Course Code: 07ATB1	**Programme:**	**B.Sc.,**	**CIA:** II Test
Date: 07.09.2019	**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. The atomic number and mass number of carbon respectively are: CO3
   (a) 2,8   (b) 4,10   (c) 6,12   (d) 8,14

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

3. The number of σ bonds and π bonds in a methane molecule respectively are: CO3
   (a) 4,0   (b) 3,2   (c) 2,3   (d) 1,1

4. A promoter is a substance which CO4
   (a) lowers the kinetic energy of reactants   (b) lowers the activation energy of reaction
   (c) enhances the activity of the catalyst   (d) enhances the concentration of the catalyst

5. A reaction requires the presence of a strip of metal in the reaction vessel, when the reactants are gases. This is an example of what kind of catalysis? CO4
   (a) homogeneous   (b) heterogeneous   (c) equilibrium   (d) thermodynamic

6. Which of the following is primary standard substance? CO5
   (a) NaOH   (b) $KMnO_4$ (c) HCl   (d) oxalic acid

7. The principle of volumetric estimation is CO5
   (a) V1 x N1 = V2 x N2   (b) V1 x V2 = N1x N2   (c) V1 x N2 = V2 x N1   (d) none of these

8. The molarities of 0.1 N HCl and 0.1 N H_2SO_4 are respectively, CO5
   (a) 0.1 M and 0.1 M   (b) 0.1 M and 0.05 M   (c) 0.05 M and 0.1 M   (d) 0.1 M and 0.2 M

9. The equivalent weight of sulphuric acid is ……….. CO5
   (a) 49   (b) 98   (c) 23   (d) 100

10. Which of the following is secondary standard substance? CO5
    (a) potassium permanganate   (b) oxalic acid
    (c) potassium dichromate   (d) sodium carbonate

SECTION – B

Answer any FIVE questions (5 x 2 = 10)

11. What is the valency of carbon atom? Draw the geometry and state the hybridization of carbon in methane. CO3
12. Define i) carbanion ii) carbon free radical CO3
13. What is auto catalysis? Give examples CO4
14. Write any two characteristics of catalysts. CO4
15. Define indicator with an example. CO5
16. What do you mean by titration? CO5
17. How do you calculate the molecular weight for glucose? CO5

SECTION – C

Answer any THREE questions (3 x 6 = 18)

18. Write the differences between homolytic and heterolytic fission CO3
19. Discuss the formation, structure and stability of carbocation CO3
20. Compare primary and secondary standard substances. CO5
21. Write a note on: (i) molecular weight (ii) formula weight (iii) equivalent weight CO5
22. Define the following terms: (i) Standard solution (ii) Titrant (iii) Analyte (iv) End point CO5

SECTION – D

Answer any ONE question (1 x 12 = 12)

23. Explain in detail about enzyme catalysis and its mechanism. CO4
24. Define the following terms: (i) Molarity   (ii) Normality   (iii) Weight percentage CO5

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Course Code: 07ATP1	**Programme:**	**B.Sc.,**	**CIA:** II Test
Date: 07.09.2019	**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. In the nucleus, $^{238}_{92}U$ there are (**CO4**)

    (a) 92 protons and 238 neutrons (b) 92 protons and 146 neutrons

    (c) 146 protons and 92 neutrons (d) 238 protons and 92 neutrons

2. $^{99}_{42}Mo$ decays to form $^{99}_{43}Tc$. The type of radioactive decay observed is (**CO4**)

    (a) A neutron (b) An alpha particle (c) A beta particle (d) A gamma particle

3. The source of energy released in fission is (**CO4**)

    (a) The mass lost in the reaction (b) The chemical reaction of the nucleus with a neutron

    (c) The burning of the nucleus in oxygen (d) The mass gained in the reaction

4. What repulsive forces must be overcome for any element other than hydrogen to exist? (**CO4**)

    (a) The repulsion between neutrons and other neutrons

    (b) The repulsion between protons and other protons

    (c) The repulsion between protons and neutrons

    (d) The repulsion between positrons and electrons

5. Alpha particles can be best described as (**CO4**)

    (a) A double-charged hydrogen nucleus (b) An electron

    (c) A pulse of electro-magnetic radiation (d) A double-charged helium ion

6. The normality of 2M sulphuric acid is (**CO5**)

    (a) 4 N (b) 2 N (c) N/2 (d) N/4

7. An exactly required concentration can be prepared from chemical substance is called as (**CO5**)

    (a) Primary standard (b) Secondary standard (c) Both A and B (d) None of this

8. The characteristics of a primary standard are (**CO5**)

    (a) Extremely pure (b) Highly stable (c) Less hygroscopic (d) All of the above

9. Which one of the following is **FALSE** for secondary standard? (**CO5**)

    (a) Its solution remains stable for a long time (b) More reactive than primary standard

    (c) It has more purity than primary standard (d) Titrated against primary standard

10. The equivalent weight of base is defined as (**CO5**)

    (a) Molecular weight of the base/basicity (b) Molecular weight of the base x basicity

    (c) Molecular weight of the base/acidity (d) Molecular weight of the base x acidity

SECTION – B

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

11. Compare the properties of alpha, beta and gamma rays **(CO4)**

12. Define mass defect and binding energy **(CO4)**

13. Calculate the disintegration constant of cobalt-60. Its half-life to produce nickel-60 is 5.2 years **(CO4)**

14. How much time would it take for a sample of cobalt-60 to disintegrate to the extent that only 2 percent remains? The disintegration constant is 0.13 year. **(CO4)**

15. 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)**

16. Draw the structure of Phenolphthalein and Methyl orange **(CO5)**

17. How do you prepare 1 N solution of NaOH in 500 ml? **(CO5)**

SECTION – C

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

18. Account on Soddy's group displacement law **(CO4)**

19. Write a short note on nuclear fission and nuclear fusion **(CO4)**

20. Half-life period of a radioactive element is 100 seconds. Calculate the disintegration constant and average life period. How much time will take for 90 percent decay? **(CO4)**

21. Define the following terms **(CO5)**

   (i) Titration   (ii) End point   (iii) Titrant   (iv) Titrate   (v) Analyte

22. Mention briefly the precautions which are required be taken to avoid errors in titrimetric analysis **(CO5)**

SECTION – D

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

23. Derive an equation to calculate the disintegration constant, half life period and average life period of radioactive nuclei **(CO4)**

24. (a) How do you prepare a standard solution? Explain **(CO5)**

   (b) Discuss the different types of titrations.

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Course Code: 07ATZ1	**Programme:**	**B.Sc.,**	**CIA:** II Test
Date: 07.09.2019	**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. The atomic number and mass number of carbon respectively are: **(CO3)**
    (a) 2,8   (b) 4,10   (c) 6,12   (d) 8,14

2. 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) $1^0 > 2^0 > 3^0$

3. The carbon atom in a carbon free radical is ….. hybridized.   **(CO3)**
    (a) sp^3 (b) sp^2 (c) sp   (d) sp^3d

4. Which among the following is electrically neutral?   **(CO3)**
    (a) carbocation   (b) carbanion   (c) Free radical   (d) All the above

5. Fission of a covalent bond results in how many types of cleavages: **(CO3)**
    (a) One   (b) Two   (c) Three   (d) Four

6. The molarity is defined as the number of moles of solute present in   **(CO5)**
    (a) one litre of the solvent   (b) one litre of the solution
    (c) one kilogram of the solvent   (d) one kilogram of the solution

7. 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

8. Properties of a primary standard for use in acid-base titrations include   **(CO5)**
    (a) high purity and low solubility   (b) low molar mass and low solubility
    (c) reactive with oxygen and low molar mass   (d) stability and high purity

9. According to the law of equivalents   **(CO5)**
    (a) $N_2V_1 = N_1V_2$ (b) $N_1V_1 = N_2V_2$ (c) $V_2V_1 = N_1N_2$ (d) none of these

10. Which of the following is not required when preparing a standard solution of the primary standard anhydrous sodium carbonate?   **(CO5)**
    a) a burette   b) an accurate balance   (c) a volumetric flask   (d) deionised water

SECTION – B

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

11) What is heterolytic fission?   **(CO3)**
12) Draw the geometry of methane and state its hybridization.   **(CO3)**
13) Find out the valency of carbon atom.   **(CO3)**
14) Define indicator with an example.   **(CO5)**
15) What do you mean by titration?   **(CO5)**
16) How will you prepare 1 M solution of NaOH in 500 mL?   **(CO5)**
17) Write any two characteristics of primary standard solution.   **(CO5)**

SECTION – C

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

18) Discuss the tetrahedral arrangement of valency of carbon atom.   **(CO3)**
19) Write the differences between homolytic and heterolytic fission.   **(CO3)**
20) Compare primary and secondary standard substances.   **(CO5)**
21) What do you mean by standardisation? How will you standardise secondary standard solutions? **(CO5)**
22) Write a note on: i) molecular weight   ii) formula weight   iii) equivalent weight **(CO5)**

SECTION – D

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

23) Discuss the formation, structure and stability of carbocations with examples.   **(CO3)**
24) a) Interpret the principle of titrimetry. **(5)**
b) Define the following terms: **(5)**
 i) Standard solution   ii) Titrant   iii) Analyte   iv) Indicator   v) End point   **(CO5)**

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Course Code: 07CT11	**Programme:**	**B.Sc.,**	**CIA:** II Test
Date: 03.09.2019	**Major:**	**CHEMISTRY**	**Semester:** I
Time: 2Hrs	**Year:**	**I**	**Maximum:** 50 Marks
Course Title:		**GENERAL CHEMISTRY – I**	

SECTION – A

Answer ALL questions (10 x 1 = 10)

1. f-block elements comprises of _____ elements. **(CO2)**
   (a) alkaline and alkaline earth   (b) lanthanides and actinides
   (c) metals and non-metals   (d) non-metals only

2. The order of screening effect of orbital is: **(CO2)**
   (a) s>p>d>f   (b) f>d>p>s   (c) p>d>s>f   (d) d>f>s>p

3. According to periodic law, the variation in properties of elements is related to their: **(CO2)**
   (a) atomic number   (b) atomic mass   (c) nuclear mass   (d) neutron-proton ratio

4. The correct order of size of the given species: **(CO2)**
   (a) $I > I^- > I^+$ (b) $I^+ > I^- > I$ (c) $I > I^+ > I^-$ (d) $I^- > I > I^+$

5. The correct order of ionization energies of Group I elements is: **(CO2)**
   (a) K>Li>Rb>Na   b) Li>Na>K>Rb   (c) Na>K>Li>Rb   (d) Rb>Na>K>Li

6. Which one of the following effect is temporary effect? **(CO4)**
   (a) Inductive effect   b) Electromeric effect   c) Mesomeric effect   (d) Hyperconjugation effect

7. Which of the following is **NOT** a nucleophile? **(CO4)**
   (a) NH_3 (b) HSO_3^- (c) $AlCl_3$ (d) OH^-

8. A thermolysis of azide gives… **(CO4)**
   (a) Carbocations   (b) Carbenes   (c) Benzyne   (d) Nitrenes

9. Resonance in most of the organic molecule **(CO4)**
   (a) increases reactivity   (b) decreases stability   (c) increases stability   (d) decreases reactivity

10. Which one of the following is an example of +I effect? **(CO4)**
    a) –F   (b) $–CH_3$ (c) –SH   (d) – COOH

SECTION – B

Answer any FIVE questions (5 x 2 = 10)

11. What are carbenes? Write the general formula. **(CO4)**
12. What are electrophiles? Give one example. **(CO4)**
13. Predict the stability order of $1^o, 2^o$ and 3° carbanions. **(CO4)**
14. What are polymerization reactions? Write one example. **(CO4)**
15. What are the Magic Numbers in Periodic Table? **(CO2)**
16. Write general outer electronic configuration of s, p, d and f block elements. **(CO2)**
17. What is period and group in a periodic table? **(CO2)**

SECTION – C

Answer any THREE questions (3 x 6 = 18)

18. Discuss BET theory? **(CO5)**
19. Discuss general characteristics of s and p block elements. **(CO2)**
20. Define the following terms: (i) Covalent radius   (ii) ionic radius and **(CO2)**
         (iii) van der Waal's radius.
21. Write a note on: i) Inductive effect   ii) Mesomeric effect **(CO4)**
22. Write short notes on: i) Hyperconjugation   ii) Steric effect **(CO4)**

SECTION – D

Answer any ONE question (1 x 12 = 12)

23. Discuss periodic trends of ionization energy and electron affinity. **(CO2)**
24. i) Discuss the structure and stability of carbocations. (5) **(CO4)**
         ii) What are homolytic cleavages? Explain. (3) **(CO4)**
         iii) Explain substitution and rearrangement reactions with examples. (4) **(CO4)**

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Course Code: 07CT12	**Programme:**	**B.Sc.,**	**CIA:** II Test
Date: 06.09.2019	**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. An example for protic solvent is (CO1)
   a) H_2SO_4 b) Hexane c) CCl_4 d) $CHCl_3$
2. Liq.SO_2 is an example for ………solvent. (CO1)
   a) Protic b) Amphoteric c) Neutral d) Aprotic
3. Which of the following is called as heavy water? (CO2)
   a) H_2O b) D_2O c) T_2O d) H_3O^+
4. Which of the following alkali metal gives a crimson red colour to flame? (CO2)
   a) Sodium b) Potassium c) Rubidium d) Lithium
5. Which of the following compounds cannot exists as cis/trans isomers? (CO3)
   a) CH_3-CH=CH-C_2H_5 b) Cl-CH=CH-Br c) Cl-CH=CH-Cl d) CH_2=CH-C_2H_5
6. The scattering of light by coarse and colloidal dispersed systems is known as? (CO5)
   a) Contrast matching b) DLVO theory c) Tyndall effect d) Creaming
7. Blood is an example of (CO5)
   a) true solution b) suspension c) colloidal solution d) saturated solution
8. Sugar and salt solutions are (CO5)
   a) true solution b) suspension c) colloidal solution d) saturated solution
9. Dispersed phase and dispersing medium of smoke are (CO5)
   a) solid in liquid b) liquid in solid c) solid in gas d) gas in solid
10. The particle size in a colloidal solution is (CO5)
    a) 1Å – 10Å b) 10Å – 2000Å c) more than 2000Å d) less than 1Å

SECTION – B

Answer any FIVE questions (5 x 2 = 10)

11. Define Usanovich concept (CO1)
12. What is para and ortho hydrogen (CO2)
13. What is amphoteric solvent? Give an example? (CO3)
14. Define the term colloidal solution give examples. (CO5)
15. What is meant by Dialysis? (CO5)
16. What are dispersed phase and dispersion medium in the colloidal system? (CO5)
17. Giveany two points of comparison between lyophobic and lyophilic colloids. (CO5)

SECTION – C

Answer any THREE questions (3 x 6 = 18)

18. Briefly explain Liquid Ammonia (CO1)
19. Write short notes on Hydrides (CO2)
20. What is Saytzeff's rule? Explain it with suitable example (CO3)
21. Explain the kinetic properties of colloids. (CO5)
22. Discuss the classification of colloidal system. (CO5)

SECTION – D

Answer any ONEquestion (1 x 12 = 12)

23. List out anysix reactionof chemical properties of alkene. (CO3)
24. Describe a method for purifying colloidal solutions. (CO5)

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DEPARTMENT OF CHEMISTRY

Course Code: 07CT31	Programme:	B.Sc.,	CIA: II Test
Date: 03.09.2019	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. Toluene is treated with chlorine in the presence of sunlight gives **(CO1)**
   a) methyl chloride b) chlorobenzene c) benzyl chloride d) benzoyl chloride

2. Compounds having same sequence of covalent bonds but differ in relative position of the atoms or groups in space are called **(CO5)**
   a) stereoisomers b) metamers c) functional isomers d) structural isomers

3. Geometric isomerism will be exhibited by **(CO5)**
   a) 1-Pentene b) 3-Methyl-1-butene c) 2-Pentene d) all of these

4. Which of the following groups has the highest priority according to the Cahn-Ingold-Prelog sequence rules? **(CO5)**
   a) $-CH_3$ b) $-CH_2CH_3$ c) $-CH=CH$ d) $-C\equiv CH$

5. The order of priority among the following groups according to CIP rule: CH_3, D, H and Br **(CO5)**
   a) $Br > D > CH_3 > H$ b) $CH_3 > Br > D > H$ c) $Br > CH_3 > D > H$ d) $Br > CH_3 > H > D$

6. Benzaldehyde and acetone can be best distinguished using **(CO4)**
   a) hydrazine b) Tollen's reagent c) sodium hydroxide solution d) none of these

7. The oxidation of benzyl chloride with lead nitrate gives which of the following compound? **(CO4)**
   a) Benzaldehyde b) Benzyl alcohol c) Benzoic acid d) p-chlorobenzaldehyde

8. Which of the following is the not a method of preparation of benzaldehyde? **(CO4)**
   a) Gattermann Koch synthesis b) Etards reaction c) Stephan's reaction d) Oxidation of secondary alcohol

9. What reagents will be used in the preparation of benzaldehyde via Gattermann Koch synthesis? **(CO4)**
   a) Carbon dioxide and HCl b) Carbon monoxide and HCl c) Oxygen and H_2SO_4 d) Carbon monoxide and H_2SO_4

10. The carbon atom of carbonyl group is **(CO4)**
    a) sp hybridized b) sp^2 hybridized c) sp^3 hybridized d) sp^2 hybridized

SECTION – B

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

11. How will you distinguish chlorobenzene and benzyl chloride? **(CO1)**
12. Differentiate laevorotatory and dextrorotatory. **(CO5)**
13. Define asymmetry and asymmetric carbon. **(CO5)**
14. What happens when 4-methyl benzoyl chloride id reduced with $BaSO_4$ / xylene? **(CO4)**
15. Why is the α-hydrogen in aldehydes and ketones acidic in nature? **(CO4)**
16. How will you synthesis benzaldehyde from benzene. **(CO4)**
17. Compound (A), C_7H_8, is chlorinated in the presence of UV-light to give (B). Compound (B) on hydrolysis with dilute NaOH gives (C). Identify the compounds and give reaction. **(CO4)**

SECTION – C

Answer any THREE questions (3 x 6 = 18)

18. Explain geometrical isomerism with suitable examples. **(CO5)**
19. Write Cahn-Ingold-Prelog rule. Assign E/Z or R/S for following compounds **(CO5)**

a)   b)
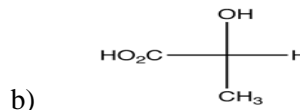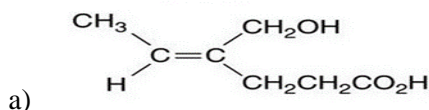
20. Suggest mechanism of Gattermann-Koch synthesis. **(CO4)**
21. How will you distinguish between benzaldehyde and acetaldehyde? **(CO4)**
22. What reactions does benzaldehyde undergo with the following reagents? **(CO4)**
    a) Conc.aq.NaOH b) CH_3MgI c) CH_3OH d) PCl_5 e) aniline f) $LiAlH_4$

SECTION – D

Answer any ONE question (1 x 12 = 12)

23. Discuss the mechanism of aldol condensation reaction with their limitation. **(CO4)**
24. Interpret the following terms with suitable examples. **(CO5)**
    (i) chirality (ii) conditions for optical activity (iii) eantiomers (iv) diastereomers (v) Fischer projection formula

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Course Code: 07CT32	**Programme:**	**B.Sc.,**	**CIA:** II Test
Date: 06.07.2019	**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 Gibb's Helmholtz equation is applicable to   **(CO 2)**
   (a) All processes, chemical or physical   (b) All process, chemical or physical but in a closed system
   (c) All chemical processes in a closed system   (d) All physical processes in a closed system

2. In a process ΔH = 100 kJ and ΔS = 100 JK–1 at 400 K. The value of ΔG will be   **(CO 2)**
   (a) Zero   (b) 100 kJ   (c) 50 kJ   (d) 60 kJ

3. Which of the following is a correct statement of third law of thermodynamics   **(CO 2)**
   (a) Entropy of perfectly crystalline substance is zero at T = 0
   (b) Entropy of perfectly crystalline substance is zero at standard state conditions
   (c) Entropy and enthalpy of substance are equal at T = 0
   (d) Free energy of perfectly crystalline substance is zero at T = 0

4. Which of the molecules are having residual entropies at 0 K?   **(CO 2)**
   (a) H_2 (b) D2   (c) CO   (d) all of them

5. The pH of a solution increases from 1 to 2. The concentration of H^+ ions   **(CO 3)**
   (a) Decreases   (b) Increases   (c) Remains the same   (d) Become zero

6. Which of the following is not an example of a weak acid?   **(CO 3)**
   (a) Lactic acid   (b) Carbonic acid   (c) Sulfuric acid   (d) Pyruvic acid

7. A solution of ammonium acetate is --------------- and its pH value is   **(CO 3)**
   (a) Acidic, less than 7   (b) Basic, more than 7   (c) Neutral, less than 7   (d) (c) Neutral, more than 7

8. The dissociation constant of weak acid, Ka and that of a base Kb are related to hydrolysis of the salt by the relation**(CO 3)**
   (a) $K_w = K_a \times K_b$ (b) $K_a = K_w \times K_b$ (c) $K_b = K_w \times K_a$ (d) $K_w = K_a / K_b$

9. When a bottle of soda-water is opened, the partial pressure of CO_2 ---------------   **(CO 5)**
(a) Decreases (b) Increases (c) Remain same (d) Increases and then decreases

10. Nernst distribution law is also known as   **(CO 5)**
    (a) Hendry's law   (b) Raoult's law   (c) Partition law   (d) Equilibrium law

SECTION – B

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

11. The free energy change accompanying a given process is -85.77 Kj at 25ºC and -83.68 kj at 35º C. Calculate the change in enthalpy for the process at 30º C.   **(CO 2)**

12. State third law of thermodynamics.   **(CO 2)**

13. Find the pH of a buffer solution containing 0.02 moles per litre sodium acetate and 0.15 moles per litre acetic acid. Ka for acetic acid is 1.8 x 10^-5.   **(CO 3)**

14. Write the statement and formula of distribution law   **(CO 5)**

15. Mention the limitations of distribution law   **(CO 5)**

16. State Hendry's law of distribution law   **(CO 5)**

17. In the distribution of succinic acid between ether and water at 25 C, 20 mL of the ethereal layer contains 0.092 g of the acid. Find out the weight of the acid present in 50 mL of the aqueous solution in equilibrium with it if the distribution coefficient for succinic acid between water and ether is 5.2   **(CO 5)**

SECTION – C

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

18. What is meant by chemical potential? Derive the Gibbs –Duhem equation.   **(CO 2)**

19. State and explain Nernst heat theorem.   **(CO 2)**

20. Define residual entropy. How the concepts of residual entropy originated? How it's can be calculated?**(CO 2)**

21. Discuss the application of solubility product for (a) Determination of solubility of sparingly soluble salt
    (b) Predicting precipitation reactions   **(CO 3)**

22. Illustrate the method to determine equilibrium constant from distribution coefficient   **(CO 5)**

SECTION – D

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

23. (a) Derive Gibbs – Helmholtz equation for a process at constant pressure and constant volume.
    (b) Derive the Clapeyron – Clausius equation   **(CO 2)**

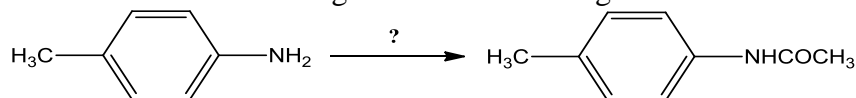24. Discuss the applications of distribution law   **(CO 5)**

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Course Code: 07CT51	**Programme:**	**B.Sc.,**	**CIA:** II Test
Date: 03.09.2019	**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. Predict the suitable reagent for the following conversion

H_3C—〈 〉—NH_2 ——?——> H_3C—〈 〉—$NHCOCH_3$

   (a) $KMnO_4$ (b) CH_3COCl (c) NH_3 (d) CH_3COOH

2. On photolysis of diazomethane gives
   (a) methylene   (b) methyl radical   (c) methyl cation   (d) methyl anion

3. Which of the following regents does not react with aniline?
   a) Acetyl chloride   b) Acetic anhydride   c) Ammonia   d) Nitrous acid

4. Which of the following represents a racemic mixture?
   a) 75% (R)-2-Butanol + 25% (S)-2-Butanol   b) 25% (R)-2-Butanol + 75% (S)-2-Butanol

5. The order of priority among the following groups according to CIP rule: CH_3, D, H and Br
   a) $Br > D > CH_3 > H$ b) $CH_3 > Br > D > H$ c) $Br > CH_3 > D > H$ d) $Br > CH_3 > H > D$

6. What is the other name of the cyanide?
   a) nitrile   b)isonitrile   c)azide   d) amine

7. On reduction of cyanide gives------
   a) amine   b) acid   c) aldehyde   d) ketone

8. Which one of the reagent is used to differentiate cyanide from isocyanide?
   a) $LiAlH_4$ b) H_2O c) HCl   d) NaOH

9. Carbonyl chloride reacts with ammonia to give.
   a)Urea   b) Acetone   c) acetamide   d) Chloroform

10. On hydrolysis of isocyanide with mineral acid gives --------
   a) amine   b) aldehyde   c) acid   d) both A& C

SECTION – B

Answer any FIVE questions   (5 x 2 = 10)

11. Give an example for D, L, Erythro and threo notations
12. What do you mean by stereoisomer? Give example for each of them
13. Write any two name reaction involving aromatic nitro compound as starting material
14. How will you prepare Benzidine?
15. How will you convert a primary amine into urea?
16. Why urea behave as a weak base?
17. What is Biuret test?

SECTION – C

Answer any THREE questions   (3 x 6 = 18)

18. Illustrate the optical activity of cumulated dienes
19. Discuss the preparation and synthetic applications of diazoacetic ester
20. Discuss the method of preparation, important properties and structure of urea.
21. How will you perform following conversions?
   a) Nitrile to carboxylic acids   (b) Nitrile to primary amine   (c) Nitrile to aldehyde
22.   (i) How will you prepare thiourea form cyanamide and calcium carbide? (4)
      (ii)Why urea weak base than thiourea. (2)

SECTION – D

Answer any ONE question   (1 x 12 = 12)

23. Convert the following:
(a) Benzene to biphenyl   (b) N-methyl-N-nitrosourea to cycloheptanone
(c) Benzene to N-phenylhydoxylamine   (d) Benzene to Benzanilide
(e) Toluidine to p-aminobenzoic acid   (f) Diazomethane to cycloheptanone
24. Compare alkyl cyanides and alkyl isocyanides

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Course Code: 07CT52	**Programme:**	**B.Sc.,**	**CIA:** II Test
Date: 04.09.2019	**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. Both geometrical and optical isomerism are shown by
    (a) $[Co(en)_2Cl_2]^+$ (b) $[Co(NH_3)_5Cl]^{2+}$ (c) $[Co(NH_3)_4Cl_2]^+$ (d) $[Cr(ox)_3]^{3-}$

2. According to Werner's theory of coordination compounds
    (a) primaryvalency is ionisable   (b) secondary valency is ionisable
    (c) primary and secondary valencies are ionisable   (d) neither primary nor secondary valency is ionisable

3. The value of the 'spin only' magnetic moment for one of the configurations 2.84 BM. The correct one is
    (a) d^4 (in strong field ligand)   (b) d^4 (in weak field ligand)
    (c) d^3 (in weak as well as strong fields)   (d) d^5 (in strong field ligand)

4. Electronic configuration of $[Cu(NH_3)_6]^{2+}$ on the basis of crystal field splitting theory is
    (a) $t_{2g}^5 e_g^4$ (b) $t_{2g}^6 e_g^3$ (c) $t_{2g}^9 e_g^0$ (d) $t_{2g}^4 e_g^5$

5. Which one of the following is kinetically inert?
    (a) Cr^{2+} (b) Co^{3+} (c) Co^{2+} (d) Fe^{3+}

6. The reactions of $[PtCl_4]^{2-}$ with NH_3 gives rise to
    (a) $[PtCl_4(NH_3)_2]^{2-}$ (b) *trans*-$[PtCl_2(NH_3)_2]$ (c) $[PtCl_2(NH_3)_4]$ (d) *cis*-$[PtCl_2(NH_3)_2]$

7. Which of the following square planar complex ions can have cis-trans isomers?
    (a) $[Pt(NH_3)_4]^{2+}$ (b) $[Ni(NH_3)_4]^{2+}$ (c) $[Pt(NH_3)_2Cl_2]$ (d) $[Pt(NH_3)Cl_3]^-$

8. For outer sphere mechanism, electron transfer reactions
    (a) Both the complexes should be inert   (b) Both the complexes should be labile
    (c) One should be inert and other should be labile   (d) Electron transfer is slow if the ligands are pi-acceptor

9. Precipitation is applicable for what types of solutes?
    a) Insoluble   b) Soluble   c) Sparingly soluble   d) both insoluble and soluble

10. Water falling on earth surface in any form is called
    a) atmosphere   b) climate   c) weather   d) precipitation

SECTION – B

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

11. What is meant by spectrochemical series? Given an example
12. Define EAN rule
13. What are inert complexes?
14. Illustrate any two factors which affect the lability of complexes.
15. Compare the reactivity of Co (II) and Co (III) complexes in a substitution reaction
16. What is post precipitation?
17. What is precipitation gravimetric?

SECTION – C

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

18. What are the limitation of VBT?
19. Discuss the optical isomerization of coordination complexes
20. What do you mean by trans effect? Account for the polarization theory of trans effect.
21. Give an account on the inner sphere electron transfer reactions.
22. Explain the formation of co-precipitation method

SECTION – D

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

23. Explain in detail about postulates of CFT and its applications?
24. Write a note on the following: (6+6)
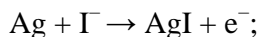   i) Associative mechanism   ii) Dissociative mechanism

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Course Code: 07CT53	**Programme:**	**B.Sc.,**	**CIA:** II Test
Date: 05.09.2019	**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. Given the data at 25°C,

   $Ag + I^- \rightarrow AgI + e^-$; $E^o = 0.152$ V

   $Ag \rightarrow Ag^+ + e^-$; $E^o = -0.800$ V

   What is the value of log K_{sp} for AgI?
   (a) −8.12   (b) 8.612   (c) −37.83   (d) −16.13

2. The composition of calomel electrode is
   (a) Hg, $HgCl_2$ and KCl   (b) Hg, Hg_2Cl_2 and KCl   (c) Hg and KCl   (d) $HgCl_2$ and KCl

3. Potential of SHE is considered as
   (a) zero   (b) unity   (c) constant   (d) multiple of 1

4. Chemical used in salt bridge is
   (a) KOH   (b) KCl   (c) KBr   (d) NaCl

5. Saturated solution of KNO_3 is used to make 'salt bridge' because
   (a) velocity of K^+ is greater than that of NO_3^- (b) velocity of NO_3^- is greater than that of K^+
   (c) velocity of both K^+ and NO_3^- are nearly the same   (d) KNO_3 is highly soluble in water

6. The hydrogen electrode is dipped in a solution of pH 3 at 25°C. The potential would be (the value of 2.303 RT/F is 0.059 V)
   (a) 0.177 V   (b) 0.087 V   (c) 0.059 V   (d) –0.177 V

7. The glow of fireflies is due to the aerial oxidation of luciferin. It is an example of
   (a) Fluorescence   (b) phosphorescence   (c) chemiluminescence   (d) none of these

8. A system containing liquid water and water vapour has the number of phase equal to
   (a) 0   (b) 1   (c) 2   (d)3

9. The phase rule is applicable to
   (a) Homogeneous system   (b) Reversible system
   (c) Irreversible system   (d) Heterogeneous system whether physical or chemical

10. For a pure gas and mixture of gases , the degrees of freedom are
    (a) 2 and 2   (b) 2 and 3   (c) 3 and 2   (d) 3and 3

SECTION – B

Answer any FIVE questions (5 x 2 = 10)

11. Write the difference between electrochemical cell and electrolytic cell.
12. Derive a relationship between EMF of a cell and ΔG, ΔH and ΔS.
13. What isan electrochemicalseries and its importance?
14. Define salt bridge? Give its importance.
15. Differentiate phosphorescence and fluorescence.
16. Define chemiluminescence with examples.
17. What do you mean by flash photolysis?

SECTION – C

Answer any THREE questions (3 x 6 = 18)

18. Derive Nernst equation for the measuring EMF of cell.
19. What is liquid junction potential? Derive expression for the LJP and How can it be minimized or eliminated?
20. Define concentration cell and it explain without concentration cell.
21. Discuss the kinetics of the following photochemical reaction. $H_{2(g)} + Cl_{2(g)} \rightarrow 2HCl_{(g)}$
22. What do you mean by photosensitization? Discuss its mechanism.

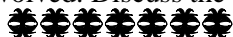### SECTION – D

Answer any ONE question (1 x 12 = 12)

23. (i) Discuss in detail about the different types of reversible electrodes. (8)
    (ii) Write down the reactions taking place separately at the two electrodes and the complete cell reaction.
    Pt, H_2 (g) / HCl (aq) // KCl (aq),AgCl (s) / Ag.   (4)
24. State phase rule. Explain the various terms involved. Discuss the derivation of phase rule.

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Course Code: 07EP51	**Programme:**	**B.Sc.,**	**CIA:** II Test
Date: 06.09.2019	**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. Daisy wheel printer is a type of
   (a) Matrix printer   (b) Impact printer   (c) laser printer   (d) Manual printer
2. Repeated sequence is an example of ------
   (a) Input statement   (b) Output statement   (c) Control statement   (d) none of these
3. By using loops, algorithm steps becomes -----
   (a) Clear and long   (b) Complex and long   (c) Clear and short   (d) None of these
4. The arithmetic operations in a digital computer are performed using radix as-------
   (a) 2   (b) 8   (c) 16   (d) Both (a) and (c)
5. What does Ctl + = key effect?
   (a) Subscript   (b) Superscript   (c) Shadows   (d) All caps
6. How many columns can you insert in a word document in maximum?
   (a) 35   (b) 15   (c) 65   (d) 63
7. Which one among the following is Greener catalyst?
   (a) Silica   (b) Nickel   (c) Rhodium   (d) Platinum
8. Green chemistry looks at pollution prevention on the
   (a) Atomic level   (b) Molecular level   (c) Nano level   (d) Both a and b
9. The alternative name of green chemistry is
   (a) Environmentally benign chemistry   (b) Clean chemistry
   (c) Sustainable chemistry   (d) All of the above
10. Green chemistry is about reducing
    (a) Waste   (b) Hazards   (c) Risks   (d) All of the above

SECTION – B

Answer any FIVE questions (5 x 2 = 10)

11. Why do we need an operating system?
12. What are input and output devices?
13. What is Microsoft access?
14. Jot down the environmental laws passed by EPA in the year of 1972.
15. Quote any two man made chemical disasters that resulted in massive public outcry.
16. Mention the Objective of Green Chemistry.
17. Write down the essence of the principles of Green Chemistry.

SECTION – C

Answer any THREE questions (3 x 6 = 18)

18. Convert the following binary numbers to their desired equivalents:
    i) $(1110.0111)_2$ and ii) $(0.101)_2$
19. Differentiate between computer Hardware and Software.
20. How to write chemical formula and equations in Microsoft word?
21. Give a gist note on green chemistry and eco-efficiency.
22. Explain in detail about the term " Atom Economy"

SECTION – D

Answer any ONE question (1 x 12 = 12)

23. Discuss steps to create and access data base in MS access.
24. What are the challenges ahead for a chemist to implement the ethics of green chemistry?

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Course Code: 07SB3A	**Programme:**	**B.Sc.,**	**CIA:** II Test
Date: 30.08.2019	**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. From which language was the term 'anaesthesia' derived?   (CO3)

 a) Greek   b) Latin   c)Spanish   d)Sanskrit

2. The metal used in the preparation of cyclopropane is: (CO3)

 a) Cu   b) Fe   c)Ni   d)Zn

3. Which among the following statement is incorrect: Morphine is   (CO4)

 a) White in colour   b)odourless nature

 c) Obtained from poppy plant   d)amorphous compound

4. Heroin is preferred less compared to morphine because: (CO4)

 a) its action takes more duration than morphine   b) its cost is high

 c) it has many side effects like vomiting, headache   d) it leads to addiction easily

5. Which among the following is called 'oil of winter green'   (CO4)

 a)methyl salicylate   b)sodium salicylate   c)diethylamine salicylate   d)salicin

SECTION – B

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

6. State the two types of narcotic analgesics with examples.   (CO3)

7. What is the chemical name of Ibuprofen. Mention one of its use.   (CO3)

8. Define the two types of anaesthetics.   (CO4)

9. Name the four stages of volatile general anaesthetics.   (CO4)

SECTION – C

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

10. Write the structure and therapeutic use of cocaine and benzocaine.   (CO3)

11. Give the structure, mode of action and uses for the following morphine derivatives:

 a) Pethidine   b) Methadone   (CO4)

SECTION – D

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

12. Discuss the chemical structure, properties, advantages and disadvantages of the following

 anaesthetics: a) Vinyl Ether   b) Chloroform   c) Trichloroethylene   (CO3)

13. Explain the classification of Non-narcotic analgesics   (CO4)

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