Course Code: 07ATB1	**Programme:**	**B.Sc.,**	**CIA:** III Test
Date: 14.10.2019	**Major:**	**BOTANY**	**Semester:** I
Time: 2Hrs	**Year:**	**I**	**Maximum:** 50 Marks
Course Title:		**CHEMISTRY FOR BIOLOGIST- I**	

SECTION – A

Answer ALL questions   **(10 x 1 = 10)**

1. A Compound (A) has the following % composition: C=52.17 %, H= 13.04%, and Oxygen. The number of hydrogen atoms in the empirical formula is   (CO1)
   (a) 6   (b) 5   (c) 4   (d) 3

2. Geometrical isomerism is shown by   (CO1)
   (a) Lactic acid   (b) maleic acid   (c) 1-butane   (d) 1,1-Dichlorothylen

3. The order of stability of a carbanion is: (CO3)
   (a) $3^0>2^0>1^0$ (b) $2^0>1^0>3^0$ (c) $2^0>3^0>1^0$ (d) $1^0>2^0>3^0$

4. The bond angle in methane molecule is: (CO3)
   (a) 60^0 (b)109.5^0 (c) 120^0 (d) 180^0

5. Catalytic poisoning   (CO4)
   (a) reduces the activity of the catalyst   (b) increases the temperature of reaction
   (c) increases the activation energy of reaction   (d) reduces the reaction rate of the reaction

6. Photochemistry deals with the study of   (CO4)
   (a) photons   (b) photos
   (c) reactions which proceed with absorption of UV light
   (d) reactions which proceed with absorption of IR light

7. The wavelength of ultraviolet and visible regions of electromagnetic spectrum is (CO4)
   (a) less than 2000 Å   (b) more than 8000 Å   (c) 2000 A to 8000 Å   (d) 4000 to 8000 Å

8. The emission of light as a result of chemical reaction is called   (CO4)
   (a) bioluminescence (b) chemiluminescence (c) fluorescence (d) phosphorescence

9. In singlet ground state of the molecule, the spin multiplicity is   (CO4)
   (a) 4   (b) 3   (c) 2   (d) 1

10. Which of the following is used as an indicator in volumetric analysis?   (CO5)
    (a) sodium hydroxide   (b) sodium carbonate   (c) oxalic acid   (d) methyl orange

SECTION – B

Answer any FIVE questions   **(5 x 2 = 10)**

11. Define molecular formula.   (CO1)
12. Define carbocation with an example.   (CO3)
13. Find out the valency of carbon atom.   (CO3)
14. What is the difference between catalyst and enzyme?   (CO4)
15. What do you mean by photochemical reaction?   (CO4)
16. What is bioluminescence?   (CO4)
17. What do you mean by titration?   (CO5)

SECTION – C

Answer any THREE questions   **(3 x 6 = 18)**

18. Write the differences between homolytic and heterolytic fission.   (CO3)
19. Write a note on enzyme catalysis and its characteristics.   (CO4)
20. Write the differences between thermal and photochemical reactions.   (CO4)
21. Compare primary and secondary standard substances.   (CO5)
22. What do you mean by standardisation? How will you standardise secondary standard solutions?   (CO5)

SECTION – D

Answer any ONE question   **(1 x 12 = 12)**

23. What is meant by isomerism? How is it classified? Explain structural isomerism with examples. (CO1)
24. Discuss in detail about Jablonski diagram.   (CO4)

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Course Code: 07ATP1	**Programme:**	**B.Sc.,**	**CIA:** III Test
Date: 14.10.2019	**Major:**	**PHYSICS**	**Semester:** I
Time: 2Hrs	**Year:**	**I**	**Maximum:** 50 Marks
Course Title:		CHEMISTRY FOR PHYSICIST - I	

SECTION – A

Answer ALL questions (10 x 1 = 10)

1. "No two electrons in an atom can have same set four set of identical quantum numbers". It is the statement of **(CO1)**
   (a) Aufbau principle (b) Hund's rule (c) Paulie's exclusion principle (d) None

2. The outermost electronic configuration of manganese (At.no=25) is **(CO1)**
   (a) $3d^5 4s^2$ (b) $3d^6 4s^1$ (c) $3d^7 4s^0$ (d) $3d^6 4s^2$

3. sp^3 hybridization leads to **(CO2)**
   (a) Trigonal geometry with bond angles 120° each
   (b) Tetrahedral geometry with bond angles 109.5° each
   (c) Tetrahedral geometry with bond angles 90° each
   (d) Square planar geometry with bond angles 90° each

4. The correct decreasing order strength of overlapping **(CO2)**
   (a) s-p > s-s > p-p   (b) p-p > s-p > s-s   (c) p-p > s-s > s-p   (d) s-s > s-p > p-p

5. The correct decreasing order of repulsive interaction of electron pairs **(CO3)**
   (a) Bond pair – Bond pair > Lone pair–Lone pair > Lone pair– Bond pair
   (b) Lone pair– Bond pair > Lone pair–Lone pair > Bond pair – Bond pair
   (c) Bond pair – Bond pair > Lone pair– Bond pair > Lone pair–Lone pair
   (d) Lone pair–Lone pair > Lone pair– Bond pair > Bond pair – Bond pair

6. A molecule or ion is stable if **(CO3)**
   (a) $N_b = N_a$ (b) $N_b < N_a$ (c) $N_a < N_b$ (d) $N_a – N_b = +ve$

7. Which of the following best describes the role of the moderator in a nuclear reactor? **(CO4)**
   (a) It removes excess neutrons if too much power is being generated
   (b) It changes the nuclear energy generated into useable forms
   (c) It slows down some of the fast neutrons
   (d) It absorbs products that could poison the fuel rods

8. Nuclear fusion produces energy because -------------------- **(CO4)**
   (a) Neutrons are produced   (b) The total mass of the products is less than that of the reactants
   (c) The total mass of the products is more than that of the reactants
   (d) It is a very powerful chemical reaction

9. The process of adding known concentration until it complete the reaction with known volume is called as **(CO5)**
   (a) Titrant   (b) Analysis   (c) Titration   (d) Titrend

10. Which of the following indicator is used for the titration of strong acid vs strong base? **(CO5)**
    (a) Methyl orange   (b) Phenolphthalein
    (c) Bromocresol Green   (d) Bromothymol Blue

SECTION – B

Answer any FIVE questions $(5 \times 2 = 10)$

11. Calculate the de-Broglie wave length of a body of mass 1 kg moving with a velocity of 2000 ms^{-1}

(CO1)

12. What is meant by Zeeman and Stark effect? (CO1)

13. Account on formation of sigma bond and pi bond (CO2)

14. Write the limitations of VB theory (CO2)

15. Write any four difference between ionic bond and covalent bond (CO3)

16. What is packing fraction? Mention its importance (CO4)

17. 25 ml of H_2SO_4 solution required 48.75 ml of 0.02 M NaOH for complete titration. Calculate the molarity of H_2SO_4. (CO5)

SECTION – C

Answer any THREE questions $(3 \times 6 = 18)$

18. Diagrammatically illustrate the formation of hydrogen spectrum by Bohrs theory (CO1)

19. Illustrate structure of methane on the basis of hybridization (CO2)

20. Briefly describe postulates and Applications of molecular orbital theory (CO3)

21. Draw and explain Born-Haber cycle for the calculation of lattice energy of NaCl crystal (CO4)

22. Write a note on (i) Molecular weight (ii) Formula weight (iii) Equivalent weight (CO5)

SECTION – D

Answer any ONE question $(1 \times 12 = 12)$

23. Explain the shapes of the following molecules by VSEPR theory (CO3)

(i) CH_4 ii) NH_3 (iii) H_2O (iv) PCl_5 (v) SF_6 (CO1)

24. Explain following terms: (a) Heisenberg's uncertainty principle   (b) Hunds rule

(c) Aufbau principle   (d) Pauli exclusion principle   (e) Electronic configuration

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DEPARTMENT OF CHEMISTRY

Course Code: 07ATZ1	**Programme:**	**B.Sc.,**	**CIA:** III Test
Date: 14.10.2019	**Major:**	**ZOOLOGY**	**Semester:** I
Time: 2Hrs	**Year:**	**I**	**Maximum:** 50 Marks
Course Title:		**CHEMISTRY FOR BIOLOGIST – I**	

SECTION – A

Answer ALL questions   **(10 x 1 = 10)**

1. A hydrocarbon is found to contain 81.80% carbon and 18.20% hydrogen. Its empirical formula will be   **(CO1)**

     (a) C_2H_6 (b) C_3H_8 (c) C_4H_8 (d) C_3H_6

2. Find the empirical formula of a monobasic acid containing C = 40%, H = 6.67% and having equivalent weight 60.   **(CO1)**

     (a) $C_2H_6O_2$ (b) CH_2O (c) $C_2H_6O_6$ (d) None of these

3. Plane-polarized light is affected by.   **(CO1)**

     (a) Identical molecules   (b) all polymers   (c) chiral molecules   (d) all biomolecules

4. n-Butane and isobutane is the example for …………………….. isomerism.   **(CO1)**

     (a) Position   (b) Function   (c) Metamerism   (d) Chain

5. The isomers of a substance must have……….   **(CO1)**

     (a) same chemical properties   (b) same molecular formula

     (c) same structural formula   (d) same functional groups

6. Which of the following is neutral nucleophile?   **(CO2)**

     (a) NH_3 (b) CN^- (c) OH^- (d) BF_3

7. The species which donates its electron pair in a reaction is called …………….   **(CO2)**

     (a) electrophile   (b) nucleophile

     (c) tautomers   (d) electron withdrawing group

8. The name catalyst was given by   **(CO4)**

     (a) Chadwick   (b) J.J. Thomson   (c) Berzelius   (d) Rutherford

9. A catalyst can be described as a substance that: **(CO4)**

     (a) undergoes change to accelerate the rate of the reaction

     (b) increases the kinetic energy of the reactants

     (c) provides a path of lower activation energy for the reaction

     (d) lowers the potential energy of the products with respect to the energy of the reactants

10. Arsenic oxide (As_2O_3) acts in the Contact process as   **(CO4)**

     (a) Promoter   (b) Poison   (c) an enzyme   (d) Catalyst

SECTION – B

Very short answer

Answer any FIVE questions   (5 x 2 = 10)

11) Define molecular formula.   **(CO1)**

12) State the necessary conditions for a compound to show Geometric isomerism.   **(CO1)**

13) Define metamerism,   **(CO1)**

14) Define structural isomerism.   **(CO1)**

15) Define nucleophile.   **(CO2)**

16) Define resonance.   **(CO2)**

17) What are catalysts? Give examples.   **(CO4)**

SECTION – C

Short answer

Answer any THREE questions   (3 x 6 = 18)

18) An organic substance contains the following percentage composition of elements.

   C= 18.6%; H=1.55%; Cl=55.04% and O=24.81%. Calculate its empirical formula.   **(CO1)**

19) Explain geometrical isomerism with examples?   **(CO1)**

20) Write the differences between resonance and tautomerism.   **(CO2)**

21) What are catalytic poisoning and promoters? Give examples.   **(CO4)**

22) Write a note on enzyme catalysis and its characteristics.   **(CO4)**

SECTION – D

Answer any ONE question   (1 x 12 = 12)

23) What is meant by isomerism? How is it classified? Explain structural isomerism with examples.

                                                                       (CO1)

24) Explain the following with examples: (2.5+2.5+2.5+2.5)   **(CO4)**

   a) Homogeneous catalysis b) Heterogeneous catalysis

   c) Autocatalysis   d) Acid-base catalysis

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Course Code: 07CT11	**Programme:**	**B.Sc.,**	**CIA:** III Test
Date: 09.10.2019	**Major:**	**CHEMISTRY**	**Semester:** I
Time: 2Hrs	**Year:**	**I**	**Maximum:** 50 Marks
Course Title:		**GENERAL CHEMISTRY – I**	

SECTION – A

Multiple choice questions:

Answer ALL questions (10 x 1 = 10)

1. Principal, azimuthal and magnetic quantum numbers are respectively related to: **(CO1)**

   (a) size, orientation and shape   (b) size, shape and orientation

   (c) shape, size and orientation   (d) none of these

2. The number of radial nodes for 3p orbital is: **(CO1)**

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

3. As energy increases, frequency and wavelength are related as: **(CO1)**

   (a) frequency increases, wavelength decreases   (b) both increases

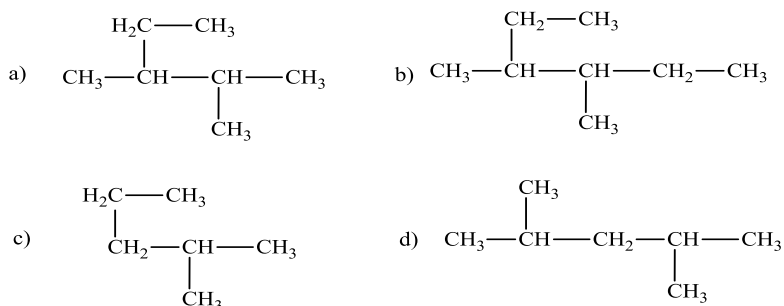   (c) wavelength increases, frequency decreases   (d) both decreases

4. Which of the following compound has zero dipole moment: **(CO2)**

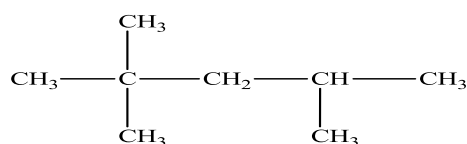   (a) H_2O (b) NH_3 (c) CO_2 (d) HCl

5. Bond energy is the energy required to **(CO2)**

   (a) make one mole of bonds   (b) break one mole of bonds

   (c) sustain one mole of bonds   (d) none of the above

6. The correct structure of 2,3-dimethylpentane is **(CO3)**

7. The correct IUPAC name for the following compound is **(CO3)**

   (a) 2-Methyl-4,4-dimethylpentane   (b) 4-Methyl-2,2-dimethylpentane

   (c) 2,2,4-Trimethylpentane   (d) 2,4-Dimethylpentane

8. A thermolysis of azide gives… **(CO4)**

   (a) Carbocations   (b) Carbenes   (c) Benzyne   (d) Nitrenes

9. A catalyst increase the rate of the reaction because it   **(CO5)**

    (a) Increase the activation energy   (b) Decrease the energy barrier for reaction

    (c) Decrease the collision diameter   (d) Increase the temperature coefficient

10. The catalyst used in the contact process of manufacturing of sulphuric acid is   **(CO5)**

    (a) Copper (b) Iron/aluminium oxide (c) Vanadium pentoxide (d) Platinized asbestos

SECTION – B

Very short answer

Answer any FIVE questions   **(5 x 2 = 10)**

 11. State the de Broglie equation and define all the symbols.   **(CO1)**

 12. What is Schrödinger wave equation?   **(CO1)**

 13. Define Heisenberg uncertainty principle   **(CO1)**

 14. What is meant by polar covalent bond give suitable example?   **(CO2)**

 15. Define molecular formula.   **(CO3)**

 16. State Huckel rule.   **(CO3)**

 17. Write any one method for the generation of benzyne.   **(CO4)**

SECTION – C

Short answer

Answer any THREE questions   **(3 x 6 = 18)**

 18. What are the properties of ionic and covalent bonds?   **(CO2)**

 19. Define dipole moment. Which out of NH_3 and NF_3 has higher dipolar moment and why?   **(CO2)**

 20. Discuss the different types of structural isomerism with example.   **(CO3)**

 21. Write the formation, structure and stability of carbenes.   **(CO4)**

 22. Define the following: **(CO5)**

    a) Catalytic promoters b) Catalytic poison c) Enzyme catalysis

SECTION – D

Answer any ONE question   **(1 x 12 = 12)**

23. (i) Define following terms: (i) Aufbau principle (ii) Pauli's exculsion and (iii) Hund's rule.

    (ii) Discuss how the Bohr model can be used to explain atomic spectra. (6+6)   **(CO1)**

24. i) Derive Michaelis-Menten equation. (6)   **(CO5)**

    ii) Explain in detail the intermediate compound formation theory. (6)   **(CO5)**

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Course Code: 07CT12	**Programme:**	**B.Sc.,**	**CIA:** III Test
Date: 12.10.2019	**Major:**	**CHEMISTRY**	**Semester:** I
Time: 2Hrs	**Year:**	**I**	**Maximum:** 50 Marks
Course Title:		**GENERAL CHEMISTRY – II**	

SECTION –A

Answer ALL questions (10 x 1 = 10)

1. Which one of the following is Lewis acid? (CO1)
   a) HNO_3 b) CH_3COOH c) SiO_2 d) BF_3
2. Benzene is an example for …………..solvent. (CO1)
   a) Polar   b) Amphoteric   c) Protic   d) Non-polar
3. Who discovered hydrogen? (CO2)
   a)Lavoisier   b) Joseph Priestley   c) Henry Cavendish   d) Robert Boyle
4. Which one of the following isotope is radioactive? (CO2)
   a)   Protium   b) Tritium   c) Deuterium   d) None of the above
5. Ethylene reacts with alkaline $KMnO_4$ to form (CO3)
   a) Oxalic acid   b) HCHO   c) Ethyl alcohol   d) Ethylene glycol
6. The movement of sol particles under an applied electric potential is called (CO5)
   a) electrophoresis   b) electro-osmosis   c) electrofiltration   d) none of these
7. The presence of the double layer in colloids accounts for (CO5)
   a) kinetic properties   b) electrical properties   c) optical properties   d) stability of colloids
8. A sol of Ferric chloride moves to the negative electrode. The colloidal particles carry (CO5)
   a) no charge   b) positive charge   c) negative charge   d) none of these
9. The movement of the dispersion medium under the influence of applied potential is known as (CO5)
   a) osmosis   b) diffusion   c) electro-osmosis   d) electrophoresis
10. The precipitating effect of an ion on dispersed phase increases with the valence of the precipitating ions. This rule is known as (CO5)
    a) flocculation value rule   b) Hardy-Schulze rule   c) Brownian rule   d) gold number rule

SECTION – B

Answer any FIVE questions (5 x 2 = 10)

11. Define the term Hardy-Schulze Rule. (CO5)
12. What is meant by gold number? (CO5)
13. What are emulsions? How are they classified? (CO5)
14. How coagulation can be brought about? (CO5)
15. Define Lux-Flood acid base concept (CO1)
16. How will prepare heavy water? (CO2)
17. Compare alkene and alkyne with an example? (CO3)

SECTION – C

Answer any THREE questions (3 x 6 = 18)

18. Explain the electrical properties of colloids. (CO5)
19. Illustrate Helmholtz Double layer of colloidal system. (CO5)
20. Give a brief account on types of solvent system (CO1)
21. Discuss the properties of Heavy water (CO2)
22. Compare the properties of s block elements(CO2)

SECTION – D

Answer any ONE question (1 x 12 = 12)

23. List out any six reaction of chemical properties of alkyne. (CO3)
24. Describe theelectrophoresis and electro-osmosis (CO5)

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Course Code: 07CT31	Programme:	B.Sc.,	CIA: III Test
Date: 09.10.2019	Major:	CHEMISTRY	Semester: III
Time: 2Hrs	Year:	II	Maximum: 50 Marks
Course Title:		ORGANIC CHEMISTRY – I	

SECTION –A

Answer ALL questions (10 x 1 = 10)

1. Which is produced on reduction of nitrobenzene with either Sn and H_2SO_4 or Zn and HCl? (CO3)

   (a) benzamide   (b) benzoic acid   (c) benzaldehyde   (d) aniline

2. The effect which reduces the basicity of aniline is (CO3)

   (a) Inductive effect   (b) resonance effect   (c) electromeric effect   (d) – I effect

3. The process of converting an amine in to its quaternary ammonium salt on treatment with excess of methyl iodide is called (CO3)

   (a) carbylamine reaction   (b) Hofmann elimination

   (c) Exhaustic methylation   (d) Friedel-Crafts alkylation

4. The production of optically active compound from a symmetric molecule without resolution is termed as (CO5)

   (a) Walden inversion   (b) partial racemization

   (c) asymmetric synthesis   (d) partial resolution

5. The absolute configuration of following compound is (CO5)
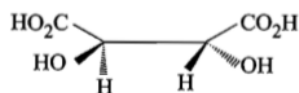
   (a) S,R   (b) S,S   (c) R,R   (d) R,S

6. In Sandmeyer's reaction the salt involved is (CO2)

   a) diazonium salt   b) cuprammonium salt   c) ferrous salt   d) ammonium salt

7. Reaction of benzene diazonium halide with acrylonitrile in presence of Cu^{2+} is known as (CO2)

   a) Gomberg reaction   b) Pschorr's synthesis   c) Meerwein reaction   d) Bart reaction

8. Which one of the following is least basic? (CO3)

   a) Cyclohexylamine   b) Triethyl amine   c) Dimethyl amine   d) Triphenyl amine

9. Which offers the best method for the conversion of an amide to an amine? (CO3)

   a) Na, NH_3 b) $LiAlH_4$ c) $NaNO_2$, HCl   d) $NaBH_4$

10. Benzaldehyde and malonic acid react to give (CO4)

    a) Ethanal   b) Cinnamic acid   c) Cinnamaldehyde   d) Crotonic acid

SECTION – B

Answer any FIVE questions (5 x 2 = 10)

11. Give any one method of preparation of aniline. (CO3)

12. What do you understand by Hoffmann elimination? (CO3)

13. Differentiate racemisation and resolution. (CO5)

14. How is acetaldehyde prepared? How does it react with HCN? (CO4)

15. Give the preparation of nitromethane (CO2)

16. What is active methylene group? Give an examples. (CO4)

17. What happens when benzaldehyde is heated with acetic anhydride? (CO4)

SECTION – C

Answer any THREE questions (3 x 6 = 18)

18. Explain the mechanism of Benzoin condensation. (CO4)

19. How can the Hinsberg test be used to distinguish 1°, 2° and 3° amines ?(CO3)

20. Illustrate the effect of substituent on the basicity of aniline in detail. (CO3)

21. Discuss the optical activity of biphenyl, allenes and spiranes. (CO5)

22. Write a note on (i) asymmetric synthesis (ii) Walden inversion. (CO5)

SECTION – D

Answer any ONE question (1 x 12 = 12)

23. (i) How is benzenediazonium chloride prepared in the laboratory? Discuss its mechanism. (6 + 6) (CO4)

    (ii) Write notes on (a) Sandmeyer reactions (b) Gomberg-Bachmann reaction and (c) Gattermann coupling reaction.

24. Draw and explain the mechanism of carbylamine reaction and Schotten-Bouman reaction. (CO3)

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Course Code: 07CT32	**Programme:**	**B.Sc.,**	**CIA:** III Test
Date: 12.10.2019	**Major:**	**CHEMISTRY**	**Semester:** III
Time: 2Hrs	**Year:**	**II**	**Maximum:** 50 Marks
Course Title:		**PHYSICAL CHEMISTRY -I**	

SECTION – A

Answer ALL Questions (10 x 1 = 10)

1. The efficiency of a heat engine is the ratio of **(CO1)**

   (a) Work obtained in a cyclic process (w) to the heat taken from the high temperature reservoir (q)

   (b) Heat taken from the high temperature reservoir (q) to the work obtained in a cyclic process

   (c) Work obtained in a cyclic process (w) to the heat taken from the low temperature sink

   (d) None of the above

2. The entropy of the system increases in the order **(CO1)**

   (a) gas < liquid < solid   (b) solid < liquid < gas

   (c) gas < solid < liquid   (d) none of these

3. When water is cooled to ice, its entropy **(CO2)**

   (a) Increases   (b) Decreases   (c) Remains the same   (d) Becomes zero

4. Which is the boltzon ? **(CO2)**

   (a) Electron   (b) Proton   (c) ^2D (d) A gas at high temperature

5. The ionic product of water will increase if **(CO3)**

   (a) Temperature is reduced   (b) Temperature is increased   (c) Pressure is decreased

   (d) Pressure is increased

6. The reaction of anion or cation with water accompanied by cleavage of O-H bond is called **(CO3)**

   (a) Neutralization   (b) Hydrolysis   (c) Acidification   (d) Ionization

7. The solubility of an electrolyte of type AB_2 is s, the expression for solubility product will be **(CO3)**

   (a) $K_{sp} = s^2$ (b) $K_{sp} = 4s^2$ (c) $K_{sp} = 4s^3$ (d) $K_{sp} = 4s^4$

8. While studying the distribution law -------------------- **(CO5)**

   (a) Temperature should be constant   (b) No association or dissociation of the solute

   (c) Concentration of the solute does not change   (d) All of the above

9. The magnetic moment of the molecule is expressed in --------------------- **(CO4)**

   (a) Magnetic ions   (b) Parachor   (c) Rheochor   (d) Magentons

10. The Rheochor is ----------------------- **(CO4)**

    (a) Additive property   (b) Constitutive property

    (c) Both a & b   (d) Dipolemoment property

SECTION – B

Answer any FIVE questions   **(5 x 2 = 10)**

11. One mole of nitrogen gas is mixed with 3 moles of oxygen gas at 25C to form a mixture at the final pressure of 1 atm, the initial pressure of each being also 1 atm. Calculate the molar entropy of mixing.   **(CO1)**

12. Write the give any two physical significance of entropy   **(CO2)**

13. What is Dunstan rule?   **(CO4)**

14. Write down the relation between solubility product and molar solubility of a sparingly soluble salt

15. Give the equation for the hydrolysis of salts of weak acids and strong bases and salts of weak bases and strong acids   **(CO3)**

16. Define the buffer index? Give examples of acidic and basic buffer   **(CO3)**

17. How will you determine the structure of ortho, meta and para isomers by dipolemoment? **(CO4)**

SECTION – C

Answer any THREE questions   **(3 x 6 = 18)**

18. Derive an expression of entropy of mixture of ideal gas.   **(CO1)**

19. State and explain the third law of thermodynamics. How can it be verified experimentally? **(CO2)**

20. Illustrate how surface tension is useful in elucidating the structure of a chemical compound   **(CO4)**

21. How will you determination of degree of hydrolysis by indirect method and freezing point depression method   **(CO3)**

22. Illustrate (i) Determination of equilibrium constant from distribution coefficient (ii) Determination of dipole moment   **(CO5)**

SECTION – D

Answer any ONE question   **(1 x 12 = 12)**

23. Describe in detail about the   **(CO2)**

    (i) Carnot cycle for establishing the maximum convertibility of heat in to work

    (ii) Absolute entropy of a substance is determined by the third law of thermodynamics

24. Discuss the applications of (i) Solubility product and (ii) Nernst distribution law   **(CO3)**

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Course Code: 07CT51	**Programme:**	**B.Sc.,**	**CIA:** III Test
Date: 09.10.2019	**Major:**	**CHEMISTRY**	**Semester:** V
Time: 2Hrs	**Year:**	**III**	**Maximum:** 50 Marks
Course Title:		**ORGANIC CHEMISTRY – II**	

SECTION – A

Answer ALL questions (10 x 1 = 10)

1. What will be the product when malonic acid is heated?

   a) Acetic acid   b) oxalic acid

   b) c) formic acid   d) all the above

2. How will you distinguish between maleic acid and fumaric acid with the help of simple test

   a) Heating   b) oxidation   c) reduction   d) addition

3. The correct decreasing order of stability of cyclohexane is

   a) Chair > Half-chair > Twist boat > Boat   b) Chair > Twist boat > Boat > Half-chair

   c) Chair > Boat > Half-chair > Twist boat   d) Chair > Boat > Twist boat > Half-chair

4. According to Baeyer strain theory, which is more stable?

   a) Cyclopentane   b) Cyclohexane

   c) Cyclobutane   d) Cyclopropane

5. Which of the following statements about conformations is FALSE?
   a) Conformers can be isolated and separated at room temperature
   b) Conformers are interconverted by rotation about sigma bonds
   c) For butane the staggered anti conformation is the most stable
   d) For ethane the eclipsed conformation is the least stable

6. Which one of the following is ortho dicarboxylic acid
   a) Phthalic acid   b) Isophthalic acid
   c) Terephthalic acid   d) salicylic acid

7. Nitrobenzene reacts with Br_2 in the presence of $FeCl_3$ to give
   a) *o*-chloronitrobenzene   b) *o*-bromonitrobenzene
   c) *m*-chloronitrobenzene   d) *m*-bromonitrobenzene

8. The conversion of acid chloride into amide followed by hydrolysis gives higher homologue is called ------------
   a) Arndt-Eistert Reaction   b) Beckamnn reaction
    c) HVZ reaction   d) none of these

9. Diastereomers can be separated by
   a) Simple distillation   b) Fractional distillation
   c) Electrophoresis   d) None of the above

10. The process of separation of racemic modification into *d* and *l* enantiomers is called
    a) Dehydration   b) Revolution
    c) Resolution   d) Walden inversion

SECTION – B

Answer any FIVE questions (5 x 2 = 10)

11. In which conformation the torsional energy of ethane is lowest?

12. Write the order of increasing order of acidity for the following acids?

    (i) Malonic acid (ii) Succinic acid and (iii) Adipic acid. Why it's change?

13. Write the chair conformations of a disubstituted cyclohexane which one has equal energy?

14. What is optical activity and how it is measured?

15. Illustrate the optical isomerism of lactic acid

16. How will you synthesise the following products (i) Phenylisocyanide (ii) Azoxybenzene

17. Write down the following reactions (i) Benzidine rearrangement (ii) Azo coupling

SECTION – C

Answer any THREE questions (3 x 6 = 18)

18. Depict chair – chair interconversion (ring flipping) in cyclohexane.

19. (a) What is the difference between axial and equatorial methyl-cyclohexane?

    (b) In the case of disubstituted cyclohexanes, when a conformation is called *cis* or *trans*?

20. Write down the preparation and synthetic applications of benzene diazonium chloride

21. Briefly explain (i) Racemic mixture (ii) Meso compound (iii) specific rotation (iv) Diasteriomers

    (v) Geometrical isomerism (vi) Absolute configuration

22. Explain the preparation and properties of any two aromatic dicarboxylic acid

SECTION – D

Answer any ONE question (1 x 12 = 12)

23. Convert the following:

    (a) ethylene to succinimide

    (b) cyclohexane to Nylone 6,6

    (c) Tetrahydrofuran to cyclopentanone

    (d) Benzene to succinic acid

    (e) Butene to meso-tartaric acid

    (f) Chloroacetic acid to malonic acid

24. Illustrate the optical activity of Tartaric acid, Allenes and biphenyls

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Course Code: 07CT52	**Programme:**	B.Sc.,	**CIA:** III Test
Date: 10.10.2019	**Major:**	**CHEMISTRY**	**Semester:** V
Time: 2Hrs	**Year:**	**III**	**Maximum:** 50 Marks
Course Title:		**INORGANIC CHEMISTRY – II**	

SECTION –A

Answer ALL questions(10 x 1 = 10)

1. The d-orbital used for dsp^2 hybridisation in $[Ni(CN)_4]^{2-}$ ion is
(a) dz^2 (b) $dx^2- y^2$ (c) d_{xy} (d) d_{yz}

2. If EAN of central metal cation M2+ in a non-chelating complex is 36 and atomic number of metal M is 26, then the number of monodentate ligand is in this complex are:
(a) 4   (b) 6   (c) 8   (d) 10

3. According to CFT, the bond between metal cation and ligand is
(a) covalent   (b) ionic   (c) coordinate covalent   (d) hydrogen bonding

4. John – Teller effect is in the field of
(a) nuclear physics   (b) vibronic interaction
(c) thermodynamics   (d) kinetic theory of gases

5. Which of the following is correct order with respect to Trans effect?
(a) $[CN]^- > [NO_2]^- > Br^- > NH_3$ (b) $[CN]^- > Br^- > NH_3 > [NO_2]^-$
(c) $[NO_2]^- > [CN]^- > NH_3 > Br^-$ (d) $Br^- > [CN]^- > NH_3 > [NO_2]^-$

6. Which among the following ion is labile?
(a) Rh^{3+} (b) Ti^{3+} (c) Ru^{2+} (d) Cr^{3+}

7. Which of the following is an active metal in carbonic anhydrase?
(a) Fe   (b) Zn   (c) Mg   (d) Co

8. The role of myoglobin is
(a) O_2 transport   (b) O_2 storage   (c) Hydrolase   (d) Transportation of Na

9. Which of the method cannot be used to determine accuracy?
a) Absolute   b) Minimal   c) Comparative   d) All of these

10. The closeness of a result to its true or accepted value is----
a) precision   b) accuracy   c) median   d) none of these

SECTION – B

Answer any FIVE questions   (5 x 2 = 10)

11. Give any two limitation of CFT
12. What is meant by CFSE?
13. What are inert and labile complexes?
14. What do you mean by trans effect?
15. Name the toxicity diseases of fluoride and copper.
16. What is co-precipitation?
17. Define error

SECTION – C

Answer any THREE questions   (3 x 6 = 18)

18. Explain John – Teller Effect with example?
19. Draw and explain various CFSE splitting for each 4,5 and 6 coordination complex ?
20. Write short notes on: a) Associative mechanism b) Outer sphere mechanism
21. Discuss the structure and functions of haemoglobin.
22. Comparison between accuracy and precision

SECTION – D

Answer any ONE question   (1 x 12 = 12)

23. Explain the properties of following complex using MOT
$[CoF_6]^{3-}$ and $[Co(NH_3)_6]^{3+}$

24. i) Write the applications of metals in medicine. (6)
    ii) Write a note on a) Bohr effect b) Cooperative effect (6)

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Course Code: 07CT53	**Programme:**	**B.Sc.,**	**CIA:** III Test
Date: 11.10.2019	**Major:**	**CHEMISTRY**	**Semester:** V
Time: 2Hrs	**Year:**	**III**	**Maximum:** 50 Marks
Course Title:		**PHYSICAL CHEMISTRY-III**	

SECTION –A

Answer ALL questions (10 x 1 = 10)

1. The order of equivalent conductance at infinite dilution of LiCl, NaCl and KCl is
   (a) LiCl >NaCl >KCl   (b) KCl >NaCl >LiCl   (c) NaCl > KCl >LiCl   (d) LiCl > KCl > NaCl

2. The resistance of a 0.1 N aceticacid solution is 250 ohm when measured in a cell of cell constant 1.15 cm^{-1}.
   The equivalent conductance of 0.1 N aceticacid solution in 91 ohm^{-1} cm^2 eq^{-1}
   (a) 2.3   (b) 4.6   (c) 9.2   (d) 46

3. The correct order of chemical reactivity with water according to electrochemical series
   (a) K > Mg > Zn > Cu   (b) Mg > Zn > Cu > K   (c) K > Zn > Mg > Cu   (d) Cu > Zn > Mg > K

4. Corrosion of iron is essentially an electrochemical phenomenon where the cell reaction are
   (a) Fe is oxidised to Fe^{2+} and dissolved oxygen in water is reduced to OH^-
   (b) Fe is oxidised to Fe^{2+} and water is reduced to O_2^{2-}
   (c) Fe is oxidised to Fe^{2+} and water is reduced to O_2^-
   (d) Fe is oxidised to Fe^{2+} and water is reduced to O_2

5. The energy of a secondary cell is usually renewed
   (a) By passing a current through it   (b) it cannot be renewed at all
   (c) by nenewing its chemicals (d) by heating it

6. For one component system the phase rule is
   (a) F = 3 – P   (b) F = 2 – P   (c) F = 1 – P   (d) none of these

7. At a triple point
   (a) Three phase coexists in equilibrium (b) The vapour pressure is equal to atmospheric pressure (c)
   There are three components in equilibrium (d) There are three degrees of freedom

8. In a system of two components at equilibrium the maximum possible number of phases
   and maximum number of degree of freedom will respectively be
   (a) 4 and 3   (b) 5 and 1   (c) 4 and 1   (d) 5 and 3

9. Reduced phase rule for a 3 component system is
   (a) F = 5 – P   (b) F = 4 – P   (c) F = 2 – P   (d) F = 1 –P

10. For a two component system in a single phase, the degrees of freedom is
    (a) 0   (b) 1   (c) 2   (d) 3

SECTION – B

Answer any FIVE questions (5 x 2 = 10)

11. Why is alternating current used for measuring resistance of an electrolytic solution?
12. Rusting of iron is quicker in saline water than in ordinary water. Give reason.
13. Why does the conductivity of a solution decreases with dilution?
14. What do you mean by fuel cell?
15. What do you mean by reduced phase rule?
16. For one component system the triple point is an invariant. Discuss
17. Define eutectic point.

## SECTION – C

Answer any THREE questions (3 x 6 = 18)

18. State and explain the Kohlrausch's law
19. Write a note on Lead storage cell and Westron –Cadmium cell
20. Outline the polarography.
21. Draw and explain the phase diagram of sulphur system.
22. Explain in detail about phase diagram of Pb-Ag system.

SECTION – D

Answer any ONE question (1 x 12 = 12)

23. (i) Describe the use of emf measurements to determine the PH of aqueous solutions. Include in your
    answer a reference of both Hydrogen, Glass, Calomel and Quine hydrone electrode. (8)
    (ii) Write a note on corrosion. (4)
24. State phase rule. Draw a well labeled phase diagram of water system and discuss its salient features.

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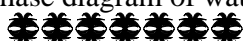
VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST - 625234
DEPARTMENT OF CHEMISTRY

Course Code: 07EP5A	**Programme:**	**B.Sc.,**	**CIA:** III Test
Date: 12.10.2019	**Major:**	**CHEMISTRY**	**Semester:** V
Time: 2Hrs	**Year:**	**III**	**Maximum:** 50 Marks
Course Title:		**COMPUTER APPLICATION IN CHEMISTRY AND GREEN CHEMISTRY**	

SECTION –A

Answer ALL questions (10 x 1 = 10)

1. Which of the following pieces of hardware is used the most in the input phase of a computer based information system?
   (a) Printer   (b) Diskette   (c) Monitor   (d) Keyboard

2. The language mainly used for scientific data processing is
   (a) FORTRAN   (b) COBOL   (c) LISP   (d) PASCAL

3. The octal equivalent of $(111)_2$ is ---------
   (a) 4   (b) 5   (c) 6   (d) 7

4. The Flow chart is ------
   (a) Computer program   (b) Pictorial representation at computer
   (c) Pictorial representation at algorithm   (d) Picture of computer units

5. What is the default font used in MS Word 2007 document?
   (a) Times New Roman   (b) Arial   (c) Calibri   (d) Preeti

6. The code no for chemical reaction arrow...
   (a) 2192   (b) 2158   (c) 2103   (d) 2105

7. Protect our Ozone" is highlighted in
   (a) Montreal Protocol   (b) Ozone Act   (c) Pollution Act   (d) Global Treaty

8. Find the odd one out based on Atom Uneconomy
   (a) Diel's Alder   (b) Elimination   (c) Substitution   d) Wittig

9. The Presidential Green Chemistry Challenge Awards were established in
   (a) 1993   (b) 1995   (c) 1994   (d) 1991

10. The sc-CO_2 is an attractive alternative solvent because
    (a) It is inexpensive   (b) Easily available
    (c) Harmless to environment and human   (d) All of the above

SECTION – B

Answer any FIVE questions (5 x 2 = 10)

11. Define the term computer
12. Draw the block diagram of computer organization
13. What are Algorithmand program of computer
14. Define chemdraw.
15. What is the ultimate objective of EPA towards green chemistry?
16. Give two everyday examples where you follow the theme of green chemistry.
17. Define the term 'Atom Economy'.

SECTION –C

Answer any THREE questions (3 x 6 = 18)

18. Describe the characteristics of computers.
19. Explain the flow chart in computer
20. Illustrate the significance of chemdraw in present time.
21. *Pollution is nothing but the resources we are not harvesting* - Elaborate.
22. Write a note on green chemistry education.

SECTION – D

Answer any ONE question (1 x 12 = 12)

23. Explain how to draw a chemical structure and paste them in the text.
24. Discuss the important principles of green chemistry over brown chemistry.

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Course Code: 07NE11	**Programme:**	**B.A., & B.Sc.,**	**CIA:** I Test
Date: 10.10.2019			**Semester:** I
Time: 2Hrs	**Year:**	**I**	**Maximum:** 50 Marks
Course Title:		FOOD CHEMISTRY	

SECTION – A

Choose the correct answer   **(1 X 10 = 10)**

1. Sources of proteins includes   **(CO1)**
   a) Fish   b) poultry   c) eggs   d) all of them

2. Carbohydrates and proteins provide about ------ calories per gram.   **(CO1)**
   a) 5   b) 4   c) 2   d) 6

3. What spice helps with nausea and motion sickness?   **(CO2)**
   a) Ginger   b) Coriander   c) Mustard   d) Cinnamon

4. The first spice used by man.   **(CO2)**
   a) Saffron   b) Pepper   c) Cardamom   d) Cinnamon

5. Prevention of Food adulteration Act was passed by the Parliament in   **(CO3)**
   a) 1948   b) 1950   c) 1955   d) 1976

6. Sugar is adulterated with   **(CO3)**
   a) Chalk powder   b) Fat and oil   c) Sand   d) All of these

7. Who is regarded as the father of canning?   **(CO4)**
   a) Nicolas Appert   b)Louis Pasteur   c)John Hall   d)Bryan Dokin

8. Which is least likely to cause food poisoning?   **(CO4)**
   a) Raw sprouts   b) Chicken   c) Salad   d) Mayonnaise

9. National Center of Organic Farming is in   **(CO5)**
   a) Nagpur   b) Kochi   c) Gangtok   d) Ghaziabad

10. A protein rich organism is   **(CO5)**
    a) Spirulina   b) Chlamydomonas   c) Ulothrix   d) Oedoganium

SECTION –B

Answer any five questions: **(2 X 5 =10)**

11. Write any twoNutrients and their sources.   **(CO1)**
12. Write any three advantages of Marinating process.   **(CO1)**
13. Define the term '**Spices'** with examples.   **(CO2)**
14. Mention any three important medicinal values of ginger.   **(CO2)**
15. Define **Food Adulteration** with suitable examples.   **(CO3)**
16. Explain the slow freezing method.   **(CO4)**
17. What is meant by Organic foods and give suitable examples?   **(CO5)**

SECTION –C

Answer any three questions: **(3 X 6 =18)**

18. Explain briefly about the functions of food in energy yielding and body building.   **(CO1)**
19. Discuss the advantages of using onion and Fenugreek seeds in our diet.   **(CO2)**
20. Explain the methods available to detect the adulterants present in   **(CO3)**
i) Milk ii) Black pepper iii) Ghee
21. Write down the principles of Food preservation.   **(CO4)**
22. Mention the classifications of food package.   **(CO5)**

SECTION –D

Answer any one question: **(1 X 12 = 12)**

23. Explain in detail about the following methods and their advantagesin cooking process.**(CO1)**
1. Boiling 2. Pressure cooking c. Microwave cooking
24. Write briefly about the Indian **AGMARK** Standard.   **(CO3)**

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Course Code: 07SB3A	**Programme:**	**B.Sc.,**	**CIA:** III Test
Date: 08.10.2019	**Major:**	**CHEMISTRY**	**Semester:** III
Time: 1Hr	**Year:**	**II**	**Maximum:** 25 Marks
Course Title:		**MEDICINAL AND PHARMACEUTICAL CHEMISTRY**	

SECTION – A

Answer ALL questions   **(5 x 1 = 5)**

1. The term 'septic' means: (CO5)

   a) ugly b) germs c) pungent d) rot

2. Which among the following statement is incorrect with respect to Lysol: (CO5)

   a) it is prepared from cresol   b) it is used to treat animal waste products

   c) it is an antiseptic liquid   d) its preparation is an saponification reaction

3. The chemical formula of bleaching powder is: (CO5)

   a) CaO_2Cl_2 b) $CaOCl_2$ c) CaO_2Cl d) $CaOCl$

4. Halazone contains _____ % of active chlorine: (CO5)

   a) 25   b) 35   c) 50   d) 75

5. The solution of formaldehyde in _____ is known as formalin: (CO5)

   a) methanol   b) ethanol c) acetone   d) acetophenone

SECTION – B

Answer any TWO questions   **(2 x 2 = 4)**

6. State the conditions for an antiseptic/disinfectant to be ideal.   (CO5)

7. Define phenol coefficient. Write down its value for i) Phenol ii) 4nbutyl cresol (CO5)

8. Write two uses of phenyl mercuric borate.   (CO5)

9. Draw the structure of any two nitrofuran derivatives.   (CO5)

SECTION – C

Answer any ONE questions   **(1 x 6 = 6)**

10. Give the structure and uses for the following organic mercurials:

    a) Cresol   b) Lysol   c) Thymol   (CO5)

11. Write the differences between antiseptics and disinfectants.   (CO5)

SECTION – D

Answer any ONE question   **(1 x 10 = 10)**

12. Discuss the chemical structure and uses of the following antiseptic/disinfectant:

    a) Thiomersol b) Nitromersol c) Dichloramine T d) Formalin e) Gluteraldehyde (CO5)

13. Explain the classification of chlorinated phenols.   (CO5)

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