Dept. of Chemistry	**II Sessional Test**
Vivekananda College	**II Semester**
Tiruvedakam West	**Max. Marks: 50**
Date: 05 .03. 2019	**Time: 2 Hours**

CHEMISTRY FOR BIOLOGIST -II (07ATB2)

SECTION – A

Answer ALL questions (10 x 1 = 10)

1. An example of a fibrous protein is **CO3**
   (a) mucin   (b)globin   (c) keratin   (d) casein
2. Which one of the following protein transport oxygen in the body? **CO3**
   (a) Keratin   (b) nucleoprotein   (c) Haemoglobin   (d) insulin
3. Xeropthalmia is caused by the deficiency of vitamin **CO3**
   (a) A   (b) B   (c) C   (d) D
4. Which of the following refers to Vitamin D_1? **CO3**
   (a) caliciferol (b)ergocalciferol   (c)cholecalciferol   (d)tocopherol
5. Deficiency of which vitamin causes lowering of red blood cells **CO3**
   (a) A   (b) C   (c) E   (d) B_{12}
6. The degree to which a chemical is poisonous to the organism is its **CO4**
   (a) toxicity (b) kill value (c) hazard rating (d) lethal dose
7. The compound responsible for the killing action of pesticides is called the **CO4**
   (a) lethal factor (b) killing agent (c) active ingredient (d) toxic factor
8. IPM stands for **CO4**
   (a) integrated pest manufacturer (b) integrated plant manufacturer
   (c) integrated pest management (d) integrated plant management
9. LD-50 is the dose of a substance that will **CO4**
   (a) kill 50% of a population (b) grow 50% of a population (c) develop 50% of a population
   (d) none of the above
10. Two types of fungicides are: **CO4**
    (a) contact and systemic (b) systemic and natural (c) natural and contact (d) none of the above

SECTION – B

Answer any FIVE questions (5 x 2 = 10)

11. What is a peptide linkage? **CO3**
12. What are essential and non-essential amino acids? Give example **CO3**
13. Write any two sources of Vitamin C. **CO3**
14. Write the two types of organic pesticides. **CO4**
15. What is inorganic pesticide? **CO4**
16. Define fungicide. **CO4**
17. Briefly write the classification of fungicide. **CO4**

SECTION – C

Answer any THREE questions (3 x 6 = 18)

19. How do you prepare prepare α-aminoacid using following methods **CO3**
    (a) Gabriel phthalimide synthesis (b) Strucker synthesis
20. Write any five chemical properties of amino acids **CO3**
21. Write short notes on the following. (a) Zwitter ion   (b) Isoelectric point. **CO3**
18. Describe the characteristics of pesticides. **CO4**
19. Write a short note on safe handling of pesticides. **CO4**

SECTION – D

Answer any ONE question (1 x 12 = 12)

23. Illustrate classification of protein with examples **CO3**
24. Explain in detail the impact of pesticides on environment **CO4**

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I B.Sc., PHYSICS

Dept. of Chemistry   **II Sessional Test**
Vivekananda College   **II Semester**
Tiruvedakam West   **Max. Marks: 50**
Date: 05 .03.2019   **Time : 2 Hours**

CHEMISTRY FOR PHYSICIST – II (07ATP2)

SECTION – A

Multiple choice questions:
Answer ALL questions   **(10 x 1 = 10)**

1) NaCl is an example of ……..system.   **(CO3)**

    (a) Tetragonal   (b) Cubic   (c) Rhombhohedral   (d) Hexagonal

2) A crystal plane has intercepts of 3, 4 and 2 units with x, y and z axes respectively. The Miller Indices are   **(CO3)**

    (a) (4,2,6)   (b) (3,4,6)   (c) (4,3,3)   (d) (4,3,6)

3) How many numbers of Bravais lattices are there?   **(CO3)**

    (a) 8   (b) 14   (c) 7   (d) 12

4) The total number of crystal systems is…   **(CO3)**

    (a) 8   (b) 14   (c) 7   (d) 12

5) Which one of the following is correct for rhombhohedral (trigonal)   **(CO3)**

    (a) $\alpha = \beta = \gamma \neq 90^0$ (a) $\alpha = \beta = 90^0 \, \gamma = 120^0$ (a) $\alpha = \beta = \gamma = 90°$ (a) $\alpha = \beta = \gamma \neq 120°$

6) The composition of calomel electrode is   **(CO5)**

    (a) $Hg, HgCl_2$ and KCl (b) Hg, Hg_2Cl_2 and KCl (c) Hg and KCl (d) $HgCl_2$ and KCl

7) Potential of SHE is considered as   **(CO5)**

    (a) zero (b) unity (c) constant (d) multiple of 1

8) Chemical used in salt bridge is   **(CO5)**

    (a) KOH (b) KCl (c) KBr (d) NaCl

9) The name of the equation showing the relation between electrode potential (E), Standard electrode potential and concentration of ions in solution is   **(CO5)**

    (a) Debye-Huckel-Onsager equation   (b) Kohlraush's equation

    (c) Nernst equation   (d) Faraday's equation

10) In galvanic cell   **(CO5)**

    (a) Chemical energy is converted into heat

    (b) Electrical energy converted into heat

    (c) Chemical energy is converted into electrical energy

    (d) Electrical energy converted into chemical energy

SECTION – B

Very short answer

Answer any FIVE questions (5 x 2 = 10)

11) Define unit cell. (CO3)

12) What do you mean by interfacial angle? (CO3)

13) Define face of a crystal. (CO3)

14) Define isotropy. (CO3)

15) What is the potential of a half-cell consisting of zinc electrode in 0.01M $ZnSO_4$ solution at 25° C? E° = 0.763 V (CO5)

16) Define single electrode potential (E). (CO5)

17) Define electrochemical cell. (CO5)

SECTION – C

Short answer

Answer any THREE questions (3 x 6 = 18)

18) Write the differences between crystalline and amorphous solid. (CO3)

19) Write a note on the following cubic system (CO3)

    i) Simple ii) Body centered iii) Face centered

20) Describe in detail the construction and working of calomel electrode. (CO5)

21) Define electrochemical series and it applications. (CO5)

22) Derive Nernst equation for EMF of cells**.** (CO5)

SECTION – D

Answer any ONE question (1 x 12 = 12)

23) i) Derive Bragg's equation.   (7) (CO3)

    ii) Explain the various symmetry elements with examples. (5)

24) (i) Explain the cell reaction and the representation of the electrode cell.(6) (CO5)

    (ii) What do you mean by EMF and it determination? (6)

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Dept. of Chemistry **II Sessional Test**
Vivekananda College **II Semester**
Tiruvedakam West **Max. Marks: 50**
Date: 05 .03. 2019 **Time: 2 Hours**

CHEMISTRY FOR BIOLOGIST -II (07ATZ2)

SECTION – A

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

1. According to the Bronsted-Lowry Theory an acid breaks up into *CO1*
   (a) an acid-base pair (b) a conjugate base and a proton
   (c) an acid and a proton (d) a conjugate acid and a proton

2. Which of the following ions do all acids have in common? *CO1*
   (a) OH^- (b) Ca^{2+} (c) H^+ (d) Na^+

3. Which one of the following is acidic? *CO1*
   (a) Lemon juice (b) Tomatoes (c) Milk (d) All

4. Phenolphthalein in acidic solution is *CO1*
   (a) colorless (b) pink colour (c) yellow colour (d) orange colour

5. Which one of the following is an example for acid according to Usanovich concept? *CO1*
   (a) SiO_2 (b) Na_2O (c) SO_3 (d) $AlCl_3$

6. Pesticides used to control plant pest are called *CO4*
   (a) weed agents (b) herbicides (c) toxicols (d) fungicides

7. Pesticides designed to kill birds are called *CO4*
   ((a) birdicides (b) herbicides (c) avicides (d) miticides

8. Which of the following information is usually found on a pesticide label? *CO4*
   (a) Product name (b) directions for use (c) Caution (d) all of these

9. The degree to which a chemical is poisonous to the organism is its *CO4*
   (a) toxicity (b) kill value (c) hazard rating (d) lethal dose

10. The potential of a pesticide for causing damage to plant is its: *CO4*
    (a) lethal dose (b) defoliation ability (c) phytotoxicity (d) chronicity

SECTION – B

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

11. Define pH. *CO1*
12. BF_3 is Lewis acid. Comment. *CO1*
13. What do you understand from the term 'amphiprotic'? *CO1*
14. What are the limitations of Arhenious acid-base concept? *CO1*
15. Define pesticide. *CO4*
16. What is inorganic pesticide? *CO4*
17. Define fungicide. . *CO4*

SECTION – C

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

18. Explain the following (i) Lux-Flood concept ii) Cady-Elsey concept *CO1*
19. Discuss Lewis acid-base concept. *CO1*
20. Write the classification of pesticides. *CO4*
21. Describe the characteristics of pesticides. . *CO4*
22. Write a short note on safe handling of pesticides. *CO4*

SECTION – D

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

23. Prepare a constructive statement on the following:
    (i) Arrhenius concept of acids and bases (ii) Bronsted – Lowry concept *CO1*
24. Explain in detail the impact of pesticides on environment. *CO4*

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Dept. of Chemistry   **II Sessional Test**
Vivekananda College   **II Semester**
Tiruvedakam West   **Max. Marks: 50**
Date: 01 .03. 2019   **Time : 2 Hours**

GENERAL CHEMISTRY-III (07CT21)

SECTION – A

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

1. The carbon-carbon bond length in benzene molecule is: (CO2)

   (a) 1.54 A°   (b) 1.39 A°   (c) 1.33A°   (d) 1.20A°

2. Benzene gives mainly: (CO2)

   (a) substitution reaction   (b) addition reaction (c) elimination reaction (d) all of these

3. Benzene reacts with H_2 at 150 °C at 30 pressure in the presence of Ni catalyst to give (CO2)

   (a) cyclohexane   (b) cyclohexene   (c) n-hexane   (d) phenol

4. When considering electrophilic aromatic substitution reactions electron donating

   subsituents (e.g. methoxy) are described as   (CO2)

   (a)ortho/para directing and activating   (b)ortho/para directing and deactivating

   (c)meta directing and activating   (c) meta directing and deactivating

5. Which of the following is meta-directing group?   (CO2)

   (a)–COOH   (b) –Cl   (c) –NH2   (d) –OH

6. Mathematically, Henry's law can be expressed as (C is the concentration of the gas in

   solution and P is the pressure of the gas)   (CO5)

   (a) Cα P   (b) C = k P   (c) k = C/P   (d) all of these

7. A colligative property depends upon   (CO5)

   (a) Chemical nature of the particles   (b) size of the particles

   (c) number of particle   (d)temperature of the solution

8. When a non-volatile solute is dissolved in a pure solvent, the vapour pressure of the

   pure solvent   (CO5)

   (a) increases   (b) decreases   (c) remains the same   (d) none of these

9. The addition of a non-volatile solute_____ the vapour pressure   (CO5)

   (a) Enhances   (b) lowers   (c) diminishes   (d) equilibrium

10. The law of the relative lowering of vapour pressure was given by   (CO5)

   (a) van't Hoff   (b) Ostwald   (c) Raoult   (d) Henry

SECTION – B

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

11. Draw the Kekule's and Dewar's structures of benzene.   (CO2)

12. What happen when benzene reacts with Cl_2 in the presence of catalyst and presence of

    sunlight?   (CO2)

13. How will you prepare benzene from phenol?   (CO2)

14. What is mean by Colligative properties?   (CO5)

15. Define Elevation of boiling point (CO5)

16. Define Henry's law constant. (CO4)

17. The normal boiling point of a solvent (whose vapour pressure curves is shown in the figure) on a planet, whose normal atmosphere pressure is 50 kPa, is about. (CO5)
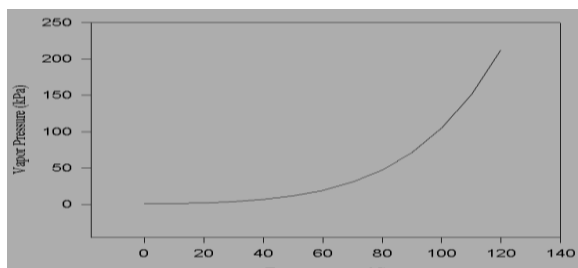
SECTION – C

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

18. Discuss the mechanism of suphonation of benzene. (CO2)

19. Draw and explain the molecular orbital structure of benzene (CO2)

20. Halogens are ring deactivators but ortho and para directors. Explain (CO2)

21. Explain the terms CST, UCST and LCST. Discuss the variation of mutual miscibility of Triethylamine –water system. (3+3) (CO4)

22. What is mean by absorption coefficient? Discuss factors influencing the solubility of a gas (CO4)

SECTION – D

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

23. Derive the mechanism for following reactions

    (i) nitration of benzene   (ii) Friedel-Crafts acylation (CO2)

24. Define lowering of vapour pressure of solvent in solution. Derive expression of Raoult's law for a solution of non-volatile solute. Determine the Molar mass of Non-volatile solute and relative lowering of vapour pressure. (2+5+5). (CO5)

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I-B.Sc. CHEMISTRY

Dept. of Chemistry   **II Sessional Test**
Vivekananda College   **II Semester**
Tiruvedakam West   **Max. Marks: 50**
Date: 06.03. 2019   **Time: 2 Hours**

GENERAL CHEMISTRY -IV (07CT22)

SECTION – A

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

1. The nucleus of radioactive element possesses   **(CO1)**
   a) zero binding energy   b) high potential energy   c) high binding energy   d) low binding energy
2. Out of the following the one which has no charge is   **(CO1)**
   a) gamma rays   b) beta rays   c) alpha rays   d) cathode rays
3. Unsymmetric cleavage of the Grignard reagent provide the following species   **(CO3)**
   a) carbanion   b) carbocation   c) free radicals   d) electrophile
4. Lithium dialkyl copper reacts with alkyl halide to form   **(CO3)**
   a) symmetric alkane   b) unsymmetric alkane   c) higher alkane   d) all the above
5. In photochemical reactions, the absorption of light takes place in   **(CO4)**
   a) primary process only   b) secondary process only   c) both primary and secondary process
   d) either primary or secondary process
6. Absorbance of sample is directly proportional to the concentrations of the attenuating species in the material sample.   **(CO4)**
   a) Lambert's law   b) Beer's Law   c) Stark Einstein Law   d) Beer-Lambert's law
7. The reactions with the high value of energy of activation are?   **(CO5)**
   a) fast   b) slow   c) moderate   d) none of these
8. The unit of rate and rate constant for a certain reaction are same. The order of the reaction is   **(CO5)**
   a) 1   b) 0   c) 3   d) 2
9. β,β' Dichloroethyl Sulfide is commonly known as   **(CO2)**
   a) Phosgene   b) Mustard gas   c) Sulphonal   d) Muscone
10. Mustard gas which is a cytotoxic, vesicant chemical warfare agent with the ability to form large blisters on exposed skin contains which of the following elements?   **(CO2)**
    a) Magnesium   b) Bromine   c) Chlorine   d) Sulphur

SECTION – B

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

11. Differentiate nuclear fission and nuclear fusion   **(CO1)**
12. How is mustard gas prepared?   **(CO2)**
13. Mention the uses of TEL   **(CO3)**
14. Define the term quantum yield and mention the types with examples   **(CO4)**
15. What is primary and secondary process in photochemistry?   **(CO4)**
16. Define rate of reaction   **(CO5)**
17. What are zero order reactions? Give one example.   **(CO5)**

SECTION – C

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

18. Discuss the mechanism for the hydrolysis of mustard gas.   **(CO2)**
19. Give the preparation and any five synthetic applications of Grignard reagents   **(CO3)**
20. Explain quantum yield   **(CO4)**
21. Discuss the kinetics of HCl formation under photochemical reaction   **(CO4)**
22. Distinguish between the terms 'order' and molecularity of a reaction.   **(CO5)**

SECTION – D

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

23. Discuss the applications of radioactive isotopes in agriculture, medicine and in carbon dating.   **(CO1)**
24. Derive the rate equation for the first order reaction. Give one example of first order reaction.   **(CO5)**

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Dept. of Chemistry	**II Sessional Test**
Vivekananda College	**IV Semester**
Tiruvedakam West	**Max. Marks: 50**
Date: 01 .03. 2019	**Time : 2 Hours**

Organic and Physical Chemistry (07CT41)

SECTION – A

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

1) Glycosidic bond in sucrose is

   a) α 1 – 4   b) β 1 – 4   c) α 1 – 2   d) β 1 – 2

2) A cane sugar on hydrolysis gives

   a) Glucose and lactose b) Glucose and fructose   c) Glucose and maltose d) Only glucose

3) The molecular mass of a compound is an example of

   a) Additive property   b) Constitutive property

   c) Additive as well as constitutive property   d) Extensive property

4) The parachor is

   a) An additive property   b) A constitutive property

   c) Both an additive and constitutive property   d) Colligative property

5) The molar viscosity is the

   a) Product of molar surface and viscosity   b) Sum of molar surface and viscosity

   c) Difference of molar surface and viscosity   d) Product of molar volume and density

6) Electrolysis of aq. Sodium acetate gives

   a) Butane b) Ethane c) Propane d) Methane

7) The famous naming reaction to prepare α-haloacetic acid is

   a) HVZ reaction b) MPV reaction c) Wolf-Kishner d) Wittig

8) The reagent which is used to synthesis the α-haloacetic acid is

   a) Cl_2/P b) Cl_2/Na c) Cl_2/K d) Cl_2/Zn

9) Among α-haloacetic acid acidity hiearchy, which one is more acidic

   a) dichlorobromo acetic acid b) dichloro aceticacid c) Trichloro aceticacid d) Trichloro

   bromo acetic acid

10) The pKa value of trichloroacetic acid is

   a) 2.86 b) 1.48 c) 0.70 d) 2.59

SECTION – B

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

11) Draw the structure of amylopectin.

12) Sucrose is a non-reducing sugar. Comment on it.

13) Define surface tension.

14) What do you mean by constitutive property? Give one example.

15) Address the usage of Parke's Process.

16) Account the applicability of HVZ reaction.

17) What is meant by dipole moment and give examples?

SECTION – C

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

18) Write a note on i) Molar viscosity   ii) Rheochor

19) Define parachor? How parachor is useful in elucidating the structure of benzene?

20) How distribution law is useful to study the complex ions?

21) Mention the important factors behind the acidity of carboxylic acids.

22) Write any three important applications of Distribution law.

SECTION – D

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

23) a) Discuss the applications of cellulose derivatives.   (8)

    b) State and explain Dunstan rule.   (4)

24) Briefly explain the synthesis and properties of di and tricholro acetic acid.

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Dept. of Chemistry   **II Sessional Test**
Vivekananda College   **IV Semester**
Tiruvedakam West   **Max. Marks: 50**
Date: 06.03. 2019   **Time : 2 Hours**

INORGANIC CHEMISTRY-I (07CT42)

SECTION – A

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

1. Which of the following is a soft base
   (a)CH_3COO^- (b)H^- (c)NO_3^- (d)CO_3^{2-}
2. Which of the following is the most acidic?
   (a)CH_4 (b)NH_3 (c) H_2O (d) HF
3. Which of the following is a hard acid?
   (a) Li^+ (b)Cu^+ (c)Ag^+ (d)Au^+
4. Which of the following can act as lewis base?
   (a) Ag^+ (b) $AlCl_3$ (c) C_2H_5OH (d)BCl_3
5. The aprotic solvent is
   (a) H_2O (b)C_6H_6 (c)HF   (d)NH_3
6. The general formula of silicate ion present cyclic silicates is:
   (a)SiO_4^{4-} (b) $Si_2O_5^{2-}$ (c) $Si_3O_9^{6-}$ (d) $(SiO_3)_n^{2n-}$
7. The mineral, quartz, is an example of:
   (a) a single-chain silicate   (b)a double-chain silicate
   (c) a framework silicate   (d) a sheet silicate
8. The silicates in which the three oxygens atoms at the vertices of tetrahedra are shared are:
   (a) Amphiboles   (b) pyroxenes   (c) phyllo silicates   (d) pyrosilicates
9. Which of the following silicates have 3D structure?
   (a)Neso   (b)Phyllo   (c)Soro   (d)Tecto

10. The number of oxygen atoms involved in sharing in $[Si_3O_9]^{6-}$ ion is:

    (a) 2   (b) 3   (c) 6   (d) 4

SECTION – B

Answer any FIVE questions   **(5 x 2 = 10)**
11. What are silicones?
12. What is the difference between silicon and silicate?
13. How is silicon used in everyday life?
14. Find out nature of bonding in silicates.
15. BF_3 act as lewis acid whereas NF_3 does not. explain
16. Define Conjugate acids and bases
17. Distiquish between protic and aprotic solvent

SECTION – C

Answer any THREE questions   **(3 x 6 = 18)**
18. What is silicate? Discuss following types of silicates
    (i) Neso silicates   (ii) Soro Silicates.
19. How to classify silicates? Draw the structure of following silicates
    (i) Ring silicates (ii) phyllo silicates.
20. Discuss the HSAB concept with suitable example
21. Write short notes on theories of acid and base
22. Discuss the role   liquid sulfur dioxide as a solvent

SECTION – D

Answer any ONE question   **(1 x 12 = 12)**
23. Write note on preparation, properties and uses of silicon.
24. Explain indetail   about Role   liquid ammonia as a solvent.
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III B.Sc., CHEMISTRY

Dept. of Chemistry   **II Sessional Test**
Vivekananda College   **VI Semester**
Tiruvedakam West   **Max. Marks: 50**
Date: 02.03. 2019   **Time : 2 Hours**

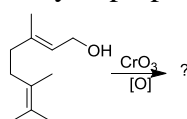**Organic Chemistry-III (07CT61)**

SECTION – A

Multiple choice questions:
Answer ALL questions   **(10 x 1 = 10)**

1. Which one of the following nuclei is **NOT** inactive in NMR?
   a) ^1H b) ^{19}F c) ^{16}O d) ^{31}P

2. In NMR spectroscopy, the alkenic protons appears at
   a) δ 7-8 ppm   b) δ 9.5-10 ppm   c) δ 4.6-5.8 ppm   d) δ 2.5-4 ppm

3. Which of the following will undergo Diels-Alder reaction?
   a) Furan   b) Thiophene   c) Pyrrole   d) Pyridine

4. Which of the following method is used to synthesis isoquinoline?
   a) Bischler-Napieralski   b) Fischer-Indole   c) Lipp   d) Friedlander

5. Oxidation of menthol gives
   a) Menthone b)Menthal c) Methol 2-ene d) Geranial

6. The catalyst used for olefin polymerization is
   (a) Ziegler-Natta catalyst   (b) Wilkinson catalyst   (c) Raney nickel catalyst   (d) Merrifield resin

7. Which is not a polymer
   a)sucrose   b) enzyme   c)starch   d) Teflon

8. Which of the following ia s chain growth polymer
   a) proteins b) starch c) nucleic acid d) polystyrene

9. The colour of a dye depends upon the wavelength of the light absorbed and released in
   a) visible region b) infra red region c)UV region d)X-rays region

10. Claisen reaction gives--------- migration leads to form product
    a) allylic   b) vinylic   c) gemina   d) both a & b

SECTION – B

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

11. Why pyrrole behaves as a weak base?
12. Draw the ^1H NMR spectra for i) ethyl alcohol ii) acetaldehyde
13. How will you prepare Alizarin
14. How will you synthesis Fluorecein
15. How will you prepare caprolactam?
16.
17. What is meant by natural and synthetic rubber

SECTION – C

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

18. Define chemical shift and discuss how electronegativity and anisotropic effect affects the chemical shift values?
19. What happens when indole is treated with the following?
    i) SO_3, Pyridine   ii) Sn/HCl   iii) HCHO, $(CH_3)_2NH$
20. Write any three physical and chemical properties of Geraniol
21. Write briefly about the synthesis, properties and uses of Menthol
22. Write short notes on properties of polymer

SECTION – D

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

23. a) What happens when thiophene is treated with the following? **(6)**
    i) $(CH_3CO)_2O$ / HNO_3 ii) SO_2Cl_2, -30° C iii) Hg/Na, EtOH
    b) Why pyridine undergoes electrophilic substitution predominantly at C-3? Explain. **(4)**
    c) Write the Skraup synthesis of quinoline. **(2)**
24. Explain in detail about benzidine and claisen rearrangement

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Dept. of Chemistry   **II Sessional Test**

Vivekananda College   **VI Semester**

Tiruvedakam West   **Max. Marks: 50**

Date: 04.03. 2019   **Time: 2 Hours**

PHYSICAL CHEMISTRY-IV (07CT62)

SECTION – A

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

1. The minimum amount of energy required for the reacting molecules to undergo reaction is called :

    (a) Potential energy   (b) Internal energy   (c) Activation energy   (d) Threshold energy

2. The collection of all symmetry element is called

    (a) Abelian group   (b) Cyclic group   (c) Point group   (d) Group

3. Cyclic groups are also_____

    (a) Abelian   (b) Non-abelian   (c) Sub-group   (d) all

4. Naphthalene has _____two fold axis

    (a) 1   (b) 5   (c) 4   (d) 3

5. The energy in joules of a photon of wavelength 355 nm is

    (a) 5.596×10^{28} J   (b) 5.596×10^{19} J

    (c) 5.596×10^{17} J   (d) 5.596×10^{26} J

6. Which statement is *incorrect* about CO_2?

    (a) CO_2 has two stretching modes of vibration

    (b) CO_2 has two degenerate bending modes of vibration

    (c) The IR spectrum of CO_2 shows four absorptions

    (d) CO_2 is linear

7. The ratio of the magnetic moments (μ) for ^{1}H and ^{13}C is 4:1. If the frequency for a given ^{1}H NMR spectrometer is 400 MHz what is the appropriate frequency for ^{13}C (given that the magnetic field remains the same)?

    (a) 1600 MHz   (b) 200 MHz   (c) 800 MHz   (d) 100 MHz

8. In fourier transform infrared spectroscopy (FTIR)

    (a) S/N is proportional to the number of scan

    (b) Requires absorbance to observed by sequentially scanning through IR bandwidth

    (c) Both the sensitivity and resolution are increased compared to traditional IR

    (d) FTIR is much slower than traditional IR

9. Match the molecular formula to the number of degrees of vibrational freedom. Which pair is *correct*?

    (a) SO_2; 3   (b) H_2S; 4   (c) CO_2; 3   (d) CS_2; 3

10. Select the incorrect statement from the following option.

    (a) TMS stands for tetra methyl silane

    (b) All the hydrogen in TMS have the same chemical shift

    (c) TMS has a high boiling point, so it is not easily lost when holding the NMR sample

    (d) TMS is relatively unreactive with most functional groups

SECTION – B

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

11. Why does a reaction not have zero activation energy?

12. What is the change in the activation energy if temperature is raised by $10^{\circ}C$?

13. In some case, it is found that a large number of colliding molecules have energy more than threshold energy. Yet the reaction is slow. Why?

14. Differentiate IR and Raman spectroscopy (any four)

15. Define the following terms (a) Larmor precession (b) magnetogyric ratio

16. A sample was excited by range 4358 Å line if mercury. A Raman line was observed at 4447 Å. Calculate the Raman shift in cm^{-1}.

17. Calculate the NMR frequency in (MHz) of the proton (^1H) in a magnetic field of intensity 1.4092 tesla, given that $g_N = 5.585$ and $\mu_N = 5.05 \times 10^{-27}$ J T^{-1}

SECTION – C

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

18. Describe the Lindemann theory of unimolecular reactions

19. Explain why water is abelian where as ammonia molecule is non abelian

20. Using group multiplication table give the symmetry operation of water molecule

21. List out the symmetry elements in the any six of the following molecule and assign each one to a point group. (a) Water (b) Ammonia (c) Benzene (d) Nitrogen trifluoride (e) Xenon tetrafluoride (f) Trans dinitrogen difluoride (g) Phosphorous trichloride (h) Hydrogendisulphide(i) Boron trifluoride (j) Acetylene

22. Write a note on (ai) determination of hydrogen bonding by IR spectroscopy (b) application of microwave spectroscopy

SECTION – D

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

23. Discuss the following: (a) Principle of NMR of bare proton (b) spin-spin splitting of ethyl iodide (c) Hyperfine NMR spectrum of pure ethanol   **(5+4+3)**

24. (a) Compare and contrast Microwave, Infra-red, Raman and NMR spectroscopy   **(8)**

    (b) The fundamental vibrational frequency of HCl is 2890 cm^{-1}. Calculate the force constant of this molecule. The masses of the two atoms are $m_H = 1.673 \times 10^{-27}$ kg and $m_{Cl} = 58.07 \times 10^{-27}$ kg   **(4)**

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Dept. of Chemistry   **II Sessional Test**
Vivekananda College   **VIth Semester**
Tiruvedakam West   **Max. Marks: 50**
Date: 05.03. 2019   **Time: 2 Hours**

NANO CHEMISTRY- (07EP62)

SECTION – A

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

1. Gold nanoshells are spherical particles with diameters typically ranging in size from
   (a) 10 to 200 nm (b) 1000 to 1800 nm   (c) 100 to 200 nm   (d) 10 to 200 cm
2. The effective use of nanotechnology in disease treatment was suggested by
   (a) Sonnichsen and Alivisatos (b) Mirkin and Mie's (c) UC. Berkeley (d) Richard Feynman
3. The size of a nanoshell is
   (a) 100 nm. (b) 200 nm (c) 400 nm (d) 500 nm
4. Nano shells are used in the treatment of which of the following disease?
   (a) Alzheimer's   (b) Cancer   (c) HIV   (d) Parkinson's
5 How many atoms consist in one quantum dot?
   a) 1 to 10   b) 10 to 50   c) 10 to 100   d) 10 to 150
6. In quantum dots the energy bandgap depends on
   a) Surface area   b) Volume   c) Size   d) All of these
7. In Quantum dots the emitted light wavelength depends on
   a) Size   b) Volume   c) Surface area   d) All of these
8. Quantum dots are
   a) Special class of semiconductors   b) Special class of metals   c) Special class of Insulators
   d) All the above
9. Which among the following helps us in getting a three-dimensional picture of the specimen?
    a) Transmission Electron Microscope b) Scanning Electron Microscope
    c) Compound Microscope d) Simple Microscope
10. Kind of electron microscope which is used to study internal structure of cells is
    a) scanning electron microscope b) transmission electron microscope c) light microscope
    d) compound microscope

SECTION – B

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

11. What is semiconductor?
12. Define quantum dots?
13. Give any four uses of semiconductor nanocrystals.
14. What is Nano medicine
15. Define Nanoshell
16. What do you mean by tectodendrimers
17. Write the difference between SEM and TEM

SECTION – C

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

18. Write a short note on molecular precursors.
19. Explain the absorption and emission spectroscopic methods used for characterization of quantum dots.
20. Illustrate the future perspectives of nanosensors.
21. Write the physical properties of nanosensors
22. How will you discuss the application of nanotechnology in diagnostics.

SECTION – D

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

23. Discuss the electronic structure of nanocrystals.
24. Describe the working principle of a transmission electron microscopy (TEM).

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CHEMISTRY IN ACTION- (07SB4A)

SECTION – A

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

1. The third element predicted to be a liquid at room temperature was _____

a) Strontium b) Radium c) Cesium d) Francium

2. Nitric oxide (NO) is:

a) paramagnetic b) diamagnetic   c) ferromagnetic   d) ferrimagnetic

3. The two allotropic forms of tin are:

a) α-grey & β-white b) α-white & β-grey c) α-grey & β-black   d) α-white & β-black

4. The formation of the shell of a hen's egg is an example of _____ process:

a) precipitation   b) condensation c) substitution   d) decomposition

5. The rate of radioactive decay of ^{14}C obeys _____ order kinetics

a) zero   b) first   c) second   d) third

SECTION – B

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

6. Write two uses and limitations of NaCl.

7. Why lakes freeze from top down?

8. Define liquid crystals. Name its two types.

9. What do you mean by the efficiency of heat engine? Write its formula.

SECTION – C

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

10. Illustrate the working of microwave ovens.

11. Discuss the pH balance in your stomach with appropriate equations.

SECTION – D

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

12. Explain in detail about LASER.

13. Account on the Haber's Process of ammonia.

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Dept. of Chemistry   **II Sessional Test**
Vivekananda College   **VI Semester**
Tiruvedakam West   **Max. Marks: 50**
Date: 27-02-2019   **Time : 1 Hour**

CHEMISTRY FOR COMPETITIVE EXAMINATIONS (07SB6A)

Answer ALL questions   **(50 x 1 = 50 marks)**

1. Which one of the following ores is best concentrated by froth floatation method?
   (a) siderite   (b) galena   (c) malachite   (d) magnetite

2. Aluminium is extracted by the electrolysis of
   (a) alumina   (b) bauxite   (c) molten cryolite   (d) alumina mixed with molten cryolite

3. Cyanide process is used for the extraction of
   (a) barium   (b) silver   (c) boron   (d) zinc

4. Total number of lone pair of electron in I_3^- ion is
   (a) 3   (b) 6   (c) 9   (d) 12

5. Which one has the highest boiling point?
   (a) He   (b) Ne   (c) Kr   (d) Xe

6. Regular use of which of the following fertilizers increase the acidity of soil?
   (a) potassium nitrate   (b) urea   (c) superphosphate of lime   (d) ammonium sulphate

7. The type of hybridization of boron in diborane is
   (a) sp hybridization   (b) sp^2 hybridization   (c) sp^3 hybridization (d) sp^3d^2 hybridization

8. Glass is a
   (a) microcrystalline solid   (b) super cooled liquid   (c) gel   (d) polymeric mixture

9. The metallic sodium dissolves in liquid ammonia to form a deep blue coloured solution. The deep blue colour is due to
   (a) solvated electron $e^-(NH_3)_x$ (b) solvated atomic sodium, $Na(NH_3)_y$ (c) $(Na^+ + Na^-)$ (d) $NaNH_2 + H_2$

10. PCl_3 and PCl_5 both exist; NCl_3 exists but NCl_5 does not exist. It is due to
    (a) lower electronegativity of P than N   (b) lower tendency of N to form covalent bond
    (c) availability of vacant d-orbital in P but not in N   (d) statement is itself incorrect

11. The oxidation states of Cr, in $[Cr(H_2O)_6]Cl_3$, $[Cr(C_6H_6)_2]$ and $K_2[Cr(CN)_2(O)_2(O_2)(NH_3)]$ respectively are
    (a) +3, +4 and +6   (b) +3, +2 and +4   (c) +3, 0 and +6   (d) +3, 0 and +4

12. Which of the following compound is metallic and ferromagnetic?
    (a) CrO_2 (b) VO_2 (c) MnO_2 (d) TiO_2

13. Which one of the following complexes shows optical isomerism?
    (a) cis$[Co(en)_2Cl_2]Cl$ (b) trans$[Co(en)_2Cl_2]Cl$ (c) $[Co(NH_3)_4Cl_2]Cl$ (d) $[Co(NH_3)_3Cl_3]$

14. The number of geometric isomers that can exist for square planar $[Pt(Cl)(Py)(NH_3)(NH_2OH)]_+$ is
    (a) 2   (b) 3   (c) 4   (d) 6

15. Which of the following groups of transition metals is called called coinage metals?
    (a) Cu, Ag, Au   (b) Ru, Rh, Pd   (c) Fe, Co, Ni   (d) Os, Ir, Pt

16. Type of isomerism shown by $[Cr(NH_3)_5NO_2]Cl_2$ is
    (a) optical   (b) ionization   (c) geometrical   (d) linkage

17. A square planar complex is formed by the hybridization of following atomic orbitals
    (a) s, p_x, p_y, p_z (b) s, p_x, p_y, p_z, d   (c) d, s, p_x, p_y (d) s, p_x, p_y, p_z, d, d

18. Which of the following ions has the maximum magnetic moment?
    (a) Mn^{2+} (b) Fe^{2+} (c) Ti^{2+} (d) Cr^{2+}

19. The gas leaked from a storage of tank of Union Carbide plant in Bhopal gas tragedy was
    (a) methylisocyante   (b) methylamine   (c) ammonia   (d) phosgene

20. What is DDT among the following
    (a) green house gas   (b) a fertilizer   (c) biodegradable pollutant   (d) non- biodegradable pollutant

21. The smog is essentially caused by the presence of
    (a) O_2 and O_3 (b) O_2 and N_2 (c) oxides of sulphu and nitrogen   (d) O_3 and N_2

22. Identify the wrong statements in the following
    (a) CFCs are responsible for ozone layer depletion
    (b) green house effect is responsible for global warming
    (c) ozone layer does not permit IR radiation from sun to reach the earth
    (d) acid rain is mostly because of oxides of nitrogen and sulphur

23. The distillation technique most suited for separating glycrol from spent lye in the soap industry is
    (a) fractional distillation   (b) steam distillation
    (c) distillation under reduced pressure   (d) simple distillation

24. Identify the compound that exhibits tautomerism
    (a) 2-butene   (b) lactic acid   (c) 2-pentanone   (d) benzaldehyde
25. Out of the following, the alkene that exhibits optical isomerism is
    (a) 3-methy-2-pentene   (b) 4-methy-1-pentene   (c) 3-methy-1-pentene   (d) 2-methy-2-pentene
26. The alkene that exhibits geometrical isomerism is
    (a) propene   (b) 2-methylpropene   (c) 2-butene   (d) 2-mthyl-2-butene
27. The IUPAC name of neopentane is
    (a) 2-mthylbutane   (b) 2,2-dimethylpropane   (c) 2-methylpropane   (d) 2,2-dimethylbutane
28. Which one of the following conformations of cyclohexane is chiral?
    (a) twist boat   (b) rigid   (c) chair   (d) boat
29. Following reaction, $(CH_3)_3CBr + H_2O \rightarrow (CH_3)_3COH + HBr$ is an example of
    (a) eleimination reaction   (b) free radical substitution
    (c) nucleophilic susbtitution   (d) electrophilic substitution
30. Racemic mixture is formed by mixing two
    (a) isomeric compound   (b) chiral compound   (c) meso compound   (d) enantiomers with chiral carbon
31. The trans-alkene are formed by the reduction of alkynes with
    (a) H_2-Pd/C, $BaSO_4$ (b) $NaBH_4$ (c) Na/liq.NH_3 (d) Sn-HCl
32. Iodoform can be prepared from all except
    (a) ethylmethyl ketone   (b) isopropyl alcohol   (c) 3-methyl-2-butanone   (d) isobutyl alcohol
33. The organic chloro compound, which shows complete stereochemical inversion during an S_N2 reaction is
    (a) $(C_2H_5)_2CHCl$ (b) $(CH_3)_3CCl$ (c) $(CH_3)_2CHCl$ (d) CH_3Cl
34. Presence of nitro group in a benzene ring
    (a) activates the ring towards electrophilic substitution   (b) renders the ring basic
    (c) deactivates the ring towards nucleophilic substitution   (d) deactivates the ring towards electrophilic substitution
35. The reaction of toluene with Cl_2 in presence of $FeCl_3$ gives predominatly
    (a) benzoyl chloride   (b) benzyl chloride   (c) o- and p-chlorotoluene   (d) m-chlorotoluene
36. Alkyl halides react with dialkyl copper reagents to give
    (a) alkenyl halides   (b) alkanes   (c) alkyl copper halides   (d) alkenes
37. Elimination of bromine from 2-bromobutane results in the formation of
    (a) predominantly 2-butyne   (b) predominantly 1-butene
          (c) predominantly 2-butene   (d) equimolar mixture of 2-butene
38. Which one of the following is reduced with zinc and hydrochloric acid to give corresponding hydrocarbon?
    (a) ethyl acetate   (b) acetic acid   (c) acetamide   (d) butan-2-one
39. The compound formed on heating chlorobenzene with chloral in the presence of con.H_2SO_4 is
    (a) gammexane   (b) DDT   (c) freon   (d) hexachloroethane
40. CH_3MgI is an organometallic compound due to
    (a) Mg–I bond   (b) C–I bond   (c) C–Mg bond   (d) C–H bond
41. Aspirin is known as
    (a) acetyl salicylic acid   (b) phenyl salicyalte   (c) acetyl salicylate   (d) methyl salicylic acid
42. Phenol is heated with solution of mixture of KBr and $KBrO_3$. The major product obtained in the above reaction is
    (a) 2-bromophenol   (b) 3-bromophenol   (c) 4-bromophenol   (d) 2,4,6-tribromophenol
43. Which of the following reagents may be used to distinguish between phenol and benzoic acid
    (a) aqueous NaOH   (b) Tollen's reagent   (c) Molisch reagent   (d) neutral $FeCl_3$
44. The strongest acid amongst the following compound is
    (a) CH_3COOH (b) HCOOH   (c) $CH_3CH_2CH(Cl)COOH$ (d) $ClCH_2CH_2CH_2COOH$
45. Silver mirror test is given by which one of the following compounds?
    (a) acetaldehyde   (b) acetone   (c) benzene   (d) benzophenone
46. The compound formed as a result of oxidation of ethyl benzene by $KMnO_4$ is
    (a) benzophenone   (b) acetophenone   (c) benzoic acid   (d) benzyl alcohol
47. Phenyl magnesium bromide reacts with methanol to give
    (a) mixture of anisole and Mg(OH)Br   (b) mixture of benzene and Mg(OMe)Br
    (c) mixture of toluene and Mg(OH)Br   (d) mixture of phenol and Mg(Me)Br
48. Ether is more volatile than an alcohol having the same molecular formula. This is due to
    (a) dipolar characters of ethers   (b) alcohols having resonance structure
    (c) intermolecular hydrogen bonding in ethers   (d) intermolecular hydrogen bonding in alcohols
49. The general formula $C_nH_{2n}O_2$ could be for
    (a) diketones   (b) carboxylic acids   (c) diols   (d) diladehydes
50. During dehydration of alcohols to alkenes by heating with con. H_2SO_4 the initiation step is
    (a) protonation of alcohol molecule   (b) formation of carbocation
    (c) elimination of water   (d) formation of an ester

III-B.Sc. CHEMISTRY

Dept. of Chemistry	II Sessional Test
Vivekananda College	VI Semester
Tiruvedakam West	Max. Marks: 50
Date: 28 .03.2019	Time: 2 Hours

ANALYTICAL METHODS IN CHEMISTRY (07SB6F)

SECTION – A

Answer ALL questions (5 x 1 = 5)

1. The Beer-Lambert's law deviates when the _____
   a) concentration is high   b) concentration is low
   c) light is monochromatic   d) light is not scattered
2. The base value for homoannular diene
   a) 214 nm   b) 202 nm   c) 253 nm   d) 217 nm
3. The parent value for acyclic α, β-unsaturated ketones
   a) 215 nm   b) 202 nm   c) 210 nm   d) 214 nm
4. The voltammetry refers to the measurement of current that result from the application of………...
   a) current   b) potential   c) current density   d) over potential
5. In Randles-Sevcik equation, D represents is
   a) density   b) diffusion coefficient   c) electrode area   d) scan rate

SECTION – B

Answer any TWO questions (2 x 2 = 4)

6. Write the base value for heteroannular diene for calculating λ_{max}.
7. Write the Randles-Sevcik equation for a reversible system.
8. Write any two limitations of Beer-Lambert's law.
9. Expand SCE.

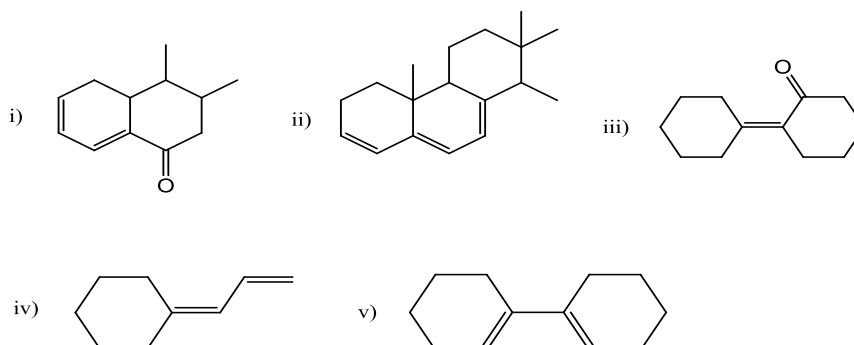### SECTION – C

Answer any ONE question (1 x 6 = 6)

10. Write a note on Beer-Lambert's law and discuss the verification this law.
11. Discuss the quantitative determination of manganese by EDTA method.

SECTION – D

Answer any ONE question (1 x 10 = 10)

12. Calculate the λ_{max} value for the following compounds.

13. Discuss the principle and instrumentation of cyclic voltammetry.

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