---------- in series.
   a) Lower b) Upper c) Both d) None

10) The critical temperature of water system is ----------
   a) 374℃ b) 274℃ c) 100℃ d) 218℃