

## I Semester B.Sc. Examination

### Paper-I CHEMISTRY

Time: 3 Hours

Max.Marks:60

**Instructions: The question paper has two Parts. Both the Parts should be answered.**

**Answer any six of the following each question carries 2 marks.**

1. Find the value of  $5\sqrt{28}$  using logarithm.
2. State Heisenberg's uncertainty principle. Give its mathematical form.
3. Write the electronic configuration of elements whose atomic numbers are 21 and 24.
4. State modern periodic law. Write the general electronic configuration of d-block elements.
5. Calculate the oxidation number of S in i)  $\text{Na}_2\text{S}_2\text{O}_3$  ii)  $\text{SO}_2$
6. What is osmosis? Give an example for semi permeable membrane.
7. a) Give IUPAC name for  $\text{CH}_3-\underset{\text{CH}_3}{\text{CH}}-\underset{\text{CH}_3}{\text{CH}}-\text{CH}_2-\text{OH}$   
b) Write the structure of 1,3 butadiene.
8. Define 'Electron affinity'.
9. What is carbonium ion? Give one example.
10. How would you prepare ethane by Kolbe's electrolysis?

#### PART-B

**Answer any eight of the following. Each question carries 6 marks. (8x6=48)**

11. a) What are the limitations of Bhor's atomic theory?  
b) Calculate the wave number of the first line in the Lyman's series of hydrogen spectrum. Given Rydberg's constant  $R=1.097 \times 10^7 \text{m}^{-1}$ . (4+2)
12. a) What are quantum numbers? Explain the significance of each quantum number.  
b) Nitrogen has higher ionization energy than oxygen. Give reason. (4+2)
13. a) What is Photoelectric effect?  
b) What is Aufbau principle?  
c) In the reaction  $\text{MnO}_2 + 4 \text{HCl} \rightarrow \text{MnCl}_2 + \text{Cl}_2 + 2\text{H}_2\text{O}$ , identify the oxidizing and reducing agents. (2+2+2)
14. Give reason:  
a) The radius of an anion is larger than the corresponding neutral atom.  
b) The size of the atoms decreases across the period.  
c) Ionization energy decreases down the group. (2+2+2)
15. a) Write a note on diagonal relationship.  
b) Among  $\text{Al}^{3+}$  and  $\text{Mg}^{2+}$  which has a smaller size and why?  
c) Define 'Electro negativity'.
16. a) Describe how the molecular weight of a non-volatile solute is determined by boiling point elevation method.  
b) What are isotonic solutions? (4+2)
17. a) A solution containing  $2.4 \times 10^{-3} \text{kg}$  of a solute dissolved in  $2.5 \text{dm}^3$  of water gave an osmotic pressure of  $2.431 \times 10^5 \text{Nm}^{-2}$  at 300 k. Calculate the molar mass of the solute.  
b) Among i) 0.1 M sodium chloride and ii) 0.1 M urea which solution has higher boiling point and why?
18. a) Mention the differences between inductive and resonance effects.  
b) What are free radicals? How are they produced? (4+2)
19. a) Explain the mechanism of chlorination of methane.  
b) Give any one general method of preparation of alkynes. (4+2)

20. a) Mention the postulates of Baeyer's strain theory. What are its limitations?  
 b) How is cyclopentane prepared? (4+2)
21. a) Draw the Newmann's projection formulae of different conformations of Ethane and compare their stabilities.  
 b) What are exact and inexact differentials? (4+2)
22. a) Explain Wurtz reaction with suitable example.  
 b) What are nucleophiles? Give any two examples.  
 c) Hydrogen atoms in acetylene are acidic in nature. Give reason. (2+2+2)

**II Semester B.Sc. Examination**  
**(Semester Scheme)**  
**CHEMISTRY-II**

Time: 3 Hours

Max.Marks:60

**Instructions: The question paper has two Parts. Both the Parts should be answered.**

PART-A

**Answer any six of the following question Each question carries 2 marks. (6x2=12)**

1. Based on the molecular orbital theory give the electronic configuration of nitrogen molecule.
2. Write the Born-Landé equation, Explain the terms involved.
3. Mention the conditions for the formation of an ideal solution.
4. How is hydrazine prepared?
5. How is  $\text{IF}_7$  prepared? Write its structure.
6. Give any two uses of Argon.
7. What are isothermal and adiabatic processes?
8. State first law of thermodynamics. Give its mathematical form.
9. Classify the following into ortho-para and meta orienting groups.  
 -  $\text{SO}_3\text{H}$ , -OH,  $-\text{C}_2\text{H}_5$ , -CHO
10. State Saytzeff's rule. Give an example.

PART-B

**Answer any eight of the following question Each question carries six marks. (8x6=48)**

11. a) Discuss the structure of Ammonia molecule based on VSEPR theory.  
 b) Calculate the bond order of  $\text{He}_2^+$  ion. (4+2)
12. a) Explain  $\text{sp}^2$  hybridization taking  $\text{BCl}_3$  as an example.  
 b) Mention any two applications of super conductors. (4+2)
13. a) Explain Inter molecular and Intra molecular hydrogen bonding with suitable example.  
 b) How is diborane prepared? (4+2)
14. a) What are Zeolites ? Give any two of their applications.  
 b) Write a note on alkalimetals in liquid ammonia.
15. a) How is xenon tetra fluoride prepared? Explain its structure.  
 b) What is the action of water on sulphuryl chloride? (4+2)
16. a) How is hydroxylamine prepared from nitric oxide? Give any two of its applications.  
 b) How is Alkyl Halide prepared? (4+2)
17. a) Explain the mechanism of nitration of benzene.  
 b) How is phthalic anhydride prepared from Naphthalene? Give equation. (4+2)
18. a) Explain the orienting influence of methyl group in Toluene.  
 b) Mention the limitations of Kekule structure of benzene. (4+2)
19. a) Explain  $\text{S}_\text{N}2$  mechanism with reference to hydrolysis of methyl chloride.  
 b) What are elimination reactions? Give an example. (4+2)
20. a) Define heat capacity of a gas. Derive the relationship between  $C_p$  and  $C_v$  for an ideal gas.

- b) What are intensive properties? Give any two examples. (4+2)
21. a) Derive an expression for the partition coefficient of a solute undergoing dissociation in one of the immiscible solvents.
- b) State Henry's law of gas solubility. (4+2)
22. a) Define upper and lower critical solution temperature. Give an example for each type.
- b) Calculate the work done when 3 moles of an ideal gas compressed reversibly and isothermally from the pressure of  $1.5 \times 10^5 \text{ Nm}^{-2}$  to  $4.5 \times 10^5 \text{ Nm}^{-2}$  at 298 K.  
 $R=8.314 \text{ JK}^{-1} \text{ mol}^{-1}$ .

**III Semester B.Sc. Examination (Semester Scheme)**  
**CHEMISTRY-III**

Time: 3 Hours

Max.Marks:60

**Instructions: Write chemical equations for all reactions.**

PART-A

**Answer any six of the following:** (6x2=12)

1. What is the significance of critical temperature and inversion temperature in the liquefaction of  $\text{H}_2$ ?
2. Define reduced pressure and reduced temperature.
3. Differentiate between cationic and free radical polymerization.
4. Why are the elements with atomic numbers 58 to 71 placed separately in the periodic table?
5. Name one ore each for Nickel and Thorium.
6. How are alcohols prepared by hydration of alkenes?
7. What happens when glycerol is treated with periodic acid?
8. What is the action of  $\text{NH}_3$  on ethylene oxide?
9. State the III law of thermodynamics.
10. Write Arrhenium equation to explain the effect of temperature on the velocity of a reaction.

PART-B

**Answer any eight questions.** (8x6=48)

11. a) How is critical volume determined experimentally?
- b) Calculate the most probable velocity of  $\text{CO}_2$  at 300 K. (4+2)
12. a) How is the velocity constant for the specification of ethyl acetate determined experimentally?
- b) Describe the half life period method of finding out the order of a reaction. (4+2)
13. a) Starting from the definition of free energy  $G=H-TS$ , derive the expression  $dG=VdP-SdT$ .
- b) Write the expression for the efficiency of a carnot engine and indicate the temperature at which the efficiency is maximum. (4+2)
14. a) Write the mechanism of Reimer-Teimann reaction.
- b) Write the structures of all possible isomers corresponding to the molecular formula  $\text{C}_4\text{H}_{10}\text{O}$ . (3+3)
15. a) Write the structures of
  - i) Nylon-66 ii) Polyurethane
- b) What are thermosetting and thermo softening polymers? Give examples. (3+3)
16. a) How are the following synthesized?
  - i) Neoprene ii) PVC
- b) What are the criterion for spontaneity of a reaction based on entropy and free energy

- concepts?  
(4+2)
17. a) Give reasons for the following:  
i) Transition metal ions form coloured compounds  
ii) Transition metals exhibit multiple oxidation states.  
b) Why are f-block elements called inner transition elements?  
(4+2)
18. a) How is chromium extracted from chromite ore?  
b) What are interstitial compounds?  
(4+2)
19. a) Describe vapour phase and zone refining processes.  
b) Explain the thermodynamic concept underlying the Ellingham diagram.  
(4+2)
20. a) How are thiols prepared from alkyl halides? How do thiols react with NaOH?  
b) Write the structures of  
i) 3-methyl pentan -1 -ol  
ii) 2-propene -1 -thiol.  
(4+2)
21. a) Discuss the Corey-House synthesis of alkanes from alkyl lithium compounds.  
b) Describe the acid and base catalysed cleavage of epoxides.  
(3+3)
22. a) Derive an expression for the velocity constant of a reaction based on transition state theory.  
b) Explain the physical significance of Entropy.  
(4+2)

**IV Semester B.Sc. Examination, June 2009**  
**(Semester Scheme)**  
**CHEMISTRY-IV**

Time:3 Hours

Max.Marks:60

Instructions: The question paper has two Parts. Both the Parts should be answered.

**PART-A**

Answer any six of the following question Each question carries 2 marks.

(6x2=12)

1. Name the artificial radioactive series and indicate its starting and ending isotopes.
2. What is transmutation of elements? Give an example.
3. What is Schottky defect? What is its effect on the density of ionic crystals?
4. Mention any two applications of powder metallurgy.
5. Explain the influence of chromium on the properties of steel.
6. What is acid rain? Explain.
7. How is a Ketone prepared from a carboxylic acid? Give a suitable example.
8. Among formic acid and acetic acid which has higher pKa value? Justify your answer.
9. Differentiate between homogeneous and heterogeneous catalysis.
10. Explain the term 'degrees of freedom'.

**PART-B**

Answer any eight of the following questions. Each question carries six marks.

(8x6=48)

11. a) Describe the construction and working principles of a scintillation counter.  
b) Illustrate the use of an isotope in elucidation of reaction mechanism.

(4+2)

12. a) Describe the determination of structure of sodium chloride crystal by rotating crystal method.
- b) What are non-stoichiometric compounds?  
(5+1)
13. a) Define the terms radius ratio and crystal coordination number. How are they useful in predicting the structure of ionic crystals?
- b) What are smectic and nematic liquid crystals? Give an example for each type.  
(4+2)
14. a) What are Miller indices? Explain.
- b) Write a note on gem stones.
- c) Explain the function of a moderator in a nuclear reactor.  
(2+2+2)
15. a) Explain any two techniques of production of metal powders.
- b) What are ferro alloys? Mention any one of their applications.  
(4+2)
16. a) Discuss the various steps involved in heat treatment of steel. How do they improve its properties?
- b) Name the process by which steel is produced at VISL.  
(5+1)
17. a) What is green chemistry? Discuss the important principles of green chemistry.
- b) What is a photo chemical smog? Mention any two of its ill-effects.  
(4+2)
18. a) State and explain Freundlich adsorption isotherm. What are its limitations?
- b) Mention the characteristics of catalysts.  
(4+2)
19. a) Write the phase diagram of water system and explain its main features.
- b) What is eutectic mixture?  
(5+1)
20. a) Discuss the mechanism of cannizzaro reaction.
- b) Explain knoevenagel condensatition with a suitable example.  
(4+2)
21. a) Giving suitable examples, explain how carboxylic acids are prepared from  
i) nitriles ii) alcohols
- b) Write a note on Hofmann degradation reaction.  
(4+2)
22. a) How is acetoacetic ester prepared?
- b) Write the synthesis of succinic acid from malonic ester.
- c) Write a note on tautomerism.  
(2+2+2)

**V Semester B.Sc. Examination, November/December 2008**

**(Semester Scheme)**

**CHEMISTRY-V**

**Organic Chemistry**

Time:3 Hours

Max.Marks:60

Instructions: The question paper has two Parts. Both the Parts should be answered.  
Structures and equations are to be given wherever necessary.

**PART-A**

Answer any six questions. Each question carries 2 marks.

(6x2=12)

1. What are enantiomers? Give an example.
2. Which of the following compounds do not show geometrical isomerism. Why?
  - i) 1- Butene
  - ii) 2- Butene
3. Identify A & B  
$$\text{NH}_2 \quad \text{NaNO}_2/\text{HCl} \rightarrow \text{A} \quad \quad \text{H}_2\text{O}/\Delta \rightarrow \text{B}$$
4. Explain why pyridine is more basic than pyrrole.
5. Name and write the structures of a pair of epimeric sugars.
6. Write the structure and a use of camphor.
7. Write any two medicinal uses of Atropine.
8. Write the structure and IUPAC name of isoprene unit.
9. Write the electronic transitions taking place when U.V. radiations are passed through acetaldehyde.
10. How do you convert methyl nitrile into ethyl amine?

#### PART-B

Answer any eight of the following questions. Each question carries six marks.

(8x6=48)

11. a) Discuss the optical isomerism in Lactic acid.  
b) Point out two differences between meso compounds and a racemic mixture.  
(4+2)
12. a) What is resolution? Explain chemical method of resolution.  
b) How do you determine the configuration of maleic acid and fumaric acid by cyclisation method?  
(4+2)
13. a) What are erythro and threo isomers? Write the structure of erythro and threo isomers of tartaric acid.  
b) Define plane of symmetry with an example.  
(4+2)
14. a) How does primary, secondary and tertiary aliphatic amines react with nitrous acid? And give equations.  
b) How is benzene diazonium chloride converted to phenyl hydrazine?  
(4+2)
15. a) Discuss the aromaticity of thiophene.  
b) Write the synthesis of pyridine from acetylene.  
(4+2)
16. a) Write Fischer indole synthesis. Give equations.  
b) Write the Haworth structure of Lactose.  
(4+2)
17. a) How do you convert fructose into glucose? Give equations.  
b) How do you show that D-glucose contain an aldehyde group in it? Give equation.  
(4+2)
18. a) Give the synthesis of  $\gamma$ - citral starting from methyl heptenone.  
b) Write the structure of nicotine and name the heterocyclic rings present in it.  
(4+2)
19. a) Point out the effects of Force constant and atomic mass of constituent atoms on the absorption of IR radiations.

b) Define chemical shift. Why TMS is used as the reference compound in NMR spectroscopy.

(4+2)

20. a) Sketch the NMR spectra of propane. Indicate the multiplicity of each peak.

b) Define Nuclear shielding and deshielding.

(4+2)

21. a) Write the synthesis of Indigo.

b) What is a Mordant? Give an example.

(4+2)

22. a) What are antipyretics? Give the synthesis of sulphanilamide.

b) Write the general method of synthesis of detergent from benzene.

(4+2)

**V Semester B.Sc. Examination, November/December 2008**

**(Semester Scheme)**

**CHEMISTRY-V**

**Physical Chemistry**

Time:3 Hours

Max.Marks:60

Instructions: The question paper has two Parts. Both the Parts should be answered.

**PART-A**

Answer any six of the following questions. Each question carries 2 marks.

(6x2=12)

1. Define the term equivalent conductance. How does it vary with dilution?
2. What is meant by quantum efficiency?
3. Give two advantages of conductometric titrations.
4. Why is the pH of ammonium chloride solution less than 7 at 298 K?
5. What is the selection rule for Raman rotation spectra?
6. Give two limitations of Standard Hydrogen electrode.
7. Explain Stokes and anti-Stokes lines.
8. What is fluorescence?
9. Calculate the total number of modes of vibration for i) CO<sub>2</sub> ii) H<sub>2</sub>O molecules.
10. What are polar and non-polar molecules?

**PART-B**

Answer any eight of the following questions. Each question carries six marks.

(8x6=48)

11. a) How is the molar conductance of 0.01 N sodium chloride solution determined by conductivity method?

b) Give two disadvantages of quinhydrone electrode.

(4+2)

12. a) Describe the determination of transport number of an ion by moving boundary method.

b) Calculate the electrode potential of a zinc electrode dipped in 1.5 M ZnSO<sub>4</sub> solution at 298 K.

$$K. E^\circ_{(Zn^{2+}/Zn)} = -0.76V.$$

(4+2)

13. a) Explain how the solubility of a sparingly soluble salt is determined by conductivity method.

b) The limiting ionic conductance of an ion is  $5.31 \times 10^{-3} \text{ Sm}^2 \text{ mol}^{-1}$ . What is its ionic mobility?

(4+2)

14. a) Describe the construction of calomel electrode. Write the electrode process.  
 b)  $\Lambda_{\infty}$  values of NaCl,  $\text{NH}_4\text{Cl}$  and NaOH are respectively  $12.6 \times 10^{-3}$ ,  $15 \times 10^{-3}$  and  $4.81 \times 10^{-3} \text{ Sm}^2\text{mol}^{-1}$ . Calculate  $\Lambda_{\infty}$  for  $\text{NH}_4\text{OH}$ .  
 (4+2)
15. a) Derive the relation between  $K_h$ ,  $k_w$  and  $k_b$  for hydrolysis of salt of weak base and strong acid.  
 b) What is the effect of temperature and dilution on the degree of hydrolysis of sodium acetate?  
 (4+2)
16. a) Give any four general characteristics of Raman lines.  
 b) Give an equation relating force constant with vibrational frequency.  
 (4+2)
17. a) Name the different types of molecular spectra. Mention the regions of the electromagnetic spectrum in which they appear.  
 b) Explain why  $\text{H}_2$  does not show rotating spectrum while HCl shows rotation spectrum.  
 (4+2)
18. a) The rotational spectrum of HF has equidistant lines separated by  $4190 \text{ m}^{-1}$ . Calculate the moment of inertia and bond length in HF,  $\mu$  for HF =  $0.1584 \times 10^{-26} \text{ kg}$   
 b) To what values of  $\Delta J$  the three branches of P, Q and R are related in the vibration rotation spectrum in the Infra red?  
 (4+2)
19. a) What are paramagnetic and ferromagnetic substances? Give two examples of each type.  
 b) What is the effect of temperature on i) specific conductance ii) molar conductance?  
 (4+2)
20. a) Define dipole moment. Give any four applications of dipole moment.  
 b) A buffer solution contains 0.1 M acetic acid and 0.5 M sodium acetate per  $\text{dm}^3$  of the solution. Calculate the pH of the solution.  $K_a$  of acetic acid is  $1.8 \times 10^{-5}$ .  
 (4+2)
21. a) The intensity of monochromatic radiation is reduced to one third of its initial value as it passes through a solution of 0.025 M concentration of an absorbing substance of length 8 cm. Calculate the molar extinction co-efficient and molar absorption co-efficient.  
 (4+2)
22. a) Explain the mechanism of photochemical decomposition of HI.  
 b) Explain dimerisation of anthracene.  
 (4+2)

## Inorganic Chemistry (paper-VII)

Time:3 Hours

Max.Marks:60

Instructions: The question paper has two Parts. Both the Parts should be answered.

### PART-A

Answer any six of the following questions. Each question carries 2 marks.

(6x2=12)

1. Name the complex compound  $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$  and write its geometrical isomers.
2. Mention any two limitations of valence bond theory.
3. What is Bihapto ligand? Give an example.
4. Define Co-ordination number. What is the Co-ordination number of coin  $[\text{Co}(\text{NH}_3)_3\text{Cl}_3]$ ?
5. Explain the Biological functions of Myoglobin.
6. Define the terms Accuracy and precision.
7. What are the roles of Sodium Chloride and Sawdust in the manufacture of Carborundum?
8. What are feldspars? Give their composition.
9. Among Titanium white and white lead which is better pigment. Give reason.
10. Mention any two advantages of EDTA in volumetric analysis.

### PART-B

Answer any eight of the following questions. Each question carries six marks.

(8x6=48)

11. a) What are Ligands? Classify the Ligands on the basis of the number of donor atoms present

and give an example for each.

b) What is EAN rule? Calculate the effective Atomic number of Nickel in  $\text{Ni}(\text{CO})_4$  [At. No. of

$\text{Ni}=28$ ]

(4+2)

12. a) Based on crystal field theory explain the magnetic properties of  $[\text{CoF}_6]^{3-}$  and  $[\text{Co}(\text{NH}_3)_6]^{3+}$ .

(4+2)

b) Crystal field splitting energy of  $[\text{CrF}_6]^{3-}$  is  $15060\text{cm}^{-1}$ . Calculate the crystal field stabilization energy in  $\text{cm}^{-1}$ .

(4+2)

13. a) State and explain 18-electron rule as applied to metal carbonyls and organo metallic compound with one example each.

b) Explain co-ordination isomerism with an example.

(4+2)

14. a) What are low spin and high spin complexes? Explain with an examples.

b) Tetrahedral complexes do not exhibit geometrical isomerism. Give reason.

(4+2)

15. a) Discuss the structure of Haemoglobin and its biological function.

b) What are trace elements? Mention any two examples.

(4+2)

16. a) Describe the manufacture of fused alumina.

b) Mention any two non-ferrous alloys. Give an application for each.

(4+2)

17. a) Write a note on safety glass.

b) What are abrasives?

(4+2)

18. a) What is paint ? Explain the role of

i) Linseed oil ii) Turpentine iii) Polyhydroxy phenol in a paint.

b) What are ceramic insulators?

(4+2)

19. a) What are the important characteristics of a good fuel?

b) What is port land cement?

(4+2)

20. a) What are propellants ? How are they classified?

- b) How is Glyceryl trinitrate prepared.  
(4+2)
21. a) Describe the estimation of Fe (II) by colorimetric method.  
b) Name the reagent used to estimate magnesium gravimetrically. Write its structure.  
(4+2)
22. a) Write the principles involved in  
i) Electrogravimetry ii) Flame Photometry  
b) What are determinate errors and indeterminate errors?  
(4+2)

**VI Semester B.Sc. Examination, June 2009**  
**(Semester Scheme)**  
**CHEMISTRY- VIII**  
**Biochemistry**

Time:3 Hours  
Max.Marks:60

Instructions: The question paper has two Parts. Both the Parts should be answered.  
Structures and equations are to be given wherever necessary.

**PART-A**

Answer any six of the following questions. Each question carries 2 marks.  
(6x2=12)

1. Mention the contributions of the following to the development of biochemistry.  
i) Khorana ii) Michaelis and Menten
2. Name the vitamin whose deficiency causes  
i) Rickets ii) Beri-Beri
3. What is Biuret test? Can an amino acid answer this test?
4. What is the biological role of vasopressin?
5. Define Iodine number. What is its significance?
6. What are amino sugars? Give an example.
7. The genetic code is 'degenerate'-Explain.
8. Write the structure of B-D-glucosamine.
9. What is Chargaff's rule of base equivalence?
10. What are okazaki fragments?

**PART-B**

Answer any eight of the following questions. Each question carries six marks.  
(8x6=48)

11. Name the storage polysaccharide present in plant. Write the name and Structure of the disaccharides formed after the partial hydrolysis of the above polysaccharide.  
6
12. a) How are amino acids classified based on the polarity of side chain groups?  
Give one example for each class.  
b) How does  $\mu$ -amino acid react with sanger's reagent?  
(4+2)
13. a) Explain Fluid mosaic model of cell membrane.  
b) Explain non-competitive inhibition of enzymes.  
(4+2)
14. a) Explain semi conservative mechanism of DNA replication.  
b) Explain the terms: i) Leading strand ii) Lagging strand.  
(4+2)
15. a) Explain the terms: i) Oxidative phosphorylation ii) Substrate level phosphorylation

- b) What are endergonic reactions? Give an example.  
(4+2)
16. a) What are the different types of specificity exhibited by enzymes? Give example to illustrate  
any one type of specificity  
b) Describe the biological role of triacyl glycerides.  
(4+2)
17. Calculate the ATP yield when one mole of glucose is completely oxidized aerobically through  
glycolysis, TCA cycle and electron transport chain.  
6
18. a) Describe two oxidation reactions from TCA cycle.  
b) How is pyruvate converted to ethanol?  
(4+2)
19. a) Write the structure of one purine and one pyrimidine bases of RNA.  
b) What is an energy rich compound? Give an example.  
(4+2)
20. Give the sequence of reactions in the  $\beta$ -oxidation of an activated fatty acid. How many acetyl coenzyme A molecules are produced from one molecule of palmitic acid during this process. 6
21. a) Explain the effect of temperature and enzyme concentration on the rate of enzyme catalyzed  
reactions.  
b) Define primary structure of proteins.
22. a) Write a note on denaturation of proteins.  
b) Write the reaction of urea cycle where urea is formed. What is the significance of this cycle?  
(3+3)

### I Semester Biochemistry

I. Answer any 5 of the following:

2x5=10

1. What factors do the following prefixes indicate a) Micro b) nano c) pico d) milli
2. Give an example for natural & artificial semi-permeable membrane
3. What are London forces?
4. Define Number average molecular weight of a polymer
5. Calculate the oxidation number of Cr in  $K_2Cr_2O_7$
6. Give any 4 properties of  $\gamma$  particle

II. Answer any 3 of the following

3x5=15

1. Set up the Born Haber cycle for sodium chloride  
.....5
2. a) Derive Henderson Hassel-balch equation for an basic buffer  
.....4  
b) Give an example for neutral buffer  
.....1
3. a) How is pH of a solution is determined using glass electrode  
.....4  
b) Define hydrolysis  
.....1

4.  $483 \times 10^{-2}$  kg of solute was dissolved in  $20.38 \times 10^{-3}$  kg of solvent the elevation of boiling point was 0.4 K calculate its molecular weight ( $k_b = 0.52 \text{ K kg mol}^{-1}$ )  
 .....5

Total 25 Marks

### I Semester Biochemistry

I. Answer any 5 of the following:

2x5=10

1. Define Ionisation Energy (potential) & 2nd IE?
2. Write all the possible values of L and M when  $n=3$
3. Calculate the oxidation number of Mn in  $\text{KMnO}_4$
4. State Henry's law of gas solubility
5. What are reversible cells? Give example
6. Mention any two Applications of Adsorption

II. Answer any 3 of the following

3x5=15

1. a) Derive Henderson Hasselbalch Equation for an acidic buffer

.....4

b) State (n+l) rule

.....1

2. a) On the basis of hybridization discuss the formation of Ethene molecule

.....4

b) Mention any one application of  $\text{C}_{14}$

3. a) Derive De Broglie Equation

.....3

b) What are hypertonic Solutions

.....2

4. Describe an experiment to determine the molecular weight of a solute by RLV method

.....5

Total 25 marks

### I Semester Biochemistry

I. Answer any 5 of the following:

2x5=10

1. Why is the atomic radius of cesium larger than that of sodium.
2. What are Lewis acids? Give Example
3. Define Elevation in boiling point
4. Derive  $\text{pH} = \text{pOH} = 14$  at  $25^\circ\text{C}$
5. Define Van Hoff factor
6. Write all the possible values of l and m when  $n=4$

II. Answer any 3 of the following

3x5=15

1. How do you determine the osmotic Pressure of a given substance by Berkley & Hartley method

.....5

2. a)  $483 \times 10^{-3}$  kg of a Solute was dissolved in  $20.38 \times 10^{-3}$  kg of a solvent the elevation of boiling

point was 0.3k calculate its molecular weight

...4

b) Define Hemolysis

.....1

3. Describe the method of measurement of conductance using whetstone's bridge  
.....5
4. a) Derive de-Broglie equation  
.....5
- b) Why ortho-nitrophenols have melting points than p-nitrophenol  
.....2

### I Semester Biochemistry

I. Answer any 5 of the following:

2x5=10

1. Give any four properties of  $\gamma$  particles
2. What are Van der waal forces?
3. Mention any two applications of p32
4. Define RLVP
5. Define Heat of adsorption.
6. Calculate  $[H^+]$  if pH is 7.4

II. Answer any 3 of the following

3x5=15

1. How do you determine the surface tension of liquids using stalagmometer.
2. On the basis of hybridization discuss the formation of ethane molecule
3. a) What is universal indicator? How is the pH of a solution determined by colorimetric method

.....4

b) Define Isoelectric pH

4. a) Give the applications of Electrochemical series any four

.....4

b) Calculate pH of 1M HCL

.....1

Total 25 Marks.

### II Semester Biochemistry

I. Answer any 5 of the following:

2x5=10

1. What are organ metallic compounds? Give an example
2. Phenols are weakly acidic?
3. Define Iso & Anisotropy
4. What do you mean by optimum temperature of Enzymes
5. Show that  $t_{75\%} = 2 t_{50\%}$
6. Define a) Carbenes b. free radicals

II. Answer any 3 of the following

3x5=15

1. a. Write the mechanism involved in addition of HCL to Propene  
.....4
- b. Define (4n+2) rule  
.....1
2. a) Explain the application of phase rule to two component systems  
.....4
- b) What are Endergonic reactions  
.....1
3. a) Derive an expression for second order Kinetics (k)  
.....4
- b) Give the general formula for Grignard Reagent  
.....1
4. a) Define Elements of symmetry  
.....3
- b) What are miller indices  
.....2

Total 25 Marks.

### II Semester Biochemistry

I. Answer any 5 of the following:

2x5=10

1. What is Inductive effect?
2. Define Markovnikov's rule.
3. Give the relationship between free energy change and Equilibrium constant
4. Define order of a reaction.
5. Give any one test to distinguish 1° 2° & 3° alcohols
6. Chemical Equilibrium is dynamic explain

II. Answer any 3 of the following

3x5=15

1. a) Derive an Expression for K of a first order reaction.  
.....4
- b) Give an Example for Zero order reaction  
.....1
2. a) Derive Van der waals Equation of state for one mole of Ideal gas  
.....4
- b) Give any two postulates of kinetic theory of gases  
.....1
3. a) Explain the mechanism involved in SN1 reactions  
.....4
- b) Give an example for dihydric alcohol
4. a) Give the mechanism involved in Aldol condensation  
.....3
- b) Define law of rotational indices  
.....2

Total 25 Marks.

### II Semester Biochemistry

I. Answer any 5 of the following:

2x5=10

1. Define keto-enol tautomerism
2. What are Exergonic reactions? Give an Example
3. Define molecularity of reaction

4. Write the structures of a naphtholene b. Anthrocene
5. Give the postulates of Baeyer strain theory
6. What are heterogeneous reactions? Give an example

II. Answer any 3 of the following

$$3 \times 5 = 15$$

1. a) Give the mechanism involved in Friedel-crfs reaction  
.....4
- b) Define Actvated Complex  
.....1
2. a) Derive an Expression for Kp for the formations of Ammonia  
.....4
- b) Define Chemical potential  
.....1
3. a) A first order reaction is half completed in 25 monuler calculatl K  
.....2
- b) Draw Boat & chair forms of Cyclohexanc  
.....2
4. a) Give the mechanism of addition of HCN to acetaldehyde  
.....4
- b) What are carbenes  
.....1

Total 25 Marks.

### II Semester Biochemistry

I. Answer any 5 of the following:

$$2 \times 5 = 10$$

1. Define Redox equilibrium
2. Define phase rule
3. Define rate determing step
4. What is Peroxide effect? Give an example
5. How do detect presence of sulphur in organc compounds
6. Define law of rational indices.

II. Answer any 3 of the following

$$3 \times 5 = 15$$

1. Give the Preparation and synthetic applications of Grignard reagent  
.....5
2. a) Explain the theories of homogeneous catalysis  
.....4
- b) What is rate equation  
.....1
3. a) Give the mechanism involved in Kolbe reaction  
.....3
- b) Give different crystal systems  
.....2
4. a) How do you detect the presence of halogen sultrier and p in organic compound with equations.  
1+2+2

Total 25 Marks.

### III Semester Biochemistry

I. Answer any 5 of the following:

$$2 \times 5 = 10$$

1. What are antibiotics? How antibiotics are classified based on mode of action.
2. State terpene rule
3. Aromatic amines are weaker bases than alkyl amines why?
4. Write the Fischer projection formula of D-Glucose
5. Give any two biological importance of  $Ca^{+2}$  ion

II. Answer any 3 of the following

$$3 \times 5 = 15$$

1. write a note on depletion of ozone layer its causes and remedial measures to be undertaken
2. Explain crystal field splitting in Tetrahedral complexes.
3. Explain chemiluminescence's and bioluminescence with Examples  $2\frac{1}{2} \times 2 \dots 5$
4. Explain the significance of chirality's in Biological world
5. How do you classify Antibiotics based on chemical structure?

Total 25 Marks.

### III Semester Biochemistry

I. Answer any 5 of the following:

$$2 \times 5 = 10$$

1. Give any two difference between lyophilic & lyophobic sols
2. What is stone leprosy?
3. What is the role of  $Mg^{+2}$  in chlorophyll?
4. Name the different types of detectors used in GLC
5. Write the structures & Cis z Butane & trans-z-Butane
6. Mesotartaric acid is optically inactive why?

II. Answer any 3 of the following

$$3 \times 5 = 15$$

1. Write a note on disposal of Radioactive wastes
2. With the help of valence bond theory explain the formation of cup ammonium sulphate
3. Discuss the principle & applications of paper chromatography
4. Describe two methods for the resolution of racemic mixture
5. Write the structure of the following and mention the sources of it  
(a) Penicillin (b) Chloramphenicol  $2\frac{1}{2}$   
 $x2 \dots 5$

Total 25 Marks.

### III Semester Biochemistry

I. Answer any 5 of the following:

$$2 \times 5 = 10$$

1. What is geometrical Isomerism? Give an Example
2. Write F&Z configurations of  $COOH-CH-COOH$
3. Define Racemisation
4. What are the biological importance of amines? Any two
5. Write the reaction & Pyridine with sodainide
6. Give an Example for chain & positional isomerism in amines

II. Answer any 3 of the following

$$3 \times 5 = 15$$

1. What do you mean by chirality's? Explain the significance of chirality's in biological world.
2. Describe the two methods for the resolution of racemic mixture
3. What is the effect of substitution on acidity? Explain

4. What is Hinsberg's reagent? Give the test to distinguish between 1° 2° & 3° amines using this reagent
5. Give the configuration symbols (R/S) to the following compounds
  - a. L-D(+) Glucose
  - b. Lactic acid

2½

Total 25 Marks.

### III Semester Biochemistry

I. Answer any 5 of the following:

2x5=10

1. What is Emulsion? Give an Example
2. What is lyophilic sol? Give an Example
3. What is meant by green house effect?
4. What is linkage Isomerism? Give an Example
5. Define EAN rule
6. What are protective colloids? Give any one biological importance

II. Answer any 3 of the following

3x5=15

1. What is BOD? Explain the various treatment of sewage water.
  2. Explain the main points of valence bond theory.
  3. Discuss the main features of crystal field theory.
  4. Explain the role of following metal ions in biological systems.  
(a) Iron (b) sodium (c) potassium (d) calcium (e) copper
- 1x5.....5
5. What are metallo Enzymes? Explain their importance

Total 25 Marks.

### IV Semester Biochemistry

I. Answer any 5 of the following:

2x5=10

1. What is the action of Lipase on triglyceride.
2. What is fibrinogen? Mention its function
3. What are Kupfer cells? Mention its function
4. What is resting membrane potential
5. What is peristalsis? Mention its importance
6. Calculate the RQ of Carbohydrate

II. Answer any 3 of the following

3x5=15

1. How are proteins digested & absorbed  
.....5
2. Explain the mechanism of action of steroid hormone  
.....5
3. Explain the transport of Ca<sup>2+</sup> in the body
4. a) Write a note on Bohr Effect  
.....3
- b) List the features of a balanced diet ...2
5. a) Write a short note on Bone remodeling ....3
- b) What is the role of Bile in the digestion of fats ....2

Total 25 Marks.

### IV Semester Biochemistry

I. Answer any 5 of the following:

2x5=10

1. Name the two factors involved in NH<sub>4</sub><sup>+</sup> excretion
2. What are chylomicrons.
3. What are PUFA? Explain their nutritional importance. (any one)
4. Give an example of complete & Incomplete Protein
5. What is mutual supplementation of protein
6. What is the effect of excess intake of (a) fluoride (b) sodium

.....1+1

II. Answer any 3 of the following

1. a) Describe the structure of sarcomere

.....4

b) What is Respiratory acidosis

.....1

2. a) Give the sources and function of

a. vit B

b. Vit K

...2+2

b) Name the hormones of pancreas

.....1

3. Describe the mechanism of action of protein hormones via CAMP

.....5

4. How is the Calorific value of foods is determined by the use of a bomb calorimeter

Total 25 Marks.

#### IV Semester Biochemistry

I. Answer any 5 of the following:

2x5=10

1. Name the fat soluble vitamins
2. Write the structure of retinole
3. What are zymogens
4. What are major elements? Give two examples
5. What is Renal failure? Mention the type
6. What is respiratory alkalosis

II. Answer any 3 of the following

3x5=15

1. How are carbohydrates digested and absorbed?
2. Name the hormones of a. parathyroid b. pancreas and their functions
3. a. Explain the distribution of body fluid

.....4

b. Mention the daily requirement of Iron in Adult Female

....1

4. Write a note on neurotransmitter

.....4

How are neurons classified?

.....1

Total 25 Marks.

#### IV Semester Biochemistry

I. Answer any 5 of the following:

2x5=10

1. What is nitrogen balance? Give its importance
2. What is Action membrane potential?

3. Mention any two functions of Liver
4. Define RQ
5. What are trace elements? Give two examples
6. Name any two components of gastric juice

II. Answer any 3 of the following

3x5=15

1. a) Describe any two regulatory functions of the liver  
.....4
- b) State the co enzyme function of TPP  
.....1
2. a) What is bone remodeling
- b) Mention the daily requirement of Iron in Adult male .....1
3. a) Explain the sliding filament theory of muscles  
.....1
- b) What is SDA of food .....1
4. Explain the mechanism of blood clotting  
.....5

Total 25 Marks.

### V Semester Biochemistry

I. Answer any 5 of the following:

2x5=10

1. List the major and trace elements present in living organism
2. What is meant by non-Protein amino acids? Give an Example
3. Write the zeffter ionic structure of Alanine
4. What is meant by Is electric PH?
5. How does amino acid react with co<sub>2</sub>?
6. Water is liquid Hydrogen sculpted is gas why?

II. Answer any 3 of the following

3x5=15

1. Explain the following properties of water & importance  
a. High heat of vaporization .....2½  
x2.....5  
b. High specific heat
2. How does an amino acid react with following  
a. Ninhydrion
- b. Sangers reaction .....2½  
x2.....5
3. What is denaturation of proteins? Explain the mechanism of operation of denaturing agents  
.....5
4. Define the tertiary structure of protein describe the forces involved in the stabilization of this structure  
.....5

Total 25 Marks.

### V Semester Biochemistry

I. Answer any 5 of the following:

2x5=10

1. What do you mean by broad specificity of Enzymes
2. What are Isoengymes? Give an example.
3. Give the Clinical significance of Streptokinase
4. What is charagaffs rule?

5. Write the partial structure of polynucleotide.

6. What are ribozymes? Give example.

II. Answer any 3 of the following

3x5=15

1. Give the classification of enzymes

.....5

2. Draw L.B. plots for uninhibited, competitive and non-competitive inhibition explain

.....5

3. Explain structural organization of eukaryotic DNA compare with that of prokaryotic DNA

...5

4. Give the Clinical applications of

a. SGOT

b. Asparagines

2½ x2.....5

Total 25 Marks.

### V Semester Biochemistry

I. Answer any 5 of the following:

2x5=10

1. Give the chemical composition of living organisms

2. Sucrose is non-reducing sugar why?

3. Define mutarotation

4. Write the structure of Glutathione.

5. What is Km Give its Significance

II. Answer any 3 of the following

3x5=15

1. What is Enzyme assay? Give the Basic principle involved in Enzyme assay.

2. What is melting temperature <sup>TM</sup> Explain the factors that affect the melting temperature

3. Write a brief note on Translation mechanism involved in protein synthesis

4. Taking example of Hemoglobin explain the quaternary structure of proteins

Total 25 Marks.

### VI Semester Biochemistry

I. Answer any 5 of the following:

2x5=10

1. Explain the entry of glycogen into glucolys

2. What are anaplerotic reactions

3. Name the steps of B-oxidation

4. Tabulate the virus classification

5. How do bacteria respond to temperature?

6. Mention the ketone bodies How they are formed?

II. Answer any 3 of the following

3x5=15

1. a) What is non oxidative deamination? Give two Examples

.....4

b) Name any one glycogen storage disease

.....1

2. a) State the energetics of TCA cycle

.....3

b) Write a substrate level phosphorylation reaction in TCA cycle

.....2

3. a) Describe the structure of Gram -ve cell wall  
.....3
- b) Describe the Structure of TMV  
.....2
4. Explain Biosynthesis & chole sterol  
.....5

Total 25 Marks.

### VI Semester Biochemistry

I. Answer any 5 of the following:  
2x5=10

1. What is gout? Mention the features
2. What are the sources of Nitrogen & carbon atoms of purine & Pyrimidine rings?
3. How photophosphorylation is different from oxidative phosphorylation
4. What are Semi synthetic penicillin's?
5. What is Palindromic sequence?
6. List the tools of genetic Engineering

II. Answer any 3 of the following  
3x5=15

1. a) Describe the steps involved in preparation of chimerical DNA  
.....4
- b) What are probes
2. a) Define (a) phagocytosis (b) opsonisation (c) Inflammation  
.....3
- b) Write a note an single cell protein  
.....2
3. Write the HSK pathway  
.....5
4. Write the flow scheme for Purine Biosynthesis .  
.....5

Total 25 Marks.

### VI Semester Biochemistry

I. Answer any 5 of the following:  
2x5=10

1. Give any two Disadvantages of microscope.
2. List major groups of fungi
3. What are Endospores?
4. What is LPS?
5. How does HIV infection spreads?
6. What is lytic phage?

II. Answer any 3 of the following  
3x5=15

1. a) Describe the lysogenic cycle of bacteriophages  
.....4
- b) What are virioids  
.....1
2. a) Illustrate the Structure of HIV  
.....4
- b) What is flu  
.....1

3. Compare the cell walls in bacteria  
.....5
4. a) How plant Viruses Spread  
.....4
- b) List the type of genomes in viruses  
.....1

Total 25 Marks.

### VI Semester Biochemistry

I. Answer any 5 of the following:

2x5=10

1. Define the two phases of metabolism?
2. What is Substrate level Phosphorylation?
3. Name the steps of glycolysis where ATP is Consumed
4. What are the glycogen storage diseases.
5. How GABA is formed from Glutamate write the reaction
6. How is Urea cycle regulated?

II. Answer any 3 of the following

3x5=15

1. a) Explain the fate of Pyruvate formed in glycolysis  
.....4
- b) Name the defective Enzyme in Cori disease  
.....4
2. a) Write the reactions of Urea cycle  
.....4
- b) Why the Urine of Alkaptonuria patients is black?  
.....1
3. a) Write a note on Citric acid cycle  
.....3
- b) Gluconeogenesis is not reversal of glycolysis Justify the Statement  
.....2
4. a) How palmitic acid is biosynthesized  
.....4
- b) Define Transamination.  
.....1

Total 25 marks