B.L.D.E.A's
S.B. ARTS AND K.C.P. SCIENCE COLLEGE VIJAYAPUR-586103
PG DEPARTMENT OF CHEMISTRY

First Internal Assessment Feb-2024

Sem: III	Sub: Inorganic Chemistry	Code: C370010
Date: 05-02-2024	Time: 4.00-5.00pm	Max. Marks: 20

Q. No. 1.	Answer any TWO of the following Questions.	2×2=4
a)	What is water gas shift reaction? Give its industrial application.	
b)	State EAN rule and predict the structure of $Co_2(CO)_8$.	
c)	Back donation alters the C-C bond distance in metal-alkene complex. Explain?	
Q. No II	**Answer any FOUR of the following Questions.**	**4×4=16**
a)	Write a short note on Ferritin.	
b)	Discuss the mechanism of Hydroformylation of olefins using Rhodium as a catalyst.	
c)	Explain the reaction and physical properties of π–allylic complexes of metals.	
d)	Write a note on Iron Sulphur protein with neat diagram. Mention their role in biological system.	
e)	How does the transport of Na^+/K^+ ions across the cell membrane is managed by Na^+-K^+ ATPase	

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Sem: III	**Sub: Organic Chemistry-III**	**Code: C370020**
Date: 06/02/2024	**Time: 4.00-5.00pm**	**Max. Marks: 20**

Q. No. 1.	**Answer any TWO of the following Questions.**	2×2=4
a)	Define Pericyclic reactions and their classifications?	
b)	Give an example for 1,3dipolar cycloaddtion reactions and Diel-alder reaction.	
c)	Give an example for retention and inversion of configuration.	
Q. No II	**Answer any FOUR of the following Questions.**	**4×4=16**
a)	Draw molecular orbital diagram for 1,3,5-hexatriene systems.	
b)	Explain the term with an example (I) Supra and antra-facial (II) Con and Dis rotatory motions.	
c)	Discuss Huckel-mobius method (PMO approach) with examples.	
d)	Explain co-relation diagram for 4n+2 systems by taking an example.	
E)	Define Ene and Cope reaction with an example.	

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Sem: III	**Sub: Organic Chemistry-III**	**Code: C370020**
Date: 06/02/2024	**Time: 4.00-5.00pm**	**Max. Marks: 20**

Q. No. 1.	**Answer any TWO of the following Questions.**	2×2=4
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First Internal Assessment Feb-2024

Sem: III	**Sub: Physical Chemistry**	**Code: C370030**
Date: 07-02-2024	**Time: 4.00pm to 5.00pm**	**Max. Marks: 20**

Q. No. 1.	**Answer any TWO of the following Questions.**	2×2=4
a)	What is BZ reaction?	
b)	Write any two characteristics of catalytic reaction.	
c)	Define Donnan Membrane equilibrium.	

Q. No II	**Answer any FOUR of the following Questions.**	4×4=16
a)	Write the postulates of Langmuir Adsorption isotherm and derive it's expression.	
b)	What are Micelles? Define CMC and Explain factors affecting CMC.	
c)	Discuss BET Isotherm for the determination of surface area.	
d)	Derive the expression for the effect of substrate on enzyme catalysis.	
e)	Derive the expression for kinetics of Unimolecular surface reaction.	

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First Internal Assessment Feb-2024

Sem: III	**Sub: : Physical Chemistry**	**Code: C370030**
Date: : 07-02-2024	**Time: 4.00pm to 5.00pm**	**Max. Marks: 20**

Q. No. 1.	**Answer any TWO of the following Questions.**	2×2=4
a)	What is BZ reaction?	
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First Internal Assessment Feb-2024

Sem: III	**Sub: Spectroscopy**	**Code: C370040**
Date: 09-02-2024	**Time: 4.00pm to 5.00pm**	**Max. Marks: 20**

Q. No. 1.	**Answer any TWO of the following Questions.**	**2×2=4**
a)	How do you distinguish Fe(II) & Fe(III) complexes by using Mossbauer spectrum.	
b)	What are limitations of NQR spectroscopy?	
c)	Write a note on Doppler shift.	
Q. No II	**Answer any FOUR of the following Questions.**	**4×4=16**
a)	Explain the parameter isomer shift, quadrupole interactions and magnetic interactions by taking suitable examples.	
b)	Draw & explain the Mossbauer spectra of $FeSO_4.7H_2O$, $FeCl_3$, $K_4Fe(CN)_6$.	
c)	Discuss the instrumentation of NQR spectroscopy.	
d)	Write the principle of Mossbauer spectroscopy.	
e)	How many NQR resonance lines you would expect for the following nuclei under the conditions indicated. i) ^{127}I : I=5/2, η=0, B_o=0 ii) ^{14}N : I=1, η=0, B_o=0	

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Sem: I	**Sub**: Inorganic Chemistry	**Code: A370010**
Date: 05-02-2024	**Time:** 4.00-5.00pm	**Max. Marks: 20**

Q. No. 1.	**Answer any TWO of the following Questions.**	**2×2=4**
a)	Write the expression for Kapustinkii equation and indicate the terms involved.	
b)	Define Polarizability and Polarizing power.	
c)	The solubility of ionic solids is low in non-polar solvents but high in polar solvents. Why?	
Q. No II	**Answer any FOUR of the following Questions.**	**4×4=16**
a)	Briefly explain the Born-Haber cycle for the formation of NaCl	
b)	Discuss the Fajan's rule in determining the amount of covalent character in ionic compounds.	
c)	What is VSEPR theory? Explain its application to predict the structure of BrF_3, NH_3 and H_2O as examples.	
d)	On the basis of Fajan's rule, explain which compound of each of the following pair is more covalent: CuO or CuS, AgCl or NaCl, LiCl or KCl, $SnCl_2$ or $SnCl_4$.	
e)	Derive Born-Lande's equation for ionic compound and explain its feature.	

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Sem: I	**Sub:** : Inorganic Chemistry	**Code: A370010**
Date: 05-02-2024	**Time:** 4.00-5.00pm	**Max. Marks: 20**

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Sem: I	**Sub: Organic Chemistry-I**	**Code: A370020**
Date: 06/02/2024	**Time: 4.00-5.00pm**	**Max. Marks: 20**

Part- A	**Answer any TWO of the following Questions.**	2×2=4
a)	Define Inductive effect with example.	
b)	Classify the following as electrophiles and nucleophiles. $H^{\oplus}$ $CH_3CH_2^{\oplus}$ BH_3 $^{\ominus}OH$ $Cl^{\ominus}$ CH_3NH_2 H_2O	
c)	What are the types of reaction give an example for each.	

Part-B	**Answer any FOUR of the following Questions.**	4×4=16
a)	Explain SP^3 hybridization with example.	
b)	Define the terms resonance, hyper conjugation with suitable example.	
c)	Explain Stability and reaction of Carbocation.	
d)	Define Benzyne ? Explain hybridization of benzyne.	
E)	Explain stability order of the following I. $\uparrow\downarrow CH_2$ $\uparrow\uparrow CH_2$ II. $\uparrow\downarrow CCl_2$ $\uparrow\uparrow CCl_2$	

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Sem: I	**Sub: Organic Chemistry-I**	**Code: A370020**
Date: 06/02/2024	**Time: 4.00-5.00pm**	**Max. Marks: 20**

Part- A	**Answer any TWO of the following Questions.**	2×2=4
a)	Define Inductive effect with example.	
b)	Classify the following as electrophiles and nucleophiles. $H^{\oplus}$ $CH_3CH_2^{\oplus}$ BH_3 $^{\ominus}OH$ $Cl^{\ominus}$ CH_3NH_2 H_2O	
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First Internal Assessment Feb-2024

Sem: I	**Sub: Physical Chemisrty**	**Code: A370030**
Date: 07-02-2024	**Time: 4.00pm to 5.00pm**	**Max. Marks: 20**

Q. No. 1.	**Answer any TWO of the following Questions.**	2×2=4
a)	State the Debye-Huckel Limiting law. Give the expression and Explain the terms.	
b)	Define Secondary Batteries. Give an example.	
c)	State the Raoult's law and Henry`s law.	
Q. No II	**Answer any FOUR of the following Questions.**	4×4=16
a)	Derive the Debye-Huckel Onsagar equation.	
b)	Explain Helmholtz-Perrin model of electrical double layer.	
c)	Write a note on Ideal and non-Ideal solutions.	
d)	Derive the expression for the Clausius-Clapeyron equation.	
e)	What is Gibb's free energy? and Derive expression for the variation of free energy with temperature and pressure.	

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First Internal Assessment Feb-2024

Sem: I	**Sub: : Physical Chemisrty**	**Code: A370030**
Date: 07-02-2024	**Time: 4.00pm to 5.00pm**	**Max. Marks: 20**

Q. No. 1.	**Answer any TWO of the following Questions.**	2×2=4
a)	State the Debye-Huckel Limiting law. Give the expression and Explain the terms.	
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Sem: I	**Sub: Analytical Chemistry**	**Code: A370050**
Date: 08-02-2024	**Time: 4.00pm to 5.00pm**	**Max. Marks: 20**

Q. No. 1.	**Answer any TWO of the following Questions.**	**2×2=4**
a)	How normal phase differs from reverse phase HPLC.	
b)	Write the principle of TLC.	
c)	Write the classification of chromatographic separation.	
Q. No II	**Answer any FOUR of the following Questions.**	**4×4=16**
a)	Write the Van-Deemeters equation. Explain the variables that affect the column efficiency.	
b)	Explain the principle, instrumentation and applications of HPLC.	
c)	Discuss the characteristics of ion exchange resins.	
d)	Explain the dynamics of chromatography.	
e)	Write the mechanism of cation exchange resin.	

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Sem: I	**Sub: Analytical Chemistry**	**Code: : A370050**
Date: 08-02-2024	**Time: 4.00pm to 5.00pm**	**Max. Marks: 20**

Q. No. 1.	**Answer any TWO of the following Questions.**	**2×2=4**
a)	How normal phase differs from reverse phase HPLC.	
b)	Write the principle of TLC.	
c)	Write the classification of chromatographic separation.	
Q. No II	**Answer any FOUR of the following Questions.**	**4×4=16**
a)	Write the Van-Deemeters equation. Explain the variables that affect the column	
b)	Explain the principle, instrumentation and applications of HPLC.	
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First Internal Assessment Feb-2024

Sem: I	**Sub: Spectroscopy**	**Code: A370040**
Date: 09-02-2024	**Time: 4.00pm to 5.00pm**	**Max. Marks: 20**

Q. No. 1.	**Answer any TWO of the following Questions.**	2×2=4
a)	What is Spectroscopy?	
b)	Define Reflection and Refraction.	
c)	Give the Selection Rule for Rotational Spectra.	
Q. No II	**Answer any FOUR of the following Questions.**	4×4=16
a)	Write a note on Dispersion, Scattering and Polarisation.	
b)	Explain Natural line width and Broadening of spectral line.	
c)	Explain the Intensity of spectral lines.	
d)	Explain the energy levels of Rotational, Vibration and Electronic transitions.	
e)	Explain the Rotational Spectroscopy of Diatomic molecules of Rigid Rotator Model.	

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Second Internal Assessment March-2024

Sem: III	Sub: Inorganic Chemistry-III	Code: C370020
Date: 25-03-2024	Time: 3.00pm to 5.00pm	Max. Marks: 40

PART-A	Answer any FOUR of the following Questions.	4×2=8
a)	Define term symbol and find out the ground term symbol for V^{+3} ion.	
b)	Calculate the total number of microstates for p^2 and d^7 configuration.	
c)	Define Haptacity. Give an example where the same ligand shows various haptacity.	
d)	Distinguish between Porphyrin ring and Corrin ring.	
e)	Write the structure of Vaska's complex.	

PART-B	Answer all of the following Questions.	
I. a)	Explain the Charge transfer spectra in $[Co(H_2O)_6]^{+3}$ complex.	5M
b)	What is Orgel diagram? Explain the electronic spectrum of $[V(bipy)_3]^{+3}$.	5M
c)	Explain the following: i) Calculate the number of microstates possible for Cu^{+2} and Cr^{+3}. ii) $[FeF_6]^{-3}$ is colorless while $[CoF_6]^{-3}$ is colored but exhibit only a single band in the visible region of the spectrum. iii) The intensity of absorption band at λmax is not same in the complexes $[Co(H_2O)_6]^{+2}$ and $[Mn(H_2O)_6]^{+2}$.	6M
OR		
d)	Describe the mechanism of Water gas shift and Hydrogenation of alkene by Wilkinson's catalyst.	6M
II. a)	Give a note on synthesis and bonding in Metal-Butadiene system.	5M
b)	What is Active ion transportation? How does the transport of Na^+/K^+ ions across the cell membrane is managed by Na^+/K^+ ATPase.	5M
c)	Explain the structure and uptake of dioxygen by Heamoglobin.	6M
OR		
d)	State Hund's rule use to find the ground term states of s free metal ion. Find the ground terms for d^2 to d^9 system	6M

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Sem: III	**Sub: Organic Chemistry-III**	**Code: C370020**
Date: 26/03/2024	**Time: 3.00-5.00pm**	**Max. Marks: 40**

Part A	**Answer any FOUR of the following Questions.**	4×2=8
a)	Define Define Sigmatropic rearrangement with an example.	
b)	Write the structure of DCC?	
c)	What is Exciplex? Give an example.	
d)	State the terms quantum efficiency and quantum yield.	
e)	Any two uses of crown ethers	
Part B	**Answer any FOUR of the following Questions.**	
I. a)	Explain Antrafacial and suprafacial shift involving carbon moieties by taking an example	5
b)	Explain Frontier orbitals for Allyl systems.	5
c)	Write a note on Norrish type-II reaction with an example?	6
	OR	
d)	Explain Photochemistry of visison.	
II. a)	Write a note on Woodward and Prevost hydroxylation reactions?	5
b)	Write note on DDQ with an example.	5
c)	Describe the photochemical reactions of aromatic compounds	6
	OR	
d)	Explain on LDA and TNBH	

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Sem: III	**Sub: Organic Chemistry-III**	**Code: C370020**
Date: 26/03/2024	**Time: 3.00-5.00pm**	**Max. Marks: 40**

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Second Internal Assessment March-2024

Sem: III	Sub: Physical chemistry	Code: C370030
Date: 27-03-2024	Time: 3.00pm to 5.00pm	Max. Marks: 40

Q. No. I.	**Answer any FOUR of the following Questions.**	4 × 2 =8
a)	Define super conductors. Give an example and Mention it's classification.	
b)	What is Meissner effect?	
c)	Define Fermi energy? What is the Fermi level for n-type semiconductor.	
d)	Give the two drawbacks of Bohr's atomic model.	
e)	Give an expression for energy of an electron based on relativistic correction.	

Q. No II	**Answer all the following Questions.**	
a)	Explain in detail the BCS Theory.	5
b)	Disscus the Hall effect in semiconductors.	5
c)	What is Josephson effect? Disccus the AC Josephson effect and DC Josephson effect. OR Discuss Gouy's method for determining the magnetic susceptibility. Write the advantages and disadvantages.	6
d)	Explain the atomic spectra of sodium atom.	5
e)	Write a note on Quantum numbers.	5
f)	Write the postulates of Bohr's theory of hydrogen atom and give an expression for the energy of a revolving electron. OR Explain the Anamalous and Normal Zeeman effect.	6

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Sem: III	**Sub: Spectroscopy**	**Code: C370040**
Date: 28-03-2024	**Time: 4.00pm to 5.00pm**	**Max. Marks: 20**

Q. No. 1.	**Answer any TWO of the following Questions.**	2×2=4
a)	Sketch the IR spectra of ammine and comment on its features upon co-ordination.	
b)	Write the significance of spin and magnetic field in ESR.	
c)	Enumerate the effect of coordination on ligand bands in IR-spectrum.	
Q. No II	**Answer any FOUR of the following Questions.**	4×4=16
a)	Explain hyperfine structure of ESR absorption.	
b)	Explain the ESR spectra of methyl, benzoquinone and cyclopentadienyl radicals.	
c)	Discuss the changes in symmetry upon coordination of NO_3^- and NO_2^-.	
d)	Sketch the IR spectra of N,N-dimethylacetamide and comment on its features upon coordination.	
e)	Sketch the IR spectra of di and trinuclear carbony complexes.	

Q. No. 1.	**Answer any TWO of the following Questions.**	2×2=4

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Second Internal Assessment March-2024

Sem: III	**Sub: Spectroscopy**	**Code: C370040**
Date: 28-03-2024	**Time: 4.00pm to 5.00pm**	**Max. Marks: 20**

a)	Sketch the IR spectra of ammine and comment on its features upon co-ordination.	
b)	Write the significance of spin and magnetic field in ESR.	
c)	Enumerate the effect of coordination on ligand bands in IR-spectrum.	
Q. No II	**Answer any FOUR of the following Questions.**	4×4=16
a)	Explain hyperfine structure of ESR absorption.	
b)	Explain the ESR spectra of methyl, benzoquinone and cyclopentadienyl radicals.	
c)	Discuss the changes in symmetry upon coordination of NO_3^- and NO_2^-.	
d)	Sketch the IR spectra of N,N-dimethylacetamide and comment on its features upon coordination.	
e)	Sketch the IR spectra of di and trinuclear carbony complexes.	

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Second Internal Assessment March-2024

Sem: I	Sub: Inorganic Chemistry-I	Code: A370010
Date: 25-03-2024	Time: 3.00pm to 5.00pm	Max. Marks: 40

PART-A	Answer any FOUR of the following Questions.	4×2=8
a)	Which of the following in each pair has the larger bond angle and why? (a)CH_4 and NH_3 (b)C_2H_2 and C_2H_4	
b)	With the help of MOT, Explain why H_2 molecule exists but He_2 molecule does not exists.	
c)	Why ionization energy of Noble gases is very high?	
d)	What are Metallocarboranes? Give an example.	
e)	Draw the structure of XeO_2F_4 and $XeOF_6$ on the bases of VBT and VSEPR theory.	

PART-B	Answer all of the following Questions.	
I. a)	Construct the MOT diagram for NO^+ and B_2 molecules. Calculate the bond order and comment on its magnetic property.	5M
b)	Describe the Electron sea model and Band theory.	5M
c)	Mention the postulates of VBT. Discuss the geometry and hybridization involved in BF_3, CH_4, NH_3 and PCl_5.	6M
OR		
d)	What is Solvation energy? Discuss the energetic of solubility of ionic salts in polar solvents and charge density of salts.	6M
II. a)	Discuss in details the nature of bonding involved in B_5H_9, B_5H_{11} and B_6H_{10}.	5M
b)	Explain the synthesis and structural aspect of closo carborane.	5M
c)	Explain the preparation, structure and bonding in XeF_6, $XeOF_4$ and XeO_3.	6M
OR		
d)	Give synthesis, properties and structural aspects of Borazine.	6M

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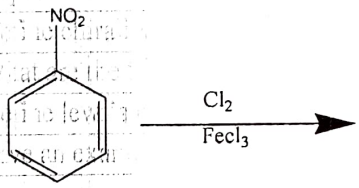
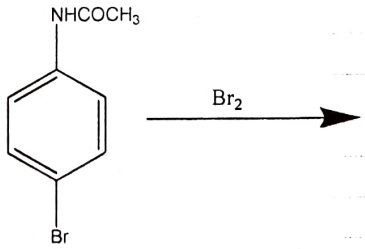
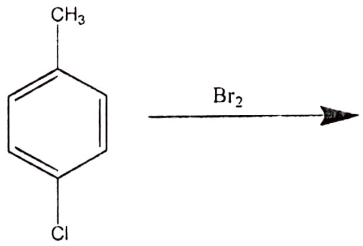
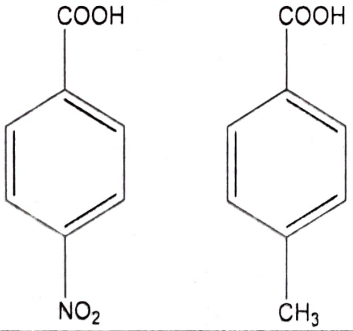
Sem: I	Sub: Organic Chemistry-I	Code: A370020
Date: 26/03/2024	Time: 3.00-5.00pm	Max. Marks: 40

Part- A	**Answer any FOUR of the following Questions.**	4×2=8
a)	Explain cross over experiment with an example.	
b)	Define chirality with an example.	
c)	What are the types of reaction mechanisms?	
d)	Define lewi's acid and base.Give example for each.	
e)	Give an example for retention and inversion configuration.	

Part-B		**Answer ALL the following questions.**	
I	a)	List out major differences between SN1 and SN2 reaction.	5
	b)	Write reaction and mechanism for Electrophilic substitution for halogens?	5
	c)	(i). Explain the process of Neighboring group participation (NGP) in Nu- substitution reaction. (ii). Explain SNi reaction.	6
		--OR--	
	d)	Predict the product 1.  2.  3. 	
II	a)	How rate law helps to find reaction mechanism. Explain.	5
	b)	Explain product analysis and intermediate analysis.	5
	c)	Explain Bucher reaction and benzyne mechanism	6
		--OR--	
	d)	Explain acidic strength of the followings 	

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Second Internal Assessment March-2024

Sem: I	**Sub: Physical chemistry-I**	**Code: A370030**
Date: 27-03-2024	**Time: 3.00pm to 5.00pm**	**Max. Marks: 40**

Q. No. 1.	**Answer any FOUR of the following Questions.**	4×2=8
a)	State the Heisenberg uncertainty principle.	
b)	What is commutator operator. Give an example.	
c)	Define degree of polymerization.	
d)	Define terpolymers. Give an example.	
e)	Write the relation between Tg and Tm.	
Q. No II	**Answer all the following Questions.**	
a)	Explain in detail the Davision and Germer experiment.	5
b)	Give the postulates of Quantum mechanics.	5
c)	Derive an expression for quantization of angular momentum of electron from de-Broglie' relationship.	6
	OR	
	Derive the expression for the Schrodinger wave equation with respect to space.	
d)	Explain factor affecting the Glass transition tempareture.	5
e)	Write the synthesis of polyamidoamine by using divergent route.	5
f)	Give the General classification of polymers.	6
	OR	
	Write the preparation, properties and commertial importance of 1. Poly vinyl chloride 2. Polystyrene	

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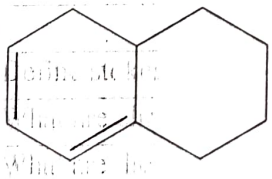
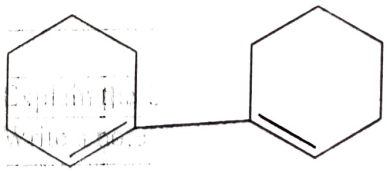
Second Internal Assesment-2024

Sem: I	**Sub: Spectroscopy**	**Code: : A370040**
Date: 28-03-2024	**Time: 4.00pm to 5.00pm**	**Max. Marks: 20**

Q. No. I.	**Answer any TWO of the following Questions.**	2×2=4
a)	Define stokes and antistokes lines.	
b)	What are chromophores and give their classification.	
c)	What are the factors affecting the Beer lambert's law?	

Q. No II	**Answer any FOUR of the following Questions.**	4×4=16
a)	Explain the Quantum theory of Raman effect.	
b)	Write a note on polarisation of Raman lines and depolarization factor.	
c)	Explain the electronic transitions occurring in the UV spectroscopy.	
d)	Explain the instrumentation of double beam UV spectrometer.	
e)	Calculate expected λmax value using Woodward-fieser rule.. 1.  2. 	

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Second Internal Assessment March-2024

Sem: I	**Sub: Analytical Chemistry**	**Code: A370050**
Date: 30-03-2024	**Time: 3.00pm to 5.00pm**	**Max. Marks: 40**

PART-A	**Answer any FOUR of the following Questions.**	4×2=8
a)	Define thin layer electrophoresis.	
b)	Define efficiency of extraction.	
c)	Write the principle thermometric titrations.	
d)	Write schematic representation of cells of Copper and Silver.	
e)	Write an equation for students 't' test.	
PART-B	**Answer all of the following Questions.**	
I. a)	Discuss working and instrumentation of differential scanning colorimetry.	5M
b)	Discuss the principle, theory and instrumentation of polarography.	5M
c)	The normality of a solution is determined by four separate titrations, the results being 0.2041, 0.2049, 0.2039 & 0.2043. Calculate the mean, median, range, average-deviation, relative average-deviation, standard deviation & co-efficient of variation.	6M
	OR	
d)	Draw the block diagram of TG-instrument. Explain the function of each component.	6M
II. a)	Discuss criteria for the rejection of observation.	5M
b)	Briefly discuss on moving boundary electrophoresis.	5M
c)	What are amperometric titrations? Sketch and explain the common types of titrimetric curves encountered in amperometry	6M
	OR	
d)	Discuss principle and working of capillary electrophoresis.	6M

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First Internal Assessment July-2024

Sem: IV	Sub: Inorganic Chemistry	Code: D370010
Date: 16-07-2024	Time: 10.30am to 11.30am	Max. Marks: 20

Q. No. 1.	Answer any TWO of the following Questions.	2×2=4
a)	Expand TNT and RDX.	
b)	What is fire point and flash point ?	
c)	Calculate spin only formula for $[Fe(H_2O)_6]^{+3}$ complex.	
Q. No II	**Answer any FOUR of the following Questions.**	4×4=16
a)	Explain the proximate analysis of fuel.	
b)	Explain octane and cetane number.	
c)	Explain calorific value of gas by the Junker's calorimeter .	
d)	Explain in detail B-H curve .	
e)	Explain in detail the spin cross over system.	

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First Internal Assessment July-2024

Sem: IV	Sub: :Inorganic Chemistry	Code: D370010
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First Internal Assessment July-2024

Sem: IV	**Sub: Organic Chemistry-IV**	**Code: D370020**
Date: 18/07/2024	**Time: 10.30-11.30am**	**Max. Marks: 20**

Q. No. 1.	**Answer any TWO of the following Questions.**	**2×2=4**
a)	What are Synthons and Synthetic equivalents?	
b)	Give an example for Diels-Alder reaction?	
c)	Give an example for FGI with explanation?	
Q. No II	**Answer any FOUR of the following Questions.**	**4×4=16**
a)	Write a note on one group C-C disconnection of alcohols?	
b)	Explain reversal of polarity with an example?	
c)	Discuss order of events in organic synthesis?	
d)	Explain Robinson annulatuion with example.	
E)	Explain synthesis of alkene by taking an example	

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First Internal Assessment July-2024

Sem: IV	**Sub: Organic Chemistry-IV**	**Code: D370020**
Date: 18/07/2024	**Time: 10.30-11.30am**	**Max. Marks: 20**

Q. No. 1.	**Answer any TWO of the following Questions.**	**2×2=4**
a)	What are Synthons and Synthetic equivalents?	
b)	Give an example for Diels-Alder reaction?	
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First Internal Assessment July-2024

Sem: IV	**Sub: Physical Chemistry-IV**	**Code: D370030**
Date: 19/07/2024	**Time: 10.30-11.30am**	**Max. Marks: 20**

Q. No. I	**Answer any TWO of the following Questions.**	**2×2=4**
a)	Explain briefly parallel and simultaneous reactions.	
b)	Define the terms 'chain length' and 'chain inhibition'.	
c)	Explain briefly polymerization.	
Q. No II	**Answer any FOUR of the following Questions.**	**4×4=16**
a)	Derive rate expression for the first order forward and backward reversible reaction.	
b)	Discuss the mechanism of decomposition of ozone.	
c)	Discuss the kinetics of thermal reaction between H_2 and Cl_2.	
d)	Explain the mechanism of pyrolysis of acetaldehyde.	
e)	Discuss the kinetics of free radical polymerization.	

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First Internal Assessment July-2024

Sem: IV	**Sub: Physical Chemistry-IV**	**Code: D370030**
Date: 19/07/2024	**Time: 10.30-11.30am**	**Max. Marks: 20**

Q. No. I	**Answer any TWO of the following Questions.**	**2×2=4**
a)	Explain briefly parallel and simultaneous reactions.	
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c)	Explain briefly polymerization.	
Q. No II	**Answer any FOUR of the following Questions.**	**4×4=16**
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First Internal Assessment July-2024

Sem: IV	**Sub: Spectroscopy-IV**	**Code: D370040**
Date: 20-07-2024	**Time: 10.30am to 11.30am**	**Max. Marks: 20**

Q. No. 1.	**Answer any TWO of the following Questions.**	**2×2=4**
a)	Write any two limitation of flame photometry.	
b)	What are the Butters interference and chemical interference.	
c)	Give the principle of flame emission spectroscopy.	
Q. No II	**Answer any FOUR of the following Questions.**	**4×4=16**
a)	Discuss the role of temperature on absorption.	
b)	Briefly explain on the interferences in flame photometry.	
c)	Discuss the flame background correction method.	
d)	Discuss the any two evaluation methods in flame photometry.	
e)	Write a note on metallic spectra in flame.	

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Sem: IV	**Sub: Spectroscopy-IV**	**Code: D370040**
Date: 20-07-2024	**Time: 10.30am to 11.30am**	**Max. Marks: 20**

Q. No. 1.	**Answer any TWO of the following Questions.**	**2×2=4**
a)	Write any two limitation of flame photometry.	
b)	What are the Butters interference and chemical interference.	
c)	Give the principle of flame emission spectroscopy.	
Q. No II	**Answer any FOUR of the following Questions.**	**4×4=16**
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b)	Briefly explain on the interferences in flame photometry.	
c)	Discuss the flame background correction method.	
d)	Discuss the any two evaluation methods in flame photometry.	
e)	Write a note on metallic spectra in flame.	

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FIRST INTERNAL TEST-2023-24

Semester: PG II SEM OEC **Time: 1.00 Hr**
Sub: Strategies of Teaching **Marks: 20**

Instructions: 1. Answer any one of the Questions.
2. Question no 3 is compulsory.

1. a) Describe the elements of micro teaching. 8+8=16
ಸೂಕ್ಷ್ಮ ಬೋಧನೆಯ ಘಟಕಾಂಶಗಳನ್ನು ವರ್ಣಿಸಿ.

b) Explain the components of the skill of stimulus variation.
ಉದ್ದೀಪನ ಮಾರ್ಪಾಡು ಕೌಶಲ್ಯದ ಘಟಕಾಂಶಗಳನ್ನು ವಿವರಿಸಿ.

2 a) Explain how micro-teaching helps to improve classroom teaching skills. 8+8=16
ತರಗತಿ ಬೋಧನೆಯ ಕೌಶಲ್ಯಗಳನ್ನು ಸುಧಾರಿಸುವಲ್ಲಿ ಸೂಕ್ಷ್ಮ ಬೋಧನೆಯು ಹೇಗೆ ಸಹಾಯಕವಾಗಿದೆ ಎಂಬುದನ್ನು ವಿವರಿಸಿ.

b) Discuss the merits and limitations of lecture method.
ಉಪನ್ಯಾಸ ವಿಧಾನದ ಲಾಭ ಹಾಗೂ ಇತಿಮಿತಿಗಳನ್ನು ಚರ್ಚಿಸಿ.

3. Write short notes on any four of the following: 1x4=4
ಈ ಕೆಳಗಿನ ಯಾವುದಾದರೂ ನಾಲ್ಕರ ಕುರಿತು ಸಂಕ್ಷಿಪ್ತ ಟಿಪ್ಪಣಿ ಬರೆಯಿರಿ:

a) Steps of discussion method.
ಚರ್ಚಾ ವಿಧಾನದ ಹಂತಗಳು.

b) Components of skill of explaining.
ವಿವರಣಾ ಕೌಶಲ್ಯದ ಘಟಕಾಂಶಗಳು.

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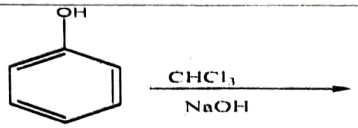
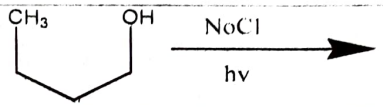
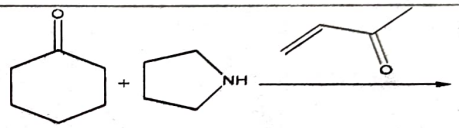
Sem: II	Sub: Organic Chemistry-II	Code: B370020
Date: 18/07/2024	Time: 10.30-11.30am	Max. Marks: 20

Part- A	Answer any TWO of the following Questions.	2×2=4
a)	What is Barton reaction?	
b)	Give any two reactions for reformtsky reaction	
c)	Find out the product. 	

Part-B	Answer any FOUR of the following Questions.	4×4=16
a)	Explain Chichibabin reaction with an example?	
b)	Assign the product with suitable mechsnism 	
c)	Explain aldol condensation and Cannizaro reaction?	
d)	What is Dieckman cyclisation reaction? Explain with mechanism?	
E)	Find out the product with suitable reaction mechanism 	

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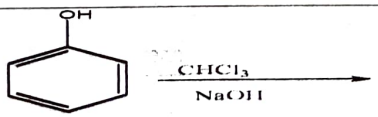
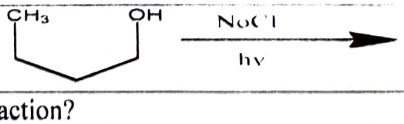
First Internal Assessment July-2024

Sem: II	Sub: Organic Chemistry-II	Code: B370020
Date: 18/07/2024	Time: 10.30-11.30am	Max. Marks: 20

Part- A	Answer any TWO of the following Questions.	2×2=4
a)	What is Barton reaction?	
b)	Give any two reactions for reformtsky reaction	
c)	Find out the product. 	

Part-B	Answer any FOUR of the following Questions.	4×4=16
a)	Explain Chichibabin reaction with an example?	
b)	Assign the product with suitable mechsnism 	
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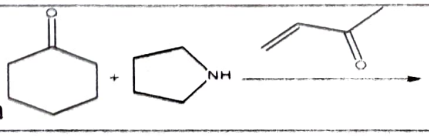
E)	Find out the product with suitable reaction mechanism 	

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First Internal Assessment July-2024

Sem: II	**Sub: Inorganic Chemistry**	**Code:B370010**
Date: 16-07-2024	**Time: 10.30am to 11.30am**	**Max. Marks: 20**

Q. No. 1.	**Answer any TWO of the following Questions.**	**2×2=4**
a)	Define nuclear fusion reaction. Give an example.	
b)	Write expression for the half life period.	
c)	Give two medical application of isotopes.	
Q. No II	**Answer any FOUR of the following Questions.**	**4×4=16**
a)	Explain the spallation reaction and nuclear fission reaction.	
b)	Explain the component of nuclear power reactor.	
c)	Derive expression for kinetics of radioactive decay.	
d)	Explain secular and transient equilibrium.	
e)	Explain inverse isotopic dilution method.	

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First Internal Assessment July-2024

Sem: II	**Sub: : Inorganic Chemistry**	**Code: B370010**
Date: : 16-07-2024	**Time: 10.30am to 11.30am**	**Max. Marks: 20**

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e)	Explain inverse isotopic dilution method.	

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First Internal Assessment July-2024

Sem: II	**Sub: Physical Chemistry**	**Code:B370030**
Date: 19-07-2024	**Time: 10.30am to 11.30am**	**Max. Marks: 20**

Q. No. 1.	**Answer any TWO of the following Questions.**	**2×2=4**
a)	Define consecutive reaction.	
b)	What is slater's determinants?	
c)	Define Linear and Non- linear variation function.	

Q. No II	**Answer any FOUR of the following Questions.**	**4×4=16**
a)	Derive the rate law for parallel reaction.	
b)	Explain Morse potential curve and mention it's spectroscopic status.	
c)	Derive the expression for the application of variation method to Helium atom.	
d)	Give the ground state term for a free ion with d^4 and d^7 configuration.	
e)	Define variation method and derive expression for variation method.	

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PG DEPARTMENT OF CHEMISTRY

First Internal Assessment July-2024

Sem: II	**Sub: : Physical Chemistry**	**Code: B370030**
Date: : 19-07-2024	**Time: 10.30am to 11.30am**	**Max. Marks: 20**

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First Internal Assessment July-2024

Sem: II	**Sub: Spectroscopy-II**	**Code: B370040**
Date: 20-07-2024	**Time: 10.30am to 11.30am**	**Max. Marks: 20**

Q. No. 1.	**Answer any TWO of the following Questions.**	**2×2=4**
a)	Define Larmor precessional frequency.	
b)	Write any two factors affecting on chemical shifts.	
c)	What are the types of coupling?	
Q. No II	**Answer any FOUR of the following Questions.**	**4×4=16**
a)	Disscus the principle and instrumentation of pulsed FT-NMR spectroscopy.	
b)	Write a note on i) lanthanide shift reagents ii) double resonance.	
c)	Calculate and draw the number of signals, splitting and peak area ratio for the following compounds. i) Tert-butyl amine ii) $(CH_3)_2CHCOH$ iii) Mesitylene	
d)	Discuss the any three of temperature variable probe.	
e)	Discuss first order and Non first order spectra.	

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First Internal Assessment July-2024

Sem: II	**Sub: Spectroscopy-II**	**Code: B370040**
Date: 20-07-2024	**Time: 10.30am to 11.30am**	**Max. Marks: 20**

Q. No. 1.	**Answer any TWO of the following Questions.**	**2×2=4**
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Second Internal Assessment March-2024

Sem: IV	**Sub: Inorganic Chemistry-IV**	**Code: D370010**
Date: 29-08-2024	**Time: 2.00pm to 3.30pm**	**Max. Marks: 40**

PART-A	**Answer any FOUR of the following Questions.**	**4×2=8**
a)	What are polyphosphazenes and give the reaction.	
b)	Give the structure of sorosilicates and give example..	
c)	Give the preparation method for the (SN)x and write its structure.	
d)	What are anion conductors? Give an example	
e)	Define Aliovalent ? Mention the defect in AgI crystal.	

PART-B	**Answer all of the following Questions.**	
I. a)	Explain the Heteronuclear carbene complex.	**5M**
b)	Explain the structure and reactivity of $S_4N_4H_4$.	**5M**
c)	Discuss the structural aspects of $(NPCl_2)_3$	**6M**
OR		
d)	Explain the synthesis and structure of S_4N_4 and S_2N_2.	**6M**
II. a)	Discuss the mechanism of conduction,interstial conduction in AgCl.	**5M**
b)	Write electrode materials and working of Lithium ion battery.	**5M**
c)	Explain application and structure of solid electrolyte by taking an example of β-Alumina.	**6M**
OR		
d)	Describe the structure of a $\propto$–AgI and conductivity of composition structure of AgI and RbI.	**6M**

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Second Internal Assessment August-2024

Semester: IV | Sub: Organic Chemistry-IV | Code: D370020

Date: 30/08/2024 | Time: 10.30am-12.00pm | Max. Marks: 40

Part A **Answer any FOUR of the following Questions.** 4×2=8

a) Define C-terminal and N-terminal of the compounds?

b) List out any four uses of Starch

c) What are Carbohydrates and how they are classified?

d) List out any two differences of DNA and RNA

e) Give an example for protection of OH group?

Part B **Answer any FOUR of the following Questions.**

I. a) Explain protection and deprotection of carboxylic group? 5

b) Explain protection and deprotection of Amino group? 5

c) How do you determine ring size of monosaccharides? Explain with an example 6

OR

d) Write brief note on **(I)** Anomeric effect

(II) Mutarotation.

II. a) Explain the Structure of Proteins? 5

b) Explain Watson and crick model of DNA 5

c) Explain Bruce-Merrifield synthesis of polypeptide 6

OR

d) Explain Edman and Sangers methods for End group Analysis.

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Second Internal Assessment August -2024

Sem: IV	**Sub: Physical chemistry-IV**	**Code: D370030**
Date: 31-08-2024	**Time: 10.30am to 12.00 am**	**Max. Marks: 40**

Q. No. I.	**Answer any FOUR of the following Questions.**	**4×2=8**
a)	Define the partial molar properties.	
b)	Give physical significance of Chemical Potential.	
c)	Write the expression for Helmholtz's free energy of ideal mixing.	
d)	Define chain transfer reactions.	
e)	What are opposing reactions?	
Q. No II	**Answer all the following Questions.**	
a)	Derive chemical potential of pure solid or liquid.	**5**
b)	Determine the partial molar property with the intercept method.	**5**
c)	Derive Duhem-Margules equation. Or Calculate the free energy, entropy & enthalpy changes of mixing 20 mole each of gases A & B at 298K & 1 bar pressure.	**6**
d)	Explain i) Free energy of ideal mixing ii) enthalpy of ideal mixing	**5**
e)	Discuss the kinetics of 1^{st} order opposed by 2^{nd} order.	**5**
f)	Explain the reaction kinetics of Hydrogen and bromide. Or Define consecutive reactions. Derive the expression for time maximum concentration of intermediate.	**6**

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Second Internal Assessment Agust-2024

Sem: IV	**Sub: Spectroscopy-IV**	**Code: D370040**
Date: 31-08-2024	**Time: 02.00am to 03.00am**	**Max. Marks: 20**

Q. No. 1.	**Answer any TWO of the following Questions.**	**2×2=4**
a)	Define binding energy and core electrons.	
b)	State octant rule.	
c)	Write the principle of AES.	
Q. No II	**Answer any FOUR of the following Questions.**	**4×4=16**
a)	Give an account for the application of ORD in determination of acid catalyzed muta-rotation of glucose and inversion of cane sugar.	
b)	Explain the cotton effect curves.	
c)	Discuss a principle and instrumentation of X-ray photoelectron spectroscopy.	
d)	Explain the instrumentation measuring fluorescence and phosphorescence (spectrofluorometers).	
e)	Discuss photoelectron spectra of H_2 molecule and He atom.	

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Second Internal Assessment Agust-2024

Sem: IV	**Sem: IV**	**Sem: IV**
Date: 31-08-2024	**Date: 31-08-2024**	**Date: 31-08-2024**

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S.B. Arts & K.C.P. Science College, Vijayapur
DEPARTMENT OF EDUCATION
SECOND INTERNAL TEST-2023-24

Semester: PG II SEM OEC **Time: 1.30 Hr**
Sub: Strategies of Teaching **Marks: 40**

Instructions: 1. Answer any **TWO** of the Questions.
2. Question no **FOUR** is compulsory.

1. a) Explain the major characteristics of an effective teaching.
ಪರಿಣಾಮಕಾರಿ ಶಿಕ್ಷಕನ ಪ್ರಮುಖ ಲಕ್ಷಣಗಳನ್ನು ವಿವರಿಸಿ 8+8

b) Describe the techniques for effective classroom teaching.
ಶಿಕ್ಷಕರು ತರಗತಿಯನ್ನು ಪರಿಣಾಮಕಾರಿಯಾಗಿಸಲು ಬಳಸುವ ತಂತ್ರಗಳನ್ನು ವರ್ಣಿಸಿ

2) a) Explain the meaning and types of communication.
ಸಂಹನದ ಅರ್ಥ ಮತ್ತು ವಿಧಗಳನ್ನು ವರ್ಣಿಸಿ 8+8

b) Describe the different strategies for effective communication.
ಪರಿಣಾಮಕಾರಿ ಸಂಸರ್ಗದ ವಿವಿಧ ತಂತ್ರಗಳನ್ನು ವರ್ಣಿ

3) a) Explain the role of Teacher in Student leaning. 8+8
ವಿಧ್ಯಾರ್ಥೀ ಕಲಿಕೆಯಲ್ಲಿ ಶಿಕ್ಷಕನ ಪಾತ್ರ ವಿವರಿಸಿರಿ.

b) Explain the barriers of communication.
ಸಂಹನದ ಅಡೆತಡೆಗಳನ್ನು ವಿವರಿಸಿರಿ.

4. Write short notes on any Two of the following: 4+4
ಈ ಕೆಳಗಿನ ಯಾವುದಾದರೂ ಎರಡು ಕುರಿತು ಸಂಕ್ಷಿಪ್ತ ಟಿಪ್ಪಣಿ ಬರೆಯಿರಿ.

a) Barriers of Communication.
ಸಂವಹನದ ಅಡೆತಡೆಗಳು

b) Components of communication.
ಸಂವಹನದ ಘಟಕಾಂಶಗಳು

c) Assessment of Teacher effectiveness
ಪರಿಣಾಮಕಾರೀ ಶಿಕ್ಷಕನ ಮೌಲಮಾಪನ

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PG DEPARTMENT OF CHEMISTRY

Second Internal Assessment August-2024

Sem: II	Sub: Inorganic Chemistry-II	Code: B370010
Date: 29-08-2024	Time: 2.00pm to 3.30pm	Max. Marks: 40

PART-A	Answer any FOUR of the following Questions.	4×2=8
a)	What are octahedral voids.	
b)	Out of seven basic crystal systems which one has maximum and minimum symmetry.	
c)	A compound consisting of cation A of radius 0.97A^0 and anion B of radius 2.51A^0 will probably crystallise in the NaCl form. Is this statement correct? Justify	
d)	Write the 2 factors affecting stability of metal complexes.	
e)	Define cross and self exchange reactions.	

PART-B	Answer all of the following Questions.	
I. a)	Discuss the close packing in 2-Dimensions.	5M
b)	What are miller indices? Sketch the planes in a cube having miller indices 1.(111) 2.(100)	5M
c)	Calculate the packing fraction for the FCC unit cell.	6M
OR		
d)	Calculate the radius ratio for the tetrahedral structure.	6M
II. a)	Write the mechanism of nucleophilic substitution in square planar complex with an example.	5M
b)	Compare and contrast Marcus theory of electron transfer with the concept of the activation energy in reactions.	5M
c)	Explain trans effect.	6M
OR		
d)	Explain photochemical cleavage of water by the exited state electron transfer reaction.	6M

B.L.D.E.A's

S.B. ARTS AND K.C.P. SCIENCE COLLEGE VIJAYAPUR-586103

PG DEPARTMENT OF CHEMISTRY

Second Internal Assessment August-2024

Sem: II | Sub: Organic Chemistry-II | Code: B370020

Date: 30/08/2024 | Time: 10.30am-12.00pm | Max. Marks: 40

Part- A **Answer any FOUR of the following Questions.** 4×2=8

a) Define heterocyclic compounds with example.

b) Why three member rings are more reactive than four member rings.

c) Give one synthesis of thiirane.

d) Define Stork enamine reation.

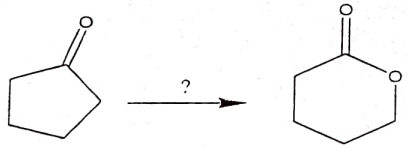
e) Give an example for Hell-Volhard-Zelinski reaction

Part-B **Answer ALL the following questions.**

I a) Give an account of Mannich reaction 5

b) Explain Shapiro reaction 5

c) How do you achieve the following transformation ? 6



OR

d) Discuss Sharpless asymmetric epoxidation.

II a) Write any two synthesis and applications of oxetanes. 5

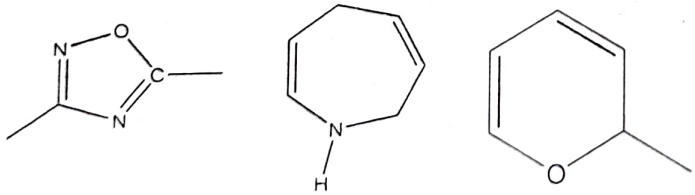
b) Write any two synthesis and applications of aziridines. 5

c) Give the structure for the following heterocyclic 6

1,3-diazete, 1,2-oxazetidine, 1,2,4-triazine.

OR

d) Find out the name of the followings



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Second Internal Assessment August-2024

Sem: II	Sub: Physical chemistry-II	Code: B370030
Date: 31-08-2024	Time: 10.30am to 12.00 am	Max. Marks: 40

Q. No. 1.	Answer any FOUR of the following Questions.	4×2=8
a)	Define degeneracy. What is degeneracy for the H-atom in case of with spin.	
b)	Define perturbation theory. Give its expression.	
c)	What are the limitations of collision theory?	
d)	Mention the postulates of activated complex theory..	
e)	What is cage effect?	
Q. No II	**Answer all the following Questions.**	
a)	Derive the rate of reaction of unimolecular reaction with Hinshelwood theory	5
b)	Explain explosion limits with a neat graph.	5
c)	Derive an expression for the radial and angular wave function. Or Write a note on Potential energy surfaces.	6
d)	Derive the Bronsted-Bjerrum equation.	5
e)	Explain the flash photolysis technique in the study of kinetics of fast reactions.	5
f)	Derive the expression for the first order perturbation theory. Or Discuss i) T-jump method ii) p-jump method	6

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Second Internal Assessment Agust-2024

Sem: II	Sub: Spectroscopy-II	Code: B370040
Date: 31-08-2024	Time: 02.00am to 03.00am	Max. Marks: 20

Q. No. 1.	Answer any TWO of the following Questions.	2×2=4
a)	Hydrogen deficiency index. Give one example.	
b)	Define (m+1) and (m+2) peaks.	
c)	Write a note on McLafferty rearrangement.	
Q. No II	**Answer any FOUR of the following Questions.**	**4×4=16**
a)	Briefly discuss on ortho effect, retro Diels-Alder with example.	
b)	Discuss DEPT Spectra.	
c)	Write a note on EI mass spectroscopy.	
d)	Discuss on instrumentation of matrix assisted laser desorption ionization mass spectroscopy.	
e)	Discuss the instrumentation of quadrupole mass filter in mass spectroscopy.	

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Second Internal Assessment Agust-2024

Sem: II	Sem: II	Sem: II
Date: 31-08-2024	Date: 31-08-2024	Date: 31-08-2024

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