

NALANDA OPEN UNIVERSITY

M.Sc. Chemistry PART-I, PAPER-I (Physical Chemistry)

Annual Examination, 2012

Time : 3 Hours.

Full Marks : 80

Answer any FIVE Questions. All questions carry equal marks.

- (a) Explain the term Entropy. Give the physical significance of entropy.
(b) Which will have higher entropy (a) Water vapour or ice at the same temp. (b) Solid Benzene or liquid benzene (c) liquid H₂O or H₂O. (vapour)
- Derive Gibb's Duben equation thermodynamically. What is phase separation. Derive clapeyron equation.
- What are Postulates of B.E.T. Theory of adsorption ? Write down the B.E.T equation and its limitation.
- (a) Derive the activated complex theory and compare with Arrhenius theory.
(b) The hydrolysis of an ester in presence of dilute acid follows first order while that in the presence of dilute alkali follows a second order kinetics, explain.
- Differentiate between the numbers of average molecular weight and the weight average molecular weight. Give principles of light scattering method for the determination of molar masses of macro molecules.
- What are the assumptions of Debye-Huckel treatment of strong electrolyte theory ? Give Debye-Huckel limiting law and give the interpretation of the law.
- (a) What is Butler Volmer equation ? Derive Butler Volmer equation.
(b) What is tafel plot? Explain clearly.
- What is half wave Potential? What are its significance?
- What are the basic differences between additive polymer condensation polymer. Illustrate by means of one example for each.
- What do you understand by Boltzmann distribution law. Derive its mathematical equation and general form.

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Examination Programme-2012

M.Sc Chemistry, Part-I

Date	Papers	Time	Examination Centre
09.05.2012	Paper-I	3.30 PM to 6.30 PM	Nalanda Open University, Patna
11.05.2012	Paper-II	3.30 PM to 6.30 PM	Nalanda Open University, Patna
15.05.2012	Paper-III	3.30 PM to 6.30 PM	Nalanda Open University, Patna
17.05.2012	Paper-IV	3.30 PM to 6.30 PM	Nalanda Open University, Patna
19.05.2012	Paper-V	3.30 PM to 6.30 PM	Nalanda Open University, Patna
21.05.2012	Paper-VI	3.30 PM to 6.30 PM	Nalanda Open University, Patna
23.05.2012	Paper-VII	3.30 PM to 6.30 PM	Nalanda Open University, Patna
25.05.2012	Paper-VIII	3.30 PM to 6.30 PM	Nalanda Open University, Patna

NALANDA OPEN UNIVERSITY

M.Sc. Chemistry PART-I, PAPER-II (Inorganic Chemistry) Annual Examination, 2012

Time : 3 Hours.

Full Marks : 80

Answer any FIVE Questions. All questions carry equal marks.

- Write down electronic configuration of all lanthanide. On the basis of their electronic configuration of lanthanides place them in the periodic table and give justification. What is lanthanide contraction ? And what are the consequences of lanthanide contraction ?
- Define order of group and classes. What is character table ? construct the character table for point group c_{2v} , c_{3v} .
- Explain the term,
 - Elements of symmetry and symmetry operations.
 - Write all the symmetry operations in following molecules :-
 - H_2O
 - NH_3
 - Pcl_5
 - SF_6
- Explain the term,
 - Moderator and Reflector
 - Reactor and Reactor coolant
 - Reactor shielding with examples.
- What do you understand by term transuranic elements ? What are main nuclear reactions by which transuranic elements are synthesized. Give an account of chemistry of Naptunium and plutonium.
- What is Wade rule ? Using Wade rule infer the structure of $[B_6 H_6]^{2-}$ from the formula and electron count.
- Draw the molecular diagram of CO and NO_2 molecule and evaluate their bond-order also comment on the magnetic behaviour.
- Explain nuclear shell model. Write the merit and evidences of shell model. Describe its limitation.
- Explain the following :-
 - According to V.S.E.P.R theory δ bonds predict the geometry of the molecule and not the π bonds.
 - Difference between d -block elements & f -block elements.
 - Why the CO_2 molecule posses zero dipole.
- Write short notes on the following :-
 - Magnetic and spectral behaviour shown by lanthanides.
 - Classification of Boranes.
 - Bent rule

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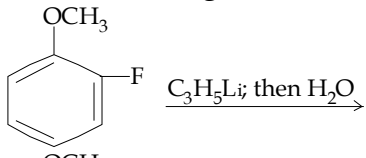
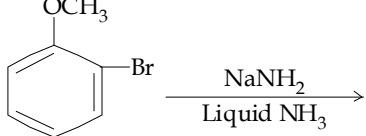
NALANDA OPEN UNIVERSITY

M.Sc. Chemistry PART-I, PAPER-III (Organic Chemistry) Annual Examination, 2012

Time : 3 Hours.

Full Marks : 80

Answer any FIVE Questions. All questions carry equal marks.

1. Discuss the aromatic behaviour of non benzenoid compounds. Explain the structure of annulenes.
2. What are Carbenes ? How are they generated ? Give the important reactions of carbenes.
3. Explain :—
 - (i) Why aniline is more basic than acetanilide in electrophilic substitution ?
 - (ii) Chlorobenzene is less active than aniline
 - (iii) Nitrobenzene on nitration gives m-dinitrobenzene.
4. Discuss the mechanism and synthetic application of any two of the following :—
 - (a) Mannich reaction
 - (b) Knoevenagel reaction
 - (c) Aldol reaction
5. Write notes on any *Three* of the following :—
 - (a) Tautomerism
 - (b) Huckel rule
 - (c) Aromaticity
 - (d) Orientation
6. Discuss the following with suitable example :—
 - (a) Curtin - Hammett principle
 - (b) Hammond postulate
7. Explain the following with suitable examples :—
 - (a) Michael addition
 - (b) Hydroboration
 - (c) Hyper conjugation
8. Complete the following reaction with mechanism
 - (a) 
COc1cccc(F)c1 >> COc1cccc(F)c1
 - (b) 
COc1cccc(Br)c1 >> COc1cccc(Br)c1
9. Discuss with suitable example :—
 - (a) Plane of Symmetry
 - (b) Reflection Symmetry
10. Explain the conformations of Dimethyl cyclohexanes.

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—: आवश्यक सूचना :—

M.Sc. Chemistry, Part-I के सभी परीक्षार्थियों को सूचित किया जाता है कि पटना नगर निगम चुनाव के कारण दिनांक 17.05.2012 को होने वाली Paper-IV की परीक्षा अब दिनांक 18.05.2012 को संध्या 3.30 बजे से 6.30 बजे के बीच आयोजित की जायेगी । अन्य पत्रों की परीक्षा अपने पूर्व निर्धारित तिथि, समय एवं स्थान पर ही आयोजित होंगी ।

NALANDA OPEN UNIVERSITY
M.Sc. Chemistry
PART-I, PAPER-IV
(Solid State Chemistry & Quantum Chemistry)
Annual Examination, 2012

Time : 3 Hours.

Full Marks : 80

Answer any FIVE Questions. All questions carry equal marks.

1. What are laws of crystallography ? How does it help in the study of crystal structure ? Crystal shows geometrical symmetry, explain.
2. (a) Explain intrinsic and extrinsic semiconductor.
(b) What are application of semiconductors.
(c) How the materials are classified on the basis of magnetic properties ?
3. State and explain organic solid with reference to poly acetylene. Explain polyacetylene is a semiconductors.
4. Prove that the operator $\frac{h}{2\pi i} x \left(-\frac{d}{dx} \right)$ is not Hermitian.
5. What is maximum electron density in H atom in the $2s$ and $2px$ states.
6. Write the expression for the average energy of He in $1s$ and $2px$ state and expand it in terms of various integrals. What will be energy in absence of inter-electronic repulsion.
7. Write the Hamiltonian for Li atom ignoring inter electronic repulsion. give wave function.
8. The following two normalized HMO_s of $C_3H_3^+$
$$\psi_2 = \frac{1}{\sqrt{2}} (P_1 - P_2)$$
$$\psi_3 = \frac{1}{\sqrt{2}} (P_1 - P_3)$$
belong to degenerate energy levels $E_2 = E_3 = ae^{-\beta}$. They are not mutually orthogonal. Construct normalized HMO , $\psi_4 = a_2\psi_2 + \psi_3$ which is orthogonal ψ_2 and ψ_3 .
9. Discuss solid state defect with special reference to
(a) Schottky defects
(b) Frenkel defect in crystals
10. Explain Slater Determinants (Determinantal form of the wave functions). Deduce the ground and excited state antisymmetric wave function for He atom in the Slater determinantal form.

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NALANDA OPEN UNIVERSITY

M.Sc. Chemistry

PART-I, PAPER-V

(Co-ordination and Magneto Chemistry)

Annual Examination, 2012

Time : 3 Hours.

Full Marks : 80

Answer any FIVE Questions. All questions carry equal marks.

1. What do you understand by splitting of d-orbital under the influence of a ligand ? How does the d-orbital split in tetrahedral field. Compare it with splitting in octahedral field.
2. Explain quenching of orbital angular momentum in some metals ion (in 3d-block elements). What are the factors which govern the quenching of orbital angular momentum.
3. Answer the following :—
 - (i) What are selection rules for d-d-transition ?
 - (ii) Explain magnetically dilute and magnetically concentrated species.
 - (iii) Explain the origin of magnetic moment found in atom, molecule in ion.
4. Calculate free ion ground term for Mn^{2+} , Co^{2+} , Ni^{2+} , Cu^{2+} and Cr^{3+} .
5. Explain the following :—
 - (i) Why d-d-transitions are so weak as compared to metal-ligand charge transfer.
 - (ii) Both $[Fe(CN)_6]^{4-}$ and $[Fe(H_2O)_6]^{3+}$ ions appear colourless in dilute aqueous solution through one is low spin and other is high-spin complex.
6. In each of the following pair of complexes which has higher value of C.F.S.E. Give reason :—
 - (i) $[Fe(H_2O)_6]^{3+}$ $[Fe(CN)_6]^{3-}$
 - (ii) $[Fe(H_2O)_6]^{2+}$ $[Fe(H_2O)_6]^{3+}$
 - (iii) $[Rh(NH_3)_6]^{2+}$ $[Co(NH_3)_6]^{2+}$
 - (iv) $[Cr(H_2O)_6]^{2+}$ $[Mn(H_2O)_6]^{2+}$
7. Write notes on :—
 - (i) Spectro chemical series.
 - (ii) Limitation of crystal field theory.
8. Calculate μ_J value of any three of lanthanide (III) ion.
9. Discuss the bonding in octahedral complexes with π bonding on the molecular orbital theory and draw the energy level diagram showing how π interactions affect the value of Δ_0 .
10. Explain the multiplet width. Explain population of J level in context to KT.

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NALANDA OPEN UNIVERSITY

M.Sc. Chemistry PART-I, PAPER-VI (Chemistry of Biomolecules) Annual Examination, 2012

Time : 3 Hours.

Full Marks : 80

Answer any FIVE Questions. All questions carry equal marks.

1. Discuss and derive the structure of atropine. Establish its structure by synthesis.
2. What are glycosides ? Give classification of glycosides. Determine the structure of glycoside by synthesis.
3. Write notes on the following :—
 - (i) β -oxidation of fatty acid.
 - (ii) Blane's rule.
 - (iii) Wagner-Mur Wein rearrangements.
4. What are alkaloids ? How are they extracted from plants ? Discuss the structure of piperine.
5. What is relation between in the following sets ?
 - (i) A nucleotide and nucleic acid.
 - (ii) Ribose and Deoxy Ribose.
 - (iii) Chromosome and DNA.
6. Write about two essential functions of triaceyl glycerol.
 - (i) Hydrogenaton of triaceyl glycerol.
 - (ii) Biological functions of triaceyl glycerol.
 - (iii) Saponification of triaceyl glycerol.
7. What are disaccharides ? Establish the structure of sucrose and also write about its inversion properties.
8. What is peptides linkage ? Give examples and explain them. How will you proceed to assign the structure to a poly-peptides.
9. Write down the structure of cytosine and thymine. Give synthesis of each of one purinebase and pyrimidine base.
10. Describe the following reactions of citral and the name of product formed.
 - (i) Hydrohysis in aqueous K_2CO_3 .
 - (ii) Ozonolysis in presence of Zn/H_2O .
 - (iii) Reduction with Na/Hg .

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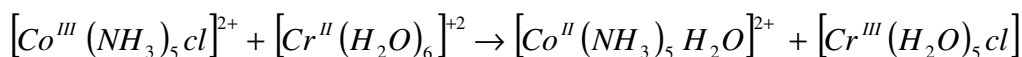
NALANDA OPEN UNIVERSITY
M.Sc. Chemistry
PART-I, PAPER-VII
(Reaction Mechanism and Supramolecular Chemistry)
Annual Examination, 2012

Time : 3 Hours.

Full Marks : 80

Answer any FIVE Questions. All questions carry equal marks.

1. (a) Describe one method each for the preparation of acetyl-acetate complex with a transition metal and non transition metal.
(b) Acetyl acetone form chetate with oxygen and carbon. Explain.
2. Describe the energy state of octahedral chromium (III) complexes and associated photo chemical process.
3. How the supramolecular catalyts are similar to enzyme catalyst ? what are differences between the two ?
4. Mention substitution reaction which undergoes without cleavage of metal-ligand. Give its mechanism with suitable examples.
5. Write notes on Helicate, Catenane, Rosettes, Cage in supramolecular chemistry.
6. Why certain electron transfer reactions proceed by inner sphere mechanism and some by outer sphere mechanism ? Explain.
7. (a) Explain S_NCB mechanism by giving examples.
(b) Discuss the mechanism of recemization of tris phenanthroline iron (II).
8. Write notes on the followings :—
 - (a) Bailar twist mechanism.
 - (b) Optical inversion.
9. What do you mean by prompt and delayed photo chemical reactions ? Give examples.
10. Explain the following :—
 - (a) Marcus-Husch theory with suitable examples.
 - (b) Electron transfer reaction in the following reaction,



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NALANDA OPEN UNIVERSITY

M.Sc. Chemistry PART-I, PAPER-VIII (Natural Product) Annual Examination, 2012

Time : 3 Hours.

Full Marks : 80

Answer any FIVE Questions. All questions carry equal marks.

1. Discuss the conversion of *Vitamine A₁* to *Vitamine A₂* and explain the role of *Vitamine A* in our life.
2. Write the synthesis of Cholestanol.
3. Give a systematic synthesis of estrone and discuss its structure.
4. What do you understand by Terpenoids ? Classify terpenoid. How the terpenoids are generally extracted by steam distillation and volatile solvent.
5. Discuss the structure of abietic acid and confirmed by synthetic methods.
6. What is *Vitamine B₆*. Give details of its synthesis.
7. Write short notes on the following :—
 - (a) Steroids
 - (b) Flavone
8. Discuss the structure of Quinine. Describe the essential steps in Woodward synthesis of quinine.
9. Write the Woodward synthesis of Chlorophyll-a.
10. Give evidence in support of structure morphine.

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**For Practical Counselling Class & Practical Examination
Programme Please See on Back Page.**

NALANDA OPEN UNIVERSITY

M.Sc. Chemistry PART-II, PAPER-IX (Spectroscopy)

Annual Examination, 2012

Time : 3 Hours.

Full Marks : 80

Answer any FIVE Questions. All questions carry equal marks.

1. Discuss the various types of electronic transitions. Name the molecules which undergo $n \rightarrow \pi$, $n \rightarrow \pi^*$ and $\pi \rightarrow \pi^*$ electron transitions. How can 1, 3 butadiene and 1, 4 butadiene be distinguished by UV spectroscopy.
2. Derive spectroscopic terms for p^2 configuration and write Hund's rule to find out ground state term.
3. Explain the mechanism of McLafferty rearrangement by taking suitable examples.
4. Answer the following :—
 - (i) In UV spectrum, the electronic band is usually broad.
 - (ii) Line spectrum in rotational spectroscopy is observed.
 - (iii) The NMR gives broad band in spectrum but mass spectrum is observed as line spectrum.
5. Distinguish among pure rotational spectrum and vibration rotational spectrum of molecule. How are they different from electronic spectrum ?
6. Discuss the principle and application of NMR spectroscopy and explain that how this technique is big used in elucidating of the structure of the molecules ?
7. Which of the following can show pure rotational spectra and which can show pure vibrational spectra. Also the name molecule which can not show any of the two spectra. Give justification for your answer.
HCl, H₂O, CO₂, CH₄, CCl₄, BF₃, C₆H₆ and Cl₂.
8. Give an account of how the Raman spectra of diatomic molecule give valuable information about their molecular structure and other parameters.
9. Answer the following :—
 - (i) Describe quantum theory of Raman spectra.
 - (ii) Write the differences between Raman spectra and I.R. spectra.
10. Write notes on the following :—
 - (i) Effect of solvent on electronic transition.
 - (ii) Shielding and deshielding in NMR spectra.
 - (iii) Selection rule in I.R. spectroscopy.

NALANDA OPEN UNIVERSITY

M.Sc. Chemistry PART-II, PAPER-X (Advance Chemical Dynamics) Annual Examination, 2012

Time : 3 Hours.

Full Marks : 80

Answer any FIVE Questions. All questions carry equal marks.

1. What is flash photolysis ? How can flash photolysis method can be used for the study of fast reaction ? Discuss the use of molecular beam in the study of fast reaction.
2. Discuss Lotka-Volterra model to explain the oscillatory reaction.
3. (a) What is the activation energy role in explaining the catalysis reactions.
(b) Derive Bronsted catalysis relation. And explain oscillatory reactions.
4. Define and explain electrocatalysis. Discuss the rate of electrocatalysis. Describe the mechanism of electrocatalysis.
5. Discuss the effect of ionic strength and dielectric constant of the medium on the rate constant of the reaction.
6. Write note on the following :—
(a) Bronsted Catalysis Law.
(b) Oscillatory Reaction.
7. Explain the term corrosion. Describe the different theories to explain corrosion. How can you prevent a metal from corrosion.
8. Describe the transition state theory of reactions in solutions. Explain the collisions on the solution encounters.
9. Explain the Kinetics of reaction in liquid and gas phase. What is diffusion control reaction ?
10. What do you understand by the dynamics of reaction ? What is mechanism of activation ? Discuss potential energy surfaces.

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NALANDA OPEN UNIVERSITY

M.Sc. Chemistry PART-II, PAPER-XI (Molecular Thermodynamics) Annual Examination, 2012

Time : 3 Hours.

Full Marks : 80

Answer any FIVE Questions. All questions carry equal marks.

1. What are the limitations of Maxwell-Boltzmann statistics ? How are these limitations overcome by Bose-Einstein and Fermi Dirac Statistics.
2. (a) Define canonical ensemble in statistical thermodynamics.
(b) Mention differences between various types of ensembles.
3. What are Lagrangian multipliers ? Using Lagrange method of undetermined multipliers, obtain an expression for Boltzmann distribution law.
4. Define and explain Molecular partition function. What is the physical significance of molecular partition function ? What is the use of this function ?
5. What do you understand by total molecular partition function ? Under what conditions can it be factorized and expressed as a product of electronic, translational, rotational, vibrational and nuclear partition functions ? Deduce this expression.
6. What are the salient features of an irreversible process ? Mention the types of irreversibility. Explain the postulates of irreversible thermodynamics.
7. Derive an expression for vibrational partition function for a diatomic molecule. How does temperature affect the value of vibrational partition function.
8. Discuss the attempts which have been made to account quantitatively for the variation of atomic heat of solid with temperature.
9. Write notes on the following :—
 - (i) Entropy of ortho and parahydrogen.
 - (ii) Debye's theory of specific heat.
10. What do you mean by entropy production ? Derive the expression for the rate of entropy production resulting from heat or mass flow in the system.

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NALANDA OPEN UNIVERSITY

M.Sc. Chemistry PART-II, PAPER-XII (Ligand Field Theory) Annual Examination, 2012

Time : 3 Hours.

Full Marks : 80

Answer any FIVE Questions. All questions carry equal marks.

1. Write down the type of splitting that Russel Sanders term undergo under the influence of octahedral field. Explain why Mn(II) complexes magnetic moment value equal to spin only value.
2. Explain Jahn-Teller Distortion and spectra with reference to $[Ti(H_2O)_6]^{3+}$ (d^1) and $[Cu(H_2O)_6]^{2+}$ (d^9).
3. Chromium (II) Fluoride and Magnese (II) Fluoride have central metal ion surrounded by six fluoride ligand. In magnese complex all Mn-F bond length are equidistance but in case of chromium complex four of the Cr-F bond length are long and two are short, why ?
4. Application of E.S.R. spectroscopy in the study of Inorganic Chemistry. Also explain E.S.R. spectrum of the complex ion $[Mo(CN)_8]^{3-}$ in solution consists of line.
5. Give an account of the role played by I.R. spectra in the structure determination of metal nitrosyles.
6. (a) How does L-S coupling constant (λ) value change from free ion to complex.
(b) What are condon-shrotly Parameters ?
7. (a) What are the ground state term for Mn^{2+} , Fe^+ and V^{2+} ion.
(b) Derive that term symbol for p^2 electronic system and determine ground state term.
8. (a) Draw correlation diagram for d^8 electronic system in octahedral.
(b) Cu(II) has only one free ion energy term. Explain.
9. Explain charge transfer Bands and their assignment in both octahedral and tetrahedral field.
10. Explain the transition and different bands in Co^{2+} ion in octahedral complexes.

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NALANDA OPEN UNIVERSITY
M.Sc. Chemistry
PART-II, PAPER-XIII
(Organotransition Metal Chemistry and Metal Clusters)
Annual Examination, 2012

Time : 3 Hours.

Full Marks : 80

Answer any FIVE Questions. All questions carry equal marks.

1. How you will Synthesize the δ bonded organotransition metal compounds. Discuss the thermal stability and decomposition Pathways for δ alkyl/aryl organometallic compounds with transition metal.
2. Write the method of Preparation and properties, Structure and bonding of Zeise's salt.
3. Write the general methods of preparation of metal carbonyl and their properties. How will you differentiate between terminal carbonyl and bridging carbonyl from I.R. spectra.
4. Write the mechanism of oxidation of ethylene using Wacker process.
5. What are the different types of fluxional organic metallic compounds. Describe them in brief with examples.
6. (a) Explain non-rigid co-ordination compound of different co-ordination number.
(b) Predict the proton NMR spectral resonances expected for n^5 and $n^1 - C_5H_5$ Ligands.
7. Explain, why dien ligands form large number of transition metal complexes. Give two methods of preparation of cyclobutadiene complex with transition metal. How does cyclobutadiene undergo electrophilic substitution and Nucleophilic attack.
8. Predict the following reaction :—
(a) (i) $FeCl_2 + 2Na^+ C_5H_5^- \xrightarrow{THF}$
(ii) $Fe(n^5 - C_5H_5) + n - C_4HgLi \rightarrow$
(b) Write the structure and properties ferrocene.
9. How the metal carbonyl hydrides are synthesized ? Write the general properties of metal carbonyl hydride. What are the uses of metal carbonyl hydrides.
10. Define and explain metal clusters. What are the basis on which metal clusters have been categorized ? Give important methods of synthesis.

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NALANDA OPEN UNIVERSITY
M.Sc. Chemistry
PART-II, PAPER-XIV
(Photochemistry and Paricyclic Reaction)
Annual Examination, 2012

Time : 3 Hours.

Full Marks : 80

Answer any FIVE Questions. All questions carry equal marks.

1. Give π molecular diagram of
 - (a) 1, 3, pentadiene.
 - (b) 1, 3, 5 hexatriene.
2. Write a note on conrotatory motion and disrotatory motion.
3.
 - (a) Write a note on suprafacial and antarafacial overlapping of orbitals.
 - (b) Explain, why [1, 3] suprafacial migration of alkyl group proceed with inversion of configuration of chiral centre while [1, 5] suprafacial migration of the same group followed retention of configuration.
4. Give mechanism of Norrish type I Process. How many types of carbonyl compounds gives this reaction ?
5. Write notes on the following :—
 - (a) Singlet and triplet state.
 - (b) Frank condon principle.
 - (c) Quenching.
6.
 - (a) Explain the stereochemistry of [3, 3] sigmatropic rearrangement under thermal and photochemical method.
 - (b) Complete the following reaction :—

$$\begin{array}{c}
 \text{O} \\
 \parallel \\
 \text{C} \\
 \diagup \quad \diagdown \\
 \text{C} \quad \text{C} \\
 \diagdown \quad \diagup \\
 \text{C} \quad \text{C} \\
 \diagup \quad \diagdown \\
 \text{O}
 \end{array}
 + \text{C}_6\text{H}_5 - \text{C} \equiv \text{C} - \text{C}_6\text{H}_5 \xrightarrow{h\nu}$$

$$\begin{array}{c}
 \text{O} \\
 \parallel \\
 \text{C} \\
 \diagup \quad \diagdown \\
 \text{C} \quad \text{C} \\
 \diagdown \quad \diagup \\
 \text{C} \quad \text{C} \\
 \diagup \quad \diagdown \\
 \text{O}
 \end{array}
 + \text{C}_6\text{H}_5 - \overset{\text{O}}{\parallel}{\text{C}} - \text{C}_6\text{H}_5 \xrightarrow{h\nu}$$
7. Explain rearrangements of cyclo dienoners involving diradical intermediate in presence of hydrogen donor and in absence of hydrogen donor.
8. Explain photolysis of nitrites having primary δ -carbon, secondary σ -carbon and no hydrogen at δ -carbon.
9.
 - (a) Explain photochemistry of butadiene in S_1 State.
 - (b) Irradiation of *O*-xylene gives a mixture of *m* and *p*-xylene. Propose suitable mechanism of these alkyl shift.
10. Write notes on the following :—
 - (a) Photochemistry of Aromatic Compounds.
 - (b) Aza cope Rearrangement.

NALANDA OPEN UNIVERSITY

M.Sc. Chemistry PART-II, PAPER-XV (Organic Synthesis) Annual Examination, 2012

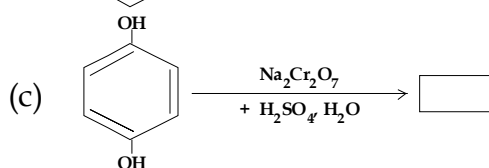
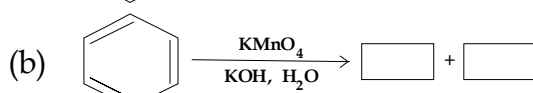
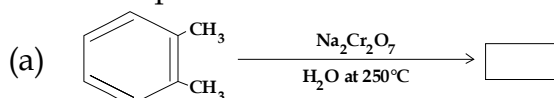
Time : 3 Hours.

Full Marks : 80

Answer any FIVE Questions. All questions carry equal marks.

- Give the mechanism of any three rearrangements :—
 - Pinacol-Pinacolone Rearrangement
 - Claisen Rearrangement
 - Wegner-Meerwein Rearrangement
 - Favorskii Rearrangement
- Write notes on the following :—
 - Elbs Reaction
 - Etard Reaction
 - Oppenaur Oxidation
 - Barton Reaction
- Explain the reduction reaction of the following compounds with example :—
 - Reduction of nitro compounds
 - Reduction of aldehyde
 - Reduction of ketones
- Discuss the preparation and four important properties of thio-ether.
- How are organo magnesium compounds prepared ? How does Grignard reagent react with :—
 - Formaldehyde
 - Acetaldehyde
 - Acetone
 - Carbonyl oxide
- Write notes on any *Three* of the following :—
 - Desulphurisation
 - Mustard gas
 - T.N.T.
 - Sulpha drug.
- How sulphonic acid is prepared in the laboratory ? Give the reaction and its mechanism. How does it react with the following when fused at 200–300°C ?
 - Sodamide
 - Potassium sulphide
 - Sodium hydroxide
- Explain the synthetic use of H_2O_2 and O_3 in the oxidation of alkene to glycol.

9. Name the products with structure :—



10. Explain, why an α -Monobromo Carbonyl compounds can not be prepared by treating a carbonyl compound with bromine under basic condition.

