I M.Sc., CHEMISTRY

II Sessional Test II Semester Max. Marks: 50 Time : 2 Hours

 $(3 \times 5 = 15)$

ORGANIC CHEMISTRY – II (33CT21)

SECTION – A

Multiple choice questions:		
Answer ALL questions		(5 x 1 = 5)
1)	Trans-2- phenyl-1 bromocyclopentane on reaction with alcoholic KOH producta) 4-phenylcyclopenteneb) 2-phenylcyclopentenec) 1-phenylcyclopentened) 3-phenylcyclopentene	ce (CO1)
2)	 Which statement about hydroboration of propene is INCORRECT? a) Hydroboration followed by treatment with H₂O₂ gives propan-1-ol b) Addition of a B–H bond to the alkene is Markovnikov addition c) The alkene is an electron donor. d) BH₃ acts as an electrophile. 	(CO3)
3)	A benzaldehyde reacts with acetic anhydride in the presence of sodium acetate	e at 180° C to give (CO3)
	a) Mandelic acid b) Cinnamic acid c) Benzoic acid d) Malo	nic acid
4)	Wolf-kishner reduction is applied to one the following functional groupa) carbonylb) alkenec) alkyned) amide	(CO4)
5)	Lithium diisopropyl amide is also called as a) Harpoon base b) Non-Nucleophilic base c) Nucleophilic base d) Both a & b	(CO5)

<u>SECTION – B</u>

Answer any FIVE questions	$(5 \mathbf{x} 2 = 10)$
6) Define Hofmann rule and Saytzeff rule.	(CO1)
7) What do you mean by Darzen reaction?	(CO3)
8) State Markovnikov rule.	(CO3)
9) What are ylides? Give one example.	(CO3)
10) Identify the product in the following reaction.	(CO3)
$\begin{array}{c} CH_3 \\ \hline \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ $	
11) What is Skraup synthesis? Given an example.	(CO4)
12) Define CRAM's Rule with one example.	(CO5)

SECTION – C

Answer any THREE questions

13) Explain E_1 and E_2 reaction with suitable mechanism.	(CO1)
14) Discuss the mechanism of i) Aldol condensation ii) Benzoin condensation	(CO3)
15) How Grignard reagents are prepared? Illustrate any three synthetic utility.	(CO3)
16) Describe Baever-Villiger oxidation with mechanism.	(CO4)
17) List out the important applications Gilman's Reagent with examples.	(CO5)

<u>SECTION – D</u>

Answer any TWO questions

 $(2 \times 10 = 20)$

(CO5)

- 18) Write a note on i) Michael addition ii) Sharpless asymmetric epoxidationiii) Mannich reactioniv) Diels-Alder reaction(3+3+3+3)(CO3)
- 19) Explain in detail about Shapiro reaction and Meerweein Ponndorf verley reduction.(CO4)
- 20) Find out the products.



I M.Sc. CHEMISTRY Dept. of Chemistry II Sessional Test Vivekananda College **II Semester Tiruvedakam West** Max. Marks: 50 Date: 04.03.2019 **Time: 2 Hours INORGANIC CHEMISTRY -II (33CT22) SECTION - A Answer ALL questions** $(5 \times 1 = 5)$ 1. The oxidation state of molybdenum in $[(\eta^7 - tropylium)Mo(CO)_3]^+$ is (CO1) (a) + 2(b) + 1(c) 0(d) -1 2. The total number of Cu–O bonds present in the crystalline copper (II) acetate monohydrate is: (CO2) (c) 8 (a) 10 (b) 6 (d) 4 3. The spectroscopic ground state symbol and the total number of electronic transition of $[Ti(H_2O)_6]^{3+}$ are (CO3) (a) ${}^{3}T_{1g}$ and 2 (b) ${}^{3}A_{2g}$ and 3 (c) ${}^{3}T_{1g}$ and 3 (d) ${}^{3}A_{2g}$ and 2 4. Electron transfer from $[Fe(H_2O)_6]^{2+}$ to $[Fe(H_2O)_6]^{3+}$ is likely to occur via: (CO4) (a) d-d transition (b) $S_{N}1$

(c) inner sphere electron transfer
5. Which is the most common oxidation state for thorium in its compounds?
(CO5)
a) +3
b) +4
c) +5
d) +6

SECTION – B

Answer any FIVE questions		$(5 \ge 2 = 10)$	
6. I	Define EAN rule and give two examples.	(CO1)	
7. V	Vhat do you mean by spectrochemical series and write spectrochemical series	? (CO2)	
8. S	how the complexes which form sp ³ hybridisation dsp ² hybridisation	(CO2)	
9. V	Vrite the limitations of Orgel diagram.	(CO3)	
10. '	What is diamagnetism and it is due to what?	(CO4)	
11. C	Give the electronic configuration for the following elements Th, Pu, Fm and L	r. (CO5)	
12. L	ist out the important uses of thorium.	(CO5)	

SECTION – C

$(3 \times 5 = 15)$
(CO1)
(CO2)
or both octahedral and
(CO3)
(CO4)
orm complexes. (CO5)

SECTION – D

----- **TWO** -----

Answer any 1 wO questions (2 x	10 = 20
18. Account on Jahn-Teller distortion and discuss the Jahn-Teller effect versus chelat	te effect. (CO2)
19. (i) Analyze the reason for intense color of permanganate ion. (6 mark)	(CO3)
(ii) Compare d-d spectra and charge transfer spectra. (4 mark)	

20. What are the problems in the separation of lanthanides from one another? Discuss the ion exchange and solvent extraction methods for the separation of lanthanides. (CO5)

() -- 10

20)

I M.Sc., CHEMISTRY

Dept. of Chemistry Vivekananda College Tiruvedakam West Date: 05 .03. 2019

20. Derive Stern-Volmer equation.

II Sessional Test II Semester Max. Marks: 50 Time: 2 Hours

(CO 5)

PHYSICAL CHEMISTRY - II (33CT23)

<u>SECTION – A</u>

Multiple choice questions:	$(5 \times 1 = 5)$
1. Using Huckel molecular orbital approximation, the two roots of secular equation (a) $\alpha + \sqrt{2} \beta$, $\alpha - \sqrt{2} \beta$ (b) $\alpha + \beta$, α (c) $\alpha + \beta$, $\alpha - \beta$ (d) $\alpha + 2\beta$, $\alpha - 2\beta$	n of ethane are (CO1)
2. What will be the value of slope after drawing graph of log x/m→ log p in Freur isotherm? (a) 1/m (b) 1/m (c) 1/m	(CO4)
(a) $1/p$ (b) $1/h$ (c) $1/a$ (d) $-k$	
3. The selection rule of the translational energy levels in the Raman spectrum is a) $\Delta J = \pm 1$ b) ± 2 c) ± 1 d) ± 2	(CO3)
4.For pure vibrational spectra, the selection rule is	(CO2)
a) 0 b) ± 1 c) 0, ± 1 d) $\pm 1, 2$ 5. Which of the following decay with change in multiplicity is known as ISC? (a) $S_1 \rightarrow S_0$ (b) $S_2 \rightarrow S_1$ (c) $T_2 \rightarrow T_1$ (d) $S_1 \rightarrow T_1$	(CO5)
SECTION – B	
Answer ANY FIVE questions 6. Give the selection rule for Raman spectra	(5 x 2 = 10) (CO3)
7. What is the difference between IR and Raman spectroscopy?	(CO3)
8. Why do overtones and combination bands appear in IR spectra?	(CO2)
9. State the Pauli Exclusion Principle in based on quantum mechanics.	(COI)
11. Define delayed fluorescence.	(CO1) (CO5)
12. What do you mean by quenching process	(CO5)
<u>SECTION – C</u>	
Answer any THREE questions	$(3 \ge 5 = 15)$
13. Construct the wave function of the sp^3 hybrid orbital in water molecule	(CO4)
14. Deduce the Langmuir adsorption isotherm	(CO4)
 15. Illustrate the principles of photoelectron spectroscopy. 16. Sketch the normal modes of vibration of a) H₂O and b) CO₂ and determine w inactive and why? 17. Write a short note on Kasha test 	(CO3) hich are IR active (CO2) (CO5)
<u>SECTION – D</u>	
Answer any TWO questions	$(2 \times 10 = 20)$
18. Set up the Huckel secular equation for 1,3 butadiene and benzene, calculate th	e energies of the
π electron and determine the delocalization energy.	(CO1)
19. Discuss the rotation-vibration spectrum of a diatomic molecule and show the a spectrum consisting of the P and R branches.	(CO3)

II-M.Sc CHEMISTRY

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

ORGANIC CHEMISTRY -IV (33CT41)

SECTION – A

Answer ALL questions

 $(5 \times 1 = 5)$

- Which type of reaction do we use for the production of Fluorobenzene?
 a) Sandmeyer's reaction b) Addition reaction c) Substitution reaction d) Rearrangement reaction
- 2. Which of the following is found on RNA but not DNA?a) Phosphateb) Deoxyribosec) Uracild) Adenine
- 3. The first intermediate formed from a neutral substrate in anodic oxidation is (a) anion radical (b) cation radical (c) free radical (d) carbocation
- 4. Supramolecular chemistry deals with molecules of length scales a) 1-100 A b) 1-100 nm c) 1-100 cm d) 1- 100 pm
- 5. Which one of the following controls the urine cycle?(a) cholesterol(b) progesterone(c) oesterone(d) reticulene

SECTION – B

Answer any FIVE questions

- 6. What is self-assembly? Give an example from nature.
- 7. How enzymes are differing from catalysts?
- 8. Draw the structure of penicillin V.
- 9. Write any four functions of proteins.
- 10. What is Host-Guest Chemistry? Give example.
- 11. Draw the structure of cortisone
- 12. Give examples for cathodic conversion electroorganic synthesis

SECTION – C

Answer any THREE questions

- 13. Discuss Sandmeyer reaction.
- 14. Elucidate the structure of chloramphenicol
- 15. Synthesis progesterone from stigmasterol and cholesterol
- 16. Write short notes on reversible and irreversible inhibition.
- 17. Explain any three factors which affecting electroorganic synthesis.

SECTION – D

Answer any TWO questions

- 18. i) What is diazotization? Briefly mention the applications of diazonium salts. (7)
 - ii) Write an account of Hunsdiecker reaction. (3)
- 19. i) What are nucleic acids? Write the functions of DNA. (3) ii) Discuss the primary and secondary structure of proteins. (4) and iii) Biological role of enzymes. (3)
- 20. i) Interpret the chemical relationship between oestrone, oestriol and oestradiol.(6)
 - ii) Write a note on anodic conversion. (4)

 $(2 \times 10 = 20)$

 $(3 \times 5 = 15)$

(5 x 2 = 10)

II-M.Sc. CHEMISTRY

II Sessional Test IV Semester Max. Marks: 50 Time: 2 Hours

INORGANIC CHEMISTRY-IV (33CT42)

<u>SECTION – A</u>

Answer ALL questions

- Adamson's rule deals with

 (a) labelization of ligand (b) inner sphere
 (c) outer sphere
 (d) photophysical

 Pick out the compound purification technique in the following
- (a) solvent extraction (b) DTA (c) TGA (d) DSC
- 3. Normal distribution is also classified as(a) Gaussian distribution(b) oisson distribution
- (c) Bernoulli's distribution
 (d)weighted average distribution
 4. Systematic errors occur due to

 (a) overuse of instruments
 (b)careless usage of instruments
 (c) both A and B
 (d)human sight
- 5. The excited lifetime of fluorescence is (a) 10^{-15} (b) 10^{-12} (c) 10^{-9} (d) 10^{-6}

SECTION – B

Answer any FIVE questions

- 6. What is meant by actinometer?
- 7. Define solvent extraction technique.
- 8. What is principle of Differential Scanning Calorimetry.
- 9. What is mean by statistical method in research?
- 10. Define accuracy and precision.
- 11. Define the term sensor and mention its uses
- 12. Define significant number

<u>SECTION – C</u>

Answer any THREE questions

- 13. Write short notes on Raman spectroscopy
- 14. Describe photo chemistry of chromium and cobalt complex
- 15. Define sampling technique. How do we analyze the results differently depending on the type of sampling?
- 16. You grow 20 crystals from a solution and measure the length of each crystal in millimeters. Here is your data: 9, 2, 5, 4, 12, 7, 8, 11, 9, 3, 7, 4, 12, 5, 4, 10, 9, 6, 9, 4. Calculate the standard deviation of the length of the crystals.
- 17. Explain the following terms. a. Lifetime b. Quantum yield (2.5+2.5)

<u>SECTION – D</u>

Answer any TWO questions

- 18. Sketch out the salient features of Internal Charge Transfer Mechanism (ICT) in fluorescent based sensors.
- 19. Explain in detail about Thermo gravimetric analysis and deferential Thermometric analysis technique with suitable examples.
- 20. What is mean by Gaussian distribution? Analyze the properties of Gaussian distribution with suitable example. Examine least square analysis. (2+5+3)

(5 x 1 = 5)

 $(3 \times 5 = 15)$

 $(2 \times 10 = 20)$

 $(5 \times 2 = 10)$

Dept. Vivek Tiruv Date:	of Chemistry ananda College edakam West 04.03. 2019 Physical Chemistry-IV (33CT43)	II Sessional Test IV Semester Max. Marks: 50 Time: 2 Hours
	<u>SECTION – A</u>	
Ans	swer ALL questions	$(5 \times 1 = 5)$
1.	Which one of the following is a fermion?	
	(a) α Particle (b) $_4$ Be ² nucleus (c) Hydrogen ato	om (d) deuteron
2.	For which gas the ratio of specific heats (Cp / C_v) will be the lar	gest?
	(a) mono-atomic (b) di-atomic (c) tri-atomic	(d) hexa-atomic
3.	Zeta potential depends on	
	(a) Dielectric constant of medium (b) Charge density	
	(c) Distance between the parallel plates (d) All of these	
4.	Silver-silver chloride reference electrode is made up of	
	(a) Copper wire coated with copper chloride	
	(b) Sodium wire coated with sod. Chloride	
	(c) Mercury with calomel	
	(d) Silver wire coated with silver chloride	
5.	Which of the following is not an application of conducting polyn	ners?
	(a) Rechargeable batteries (b) Analytical sensors (c) Ele	ctronics (d) Adhesives

<u>SECTION – B</u>

 $(5 \times 2 = 10)$

- 6. Define Maxwell-Boltzmann statistics.
- 7. What do you mean by population inversion?
- 8. What do you mean by boson gas?
- 9. How will you study reversible and quasireversible reactions reactions by CV
- 10. Draw the cyclic voltammogram of potassium ferrocyanide/potassium ferricyanide system
- 11. What are additives? Give examples.
- 12. Mention any two differences between emulsion and suspension polymerization.

<u>SECTION – C</u>

Answer any THREE questions

Answer any FIVE questions

- 13. Write the difference between three statistics
- 14. Derive Bose-Einstein statistics
- 15. Discuss the instrumentation and any one application of polarography
- 16. Explain the theories of over-voltage
- 17. Write a note on Ziegler Natta catalysts.

<u>SECTION – D</u>

Answer any TWO questions

 $(2 \times 10 = 20)$

 $(3 \times 5 = 15)$

- 18. Briefly discuss the following double layer models (i) Guoy-Chapman model (ii) Stern model
- 19. Discuss in detail about the Einstein's and Debye's theories of heat capacities of solids
- 20. i) Explain the kinetics and mechanism of cationic polymerization. ii) Write a short note on use of fillers in plastics.

I M.Sc., CHEMISTRY

Dept. of Chemistry II Sessio Vivekananda College II Semes Tiruvedakam West Max. Max. Max. Max. Max. Max. Max. Max.	
SECTION – A	
Multiple choice questions:	$(5 \times 1 = 5)$
1. The main bitter alkaloid present in neem oil is	(CO2)
(a) Nimibinin (b) Margosine (c) Sulfur (d) Opium	(CO1)
(a) rickets (b) amoebiasis (c) diabetes (d) cancer	(COI)
3. Which of the following pair of disease is caused by virus?	(CO1)
(a) Rabies, Mumps (b) Typhoid, Tetanus	
(c) AIDS, Syphilis (d) Cholera, Tuberculosis	
4. Blood sugar level is maintained constant at a value of $____$ mg of gli	acose/100ml (CO4)
5. Which vitamin is absorbed best when taken with food.	(CO5)
(a) Vitamin A b) Vitamin D c) Vitamin E d) Vitamin K	()
SECTION – B	
Answer ANY FIVE questions	(5 x 2 = 10)
6. How the acidity of stomach is controlled?	(CO2)
7. Draw the structure of Azadirachtin?	(CO2)
8. Define infective diseases.	(CO1)
9. Define pharmacokinetics	(CO1)
10. Define antiarrhythmic drugs. Write any two of its action.	(CO4)
11. What are anti-anginal agents.	(CO4)
12. What are the main sources for Vitamin C	(CO5)
<u>SECTION – C</u>	
Answer any THREE questions	$(3 \times 5 = 15)$
13. Discuss the active constituents of Neem.	(CO2)
14. Discuss the following terms (i) Insect borne diseases and (ii) air borne	diseases (CO1)
15. Discuss the following drug terminology	
(i) pharmacology, (ii) pharmacognesy and (iiI) pharmacodynamics.	(CO1)
16. Write the source, structure, action, uses and adverse effects of Lysergi	c Acid Diethylamide
(LDA)	(CO4)
17. List out the uses of Vitamin D	(CO5)
<u>SECTION – D</u>	
Answer any TWO questions	$(2 \times 10 = 20)$
18. Explain in detail about the drug receptor and its biological responses	(CO2)
19. What are neoplastic agents? Write note symptoms, prevention and trea	atment of Cancer. (CO3)
20. Explain in detail about sedatives and hypnotics highlighting the role of	f barbiturates. (CO4)

II M.Sc Chemistry

Dept. of Chemistry	II Sessional Test
Vivekananda College	Semester IV
Tiruvedakam West	Max. Marks: 50
Date: 06.03. 2019	Time: 2 Hours
CHEMISTRY FOR NATIONAL ELIGIBILTY TEST- ((33EP4B)

1. The increasing order of ionic radii is: a) $O^{2-} < N^{3-} < S^{2-} < F^-$ b) $N^{3-} < O^{2-} < S^{2-} < F^-$ c) $F^- < O^{2-} < N^{3-} < S^{2-}$ d) $F^- < S^{2-} < O^{2-} < N^{3-}$ 2. In a group of a periodic table, from top to bottom, ionization energy a) increases b) decreases c) remains same d) none of the above 3. The increasing order of electron affinity among the following is i) $1s^22s^22p^5$ ii) $1s^22s^22p^4$ iii) $1s^22s^22p^3$ iv) $1s^22s^22p^63s^23p^4$ a) i<ii<iii<iv b) i<iv<ii<iii c) iv<iii<ii<i d) ii<iii<iv 4. Mulliken scale of electronegativity is a) IE+EA/2 b) IE-EA/2 c) IExEA/2 d) IE \div EA/2 5. The order of repulsions between electron pairs is: a) l.p-l.p>b.p-b.p>l.p-b.p b) b.p-b.p>l.p-b.p>l.p-l.p c) l.p-l.p>l.p-b.p>b.p-b.p d) l.p-b.p>l.p-l.p>b.p-b.p 6. The geometry of CH₄ is a) trigonal pyramidal b) trigonal planar c) tetrahedral d) none of the above 7. The number of lone pairs and bond pairs in ClF_3 are b) 3.2 c) 4.1 d) 1.4 a) 2.3 8. The total number of electron pairs in XeF₄is: a) 3 b) 4 c) 6 d) 8 9. If the shape of the geometry is square planar, then its geometry is a) dsp^2 b) sp^3 c) sp^3d d) sp^3d^2 10. The overall order of a reaction that has the rate expression, $Rate=k[A]^{1/2}[B]^{3/2}$ is: a) 1 b) 1.5 c) 2 d) 2.5 11. The unit of rate constant for a second order reaction is: a) s^{-1} b) mol $L^{-1} s^{-1}$ c) mol⁻¹ $L s^{-1}$ d) mol⁻² $L^{-2} s^{-1}$ 12. $t_{1/2} = 0.693/k$, is the half life of which order of a reaction? a) zero b) first c) second d) third 13. The reactions in which the reactants require high amount of activation energy are generally: b) fast c) instantaneous d) none of the above a)slow 14. Collision theory is applicable to: a) unimolecular reactions b) bimolecular reactions c) intramolecular reactions d) intermolecular reactions 15. In DTA, thermal effects are caused by: a) fusion b) crystalline structure inversions c) boiling and sublimations d)all the above 16. The property measured in TGA is a) change in weight b) change in pressure c) change in temperature d) heat evolved/absorbed 17.Polorography is to study the composition of dilute electrolytic solutions by plotting: a) current-voltage curves b) voltage-temperature curves c) current-concentration curves d) voltage-concentration curves 18.Claisen rearrangement is an example of ______ sigmatropic rearrangement: b) [2,4] c) [1,5] d) [3,3] a) [2,3] 19. Dields-alder reaction is a a) [2+2] thermal cyclization b) [4+2] photoaddition c) [4+2] cycloaddition d) [3+3] cycloaddition 20. ene reaction is a electron electrocyclic reaction a) 2π b) 3π c) 4π d) 6π



3. Find out the major product



24. Among which one is not used to prepare cis 1,2-diols

a) OsO4 b) KMnO4 c) Woodward's reagent d) Prevost Reagent

25. The basic addition behind the OsO4 oxidation is

a) $2\pi+2\pi$ b) $4\pi+2\pi$ c) $3\pi+2\pi$ d)both a & b

26. Shapiro reaction is example for.....

a) Kinetically controlled b) Thermodynamically controlled c) radical reaction d) both b & c

27. Tributyl tin hydride reagent is used for

a) Displacement of nitro compound b) Reduction of carbonyl group c) Oxidation of alcohol d) all the above

28. Which of the following reagent is used to convert α -position to carbonyl compounds

a) SeO₂ b) OsO₄ c) KMnO₄ d) H_2O_2

29. In Michael addition reaction, acceptors having

a) Withdrawing group b) Donating group c) Both a & b d) Resonating group

30. Formylation of phenolic compounds with chloroform and alkali is

a) Riemer Teimann reaction b) Wurts reaction c) Suzuki coupling d) Wittig reaction

31. The following cyclic systems are said to be



a) Anti-aromatic: Aromatic b) Aromatic: Anti-aromatic c) Aromatic: Aromatic d) Anti-aromatic: Anti-aromatic

32. Among the following cations, which one is highly stable?



36. In general E1 & E2 elimination needs..... base

a) Stronger: Weaker b) Weaker: Stronger c) Weaker: Weaker d) Stronger: Stronger 37. Find out the intermediate in the following reaction



a) Carbocation b) Carbanion c) Carbene d) Benzyne

38. Acetone is less reactive than acetaldehyde due to...

a) Stabilized carbocation b) Unstabilized Carbocation c) Active hydrogens d) both a & c

- 39. Triplet carbenes are.... in nature
- a) Diamagnetic b) Paramagnetic c) Partially paramagnetic d) Partially diamagnetic
- 40. Among the following naming reactions which one will undergo carbine based mechanisms?
- a) Shapiro b) Mc-Murry Coupling d) Michael addition d) Bamford-Steven
- 41. Which of the following is a soft base?

a) SH b) Ag^+ c) NH_3 d) F^-

42.Acetic acid is an example ofsolvent.

a) Aprotic b) Amphiphilic c) Non-polar d) Amphoteric

- 43. The point group of $[TiCl_6]^{3-}$
- a) D_{4d} b) D_{3d} c) D_{4h} d) D_{3h}

44. The point group of trans- $[Cr(en)_2F_2]^+$

a) D_{4d} b) D_{3d} c) D_{4h} d) D_{3h}

45.The compound that is aromatic



a) I b) II c) III d) IV

46. The compound that gives precipitate on warming with aq. AgNO₃ is



47. The following reaction goes through intermediate.



a) Carbocation b) Carbanion c) Free radical d) Carbene

48. The geometry of I_3^- is

a) Linear
b) Trigonal c) Trigonal pyramidal
d) Square planar
49. The geometry of [Br₃]⁺ is

a) Tetrahedral b) Trigonal c) Trigonal bipyramidal d) Linear

50. The molecule C_3O_2 has a linear structure. The compound has

a) 4σ and 4π bonds b) 3σ and 2π bonds c) 2σ and 3π bonds d) 3σ and 4π bonds
