

NALANDA OPEN UNIVERSITY
M.Sc. Chemistry, Part-I
PAPER-I
(Physical Chemistry)
Annual Examination, 2016

Time : 3 Hours.

Full Marks : 80

Answer any FIVE Questions.
All questions carry equal marks.

1. What do you mean by Gibb's function of Gibb's free energy ? How Gibb's free energy vary with pressure and temperature.
2. What is meant by chain reactions ? What are steps involved in chain reactions ? Explain this reaction with reference to the reaction, $H_2 + Br_2 \rightleftharpoons 2HBr$ and derive a mathematical equation. Give the characteristics of chain reactions.
3. Explain the term entropy. Give the physical significance of entropy.
4. What does you mean by the term polarography ? What is Iskovie equation. Derive it giving the meaning of the terms.
5. Define the term adsorption and absorption. Give B.E.T. theory of absorption and what are its limitations ?
6. Explain and illustrate the following :—
 - (a) Concept of Ensembles
 - (b) Boltzmann Distribution Law
7. What are the assumption of Debye-Huckel treatment of strong electrolyte theory ? Give Debye-Huckel limiting law and give the interpretation of the law.
8. What do you mean by the terms over potential ? What are the factors which affects over potential ? What are significance of over potential.
9. What is Corrosion ? Give the mechanism of process. How Corrosion is prevented ?
10. Define polymers with suitable examples. Differentiate between synthetic polymers and natural polymers. How many types of stereoisomers are possible in the polymerization of monomer $CH_2 \rightleftharpoons CH_z$. Write the name and their structure of each type.

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Examination Programme, 2016
M.Sc. Chemistry, Part-I

<i>Date</i>	<i>Papers</i>	<i>Time</i>	<i>Examination Centre</i>
13.05.2016	Paper-I	8.00 AM to 11.00 AM	Nalanda Open University, Patna
17.05.2016	Paper-II	8.00 AM to 11.00 AM	Nalanda Open University, Patna
19.05.2016	Paper-III	8.00 AM to 11.00 AM	Nalanda Open University, Patna
21.05.2016	Paper-IV	8.00 AM to 11.00 AM	Nalanda Open University, Patna
23.05.2016	Paper-V	8.00 AM to 11.00 AM	Nalanda Open University, Patna
25.05.2016	Paper-VI	8.00 AM to 11.00 AM	Nalanda Open University, Patna
27.05.2016	Paper-VII	8.00 AM to 11.00 AM	Nalanda Open University, Patna
30.05.2016	Paper-VIII	8.00 AM to 11.00 AM	Nalanda Open University, Patna

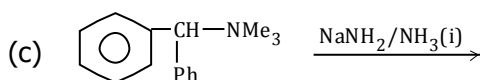
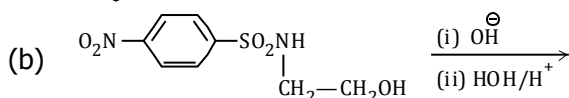
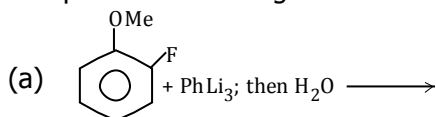
NALANDA OPEN UNIVERSITY
M.Sc. Chemistry, Part-I
PAPER-III
 (Organic Chemistry)
 Annual Examination, 2016

Time : 3 Hours.

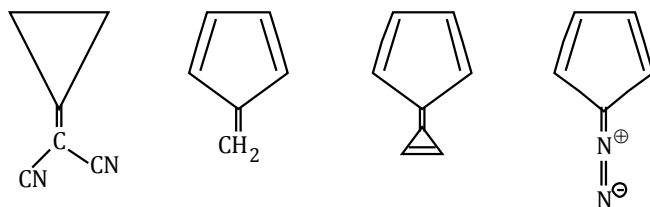
Full Marks : 80

Answer any FIVE Questions.
All questions carry equal marks.

- What do you understand by Carbocations ? Explain their stability.
- Write brief notes on :—
 - Curtin-Hammett Principle
 - Hammond's Postulates
- Complete the following reaction and outline its mechanism :—



- Explain the mechanism of Elimination Bimolecular reaction with suitable examples.
- Discuss the mechanism and stereo chemistry of free radical bromination of (R) - 1 - bromo - 2 methyl butane.
- Write the mechanism of ArSN₁ Reaction. Give atleast three examples.
- Write note on the following :—
 - Diazonium Coupling Reaction
 - Gattermann-Koch Reaction
- What are the conditions that favour E1cb mechanism in an elimination reaction ? Illustrate with two examples.
- Classify given the following reaction :—



- Resonance energy of benzene is much more higher than 1, 3 - butadiene, why ?
 - Discuss aromaticity of non-benzenoid aromatic compounds.

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NALANDA OPEN UNIVERSITY
M.Sc. Chemistry, Part-I
PAPER-IV
(Solid State and Quantum Chemistry)
Annual Examination, 2016

Time : 3 Hours.

Full Marks : 80

Answer any FIVE Questions.
All questions carry equal marks.

1. State and explain organic solid with reference to poly acetylene. Explain poly acetylene is semiconductor.
2. What do you understand by solid state defect ? Derive relation between Frankel defect and temperature. What is meaning colour centres in alkali metal crystal.
3. What are laws of crystallography ? How does it help in the study of crystal structure.
4. What is perfect and imperfect crystal ? Derive a relation between Scotty defect and temperature.
5. What do you mean by Hermitian operator ? What are important characteristics ? On the basis of its characteristic derive the mathematical equation and predict the properties of Hermitian operator.
6. What is the magnitude of total orbital, total spin and total angular momenta for ground state 4P of Vanadium.
7. Discuss perturbation theory. Apply perturbation theory so solve Schrödinger equation to determine approximate values of energies and wave function in more than one electron system.
8. Calculate the average distance of the electron from nucleus of Hydrogen in the 2S atom.
9. Discuss Hartree-Fock self consistent field theory. What are its demerit.
10. Write short notes on **One** of the following :—
 - (a) The Huckel Molecular Orbital (Hmo) theory
 - (b) Condon and Slater Rules

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NALANDA OPEN UNIVERSITY
M.Sc. Chemistry, Part-I
PAPER-V
(Co-ordination Chemistry)
Annual Examination, 2016

Time : 3 Hours.

Full Marks : 80

Answer any FIVE Questions.
All questions carry equal marks.

1. What do you understand by crystal field stabilization energy in complex ? What are the factors which determine the crystal field stabilization energy.
2. What do you mean by splitting of d-orbital under the influence of Ligand. How does the d-orbital split in Tetrahedral crystal field theory ?
3. Discuss the labile and inert octahedral complex on the basis of C.F.T.
4. Explain the factors which affect the acid hydrolysis reactions in octahedral complex.
5. (a) How does ionic radii of M^{2+} vary from d^0 to d^{10} system in the first transition system due to crystal field.
(b) S and P term do not split in crystal field but D and F term split, explain.
6. (a) Discuss electronic spectra of d^1 and d^2 system in octahedral and tetrahedral electric field.
(b) Explain, by giving examples, Jahn Teller distortions.
7. What is meant by microstate ? What is the possible maximum number of possible microstates for p^2 configuration ? Derive the possible Russell Saunderson's microstate for p^2 according to Hund's rule, arrange them in increasing order of energy and identify the ground state term symbol.
8. (a) What are selection rules for d-d transition ?
(b) Explain magnetic moment and magnetic susceptibility and establish relation between them.
9. Why magnetic moment of first transition series metal complex often approaches the μ_S value but same result does not obtain in the series.
10. Write notes on the following :—
 - (a) Spectro-Chemical Series.
 - (b) Electro Paramagnetic Resonance.

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

NALANDA OPEN UNIVERSITY
M.Sc. Chemistry, Part-I
PAPER-VI
(Chemistry of Biomolecule)
Annual Examination, 2016

Time : 3 Hours.

Full Marks : 80

Answer any FIVE Questions.
All questions carry equal marks.

1. What is Carbohydrate ? Establish ring structure of glucose.
2. What are amino acids ? Discuss the chemical reaction of amino acids involving the both functional groups present in the molecule.
3. What is Glycosides ? Give classification of glycosides. Determine the structure of glycoside by its synthesis.
4. What are alkaloids ? How are they extracted from plants ? Discuss the structure of piperine.
5. Write down the structure and synthesis of any **Two** of the following :—
 - (a) Adenine
 - (b) Cytosine
 - (c) Thymine
6. What is Maltose ? Establish the structure of maltose by degradative and synthistic methods.
7. Name the important Lipids. Write details about biological functions of Lipid and its metabolism.
8. Write notes on the following :—
 - (a) Cephalines
 - (b) Peptidelinkage
 - (c) Zwitterion
 - (d) Sphingomyelins
9. Write down the structure of cytosine and thymine. Give synthesis of each of one purinebase and pyrimidine base.
10. How will you effect of any **Three** conversions :—
 - (a) Citral to p-cymene.
 - (b) Citral to amones.
 - (c) Citral to cyclocitrals.
 - (d) Geranial to α -terpinol.

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

NALANDA OPEN UNIVERSITY

M.Sc. Chemistry, Part-I
PAPER-VII

(Reaction Mechanism and Super Molecular Chemistry)

Annual Examination, 2016

Time : 3 Hours.

Full Marks : 80

Answer any FIVE Questions.
All questions carry equal marks.

- Explain associative and dissociative mechanism with examples.
 - Discuss the phenomenon of phosphorescence and fluorescence.
- Describe the electron transfer reaction by inner and outer mechanism. Give examples.
- Draw the structure of mononuclear Schiff's base complex of Ruthenium and binuclear Schiff base complex of cobalt. Discuss bidentate Schiff's metal complexes.
- Electron transfer between $[Fe(CN)_6]^{3-}$ and $[Fe(CN)_6]^{4-}$ is much more faster than between $[Co(NH_3)_6]^{2+}$ and $[Co(NH_3)_6]^{3+}$, why ?
- Enumerate the concept in supermolecular chemistry. Explain any three of these concepts.
- Draw Tanabe Sugano energy level diagram of Cr(III) octahedral complexes and describe associated photochemical process.
- Discuss all possible path ways of racemization of optical isomers of octahedral complexes with suitable examples.
- What do you understand by metal alkoxide ? Give two methods to prepare metal alkoxides. Draw the structure of tetrameric alkoxide and discuss it. What are important applications of metal alkoxides.
- Explain the following statements :—
 - The temperature has little effect on photochemical reaction.
 - Photochemical reactions do not need Collisions.
 - Free energy value is not negative in photochemical reaction.
 - Photochemical activation is selective.
- Write notes on any **Two** of the following :—
 - Excited electron transfer.
 - Mixed Valence Complexes.
 - Application of Supermolecular Chemistry.

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

NALANDA OPEN UNIVERSITY
M.Sc. Chemistry, Part-I
PAPER-VIII
(Natural Product)
Annual Examination, 2016

Time : 3 Hours.

Full Marks : 80

Answer any FIVE Questions.
All questions carry equal marks.

1. Write the structure of cholesterol, cholestanol and cholestanone. Write the synthesis of cholesterol.
2. What are Hormones ? Discuss the classification of Estrone.
3. (a) Discuss the position of the two angular methyl group in cholesterol.
(b) Discuss the nature and position of side chain in cholesterol.
4. (a) Discuss the structure of opianic acid and cotarnine.
(b) Discuss the degradative reactions of narcotine.
5. Establish the structure of B₆ and support your answer by giving synthetic evidence.
6. Discuss the structure of morphine.
7. Elucidate the degradative and synthetic evidence that established the structure of Zingiberine.
8. Elucidate the structure of Vitamin C and discuss its synthesis.
9. Name the different members of the class flavones, isoflavones, anthocyanins and anthocyanidins. Discuss the general method of determining the structure of flavone.
10. What do you understand by Terpenoids ? Establish the structure of abietic acid.

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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, 2016

Time : 3 Hours.

Full Marks : 80

Answer any FIVE Questions.
All questions carry equal marks.

1. (a) What are the necessary conditions for a compound to be infrared active ?
(b) Distinguish between the following on the basis of I. R. Spectroscopy.
(i) CH_3CH_2CHO (ii) CH_3COCH_3
2. Give an account of how Raman spectra of diatomic molecule give valuable information about their molecular structure and other parameter.
3. Taking suitable examples, explain the mechanism of Melafferty rearrangement by taking suitable examples.
4. (a) How you will distinguish between cis and trans-isomers with the help of nmr ?
(b) Why do atoms gives rise to line spectra while molecules show band spectra.
5. What is electron spin resonance ? Give details experimental technique.
6. Discuss the principle of NMR spectroscopy and explain how this technique is used in elucidating of the structure of the molecules ?
7. Describe and explain (a) K-band (Konjugierate), (b) R-band (Radikalartig), (c) B-band (Benzenerid) and (d) E-band (Ethylenic) in electronic spectra.
8. What do you mean by zero point energy ? Draw potential energy curve of diatomic molecule undergoing an harmonic oscillation and write P.E. expression.
9. Answer the following :—
(a) Explain d-d transition.
(b) In uv spectrum, the electronic band is usually broad.
10. Write notes on any **Two** of the following :—
(a) Charge Transfer Complexes (C-T Bands)
(b) Franck-Condon Principle
(c) Chemical shift in nmr spectroscopy.

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Examination Programme, 2016
M.Sc. Chemistry, Part-II

Date	Papers	Time	Examination Centre
01.06.2016	Paper-IX	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
03.06.2016	Paper-X	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
07.06.2016	Paper-XI	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
09.06.2016	Paper-XII	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
11.06.2016	Paper-XIII	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
13.06.2016	Paper-XIV	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
15.06.2016	Paper-XV	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
17.06.2016	Paper-XVI	12.00 Noon to 3.00 PM	Nalanda Open University, Patna

NALANDA OPEN UNIVERSITY
M.Sc. Chemistry, Part-II
PAPER-X
(Advance Chemical Dynamics)
Annual Examination, 2016

Time : 3 Hours.

Full Marks : 80

Answer any FIVE Questions.
All questions carry equal marks.

1. What do you understand by transition state for bimolecular reactions. Discuss the dynamic calculation of transition state expression for bimolecular reaction.
2. What is flash photolysis ? How can flash photolysis method can be used for the study of fast reaction.
3. Discuss Lotka-Volterra model to explain the oscillatory reaction.
4. Explain general mechanism of catalytic reactions. Describe the Arrhenius and Van't Hoff intermediate for the Kinetics of catalytic reaction.
5. Explain the kinetics of reaction in liquid and gas phase. What is diffusion controlled reaction.
6. Describe the transition state theory of reactions in solutions. Explain the collision on the solution encounters.
7. Describe the direct chemical attack and electro chemical theory of corrosion. How metal be prevented from metallic corrosion ?
8. Explain relaxation method for the study of fast reaction with reference to a reversible reaction of first order.
9. What do you understand by the dynamics of reaction ? What is mechanism of activation ? Discuss potential energy surfaces.
10. Write notes on the following :—
 - (a) Theory of Acid-Base Catalysis.
 - (b) Rate of Electro Catalysis.

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NALANDA OPEN UNIVERSITY
M.Sc. Chemistry, Part-II
PAPER-XI
(Molecular Thermodynamics)
Annual Examination, 2016

Time : 3 Hours.

Full Marks : 80

Answer any FIVE Questions.
All questions carry equal marks.

1. Derive expression for vibrational partition function for ideal monoatomic gas.
2. What are the salient features of irreversible process ? Mentioned the types of irreversibility. Explain the postulates of irreversible thermodynamics.
3. What is Lagrangian multipliers ? Use Lagrange method of undetermined multiplier. Obtain an expression for Boltzmann distribution law.
4. Explain, why the values of specific heat molecular hydrogen evaluated by using third law of thermodynamics.
5. What is classical statistical mechanics ? How is it related with statistical thermodynamics.
6. Write down Debye theory and derive Debye for evaluation of the atomic heat of solid. How does Debye equation explain the variation of specific heat of solid at higher temperature and lower temperature.
7. (a) How the entropy of a thermodynamics function is related to partition function.
(b) Explain what do you mean irreversible thermodynamics. What are its features and postulates of irreversible thermodynamics.
8. What is the limitation of Maxwell-Boltzmann statistics ? How are these limitations overcome by Bose-Einstein and Fermi-Dirac statistics,
9. Mentioned various types of ensembles. Define canonical ensemble in statistical thermodynamics.
10. Write short notes on the following :—
 - (a) Dulong and Petit's Law.
 - (b) Liouville Theorem.

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NALANDA OPEN UNIVERSITY
M.Sc. Chemistry, Part-II
PAPER–XII
(Ligand Field Theory)
Annual Examination, 2016

Time : 3 Hours.

Full Marks : 80

Answer any FIVE Questions.
All questions carry equal marks.

1. Write in details about the application of IR spectroscopy in determining the structure of metal Nitrosyls.
2. What do you understand by d-d transition ? Explain the phenomenon of electronic transition from Ligand to metal ion and vice versa. How does the above transitions mainly contribute to explain the colour and spectra produced in the formation of transition metal compounds in complexes.
3. (a) What are Condon-Shortly parameter.
(b) Explain L-S and J-J coupling.
4. Application of E.S.R. spectroscopy in the study of Inorganic Chemistry.
5. Write explanatory notes of the following :—
(a) John Teller Distortion effect.
(b) Non Crossing rule.
6. Write down the following :—
(a) Hund's Rule for determination of ground state term.
(b) Mossbauer spectra.
7. (a) Discuss the condition for the cross-over point from weak field to strong field limit.
(b) What are the ground state term for Ni^{++} , Mn^{2+} , Fe^{++} and V^{2+} ion system.
8. Explain the transition and different bands in Co^{2+} ion in octahedral complexes.
9. Write down the type of splitting that Russel Sanders term undergo the influence of octahedral field. Explain why Mn(II) complexes magnetic moment value equal to spin only.
10. Write short notes on the following :—
(a) Spin cross over phenomena.
(b) Nephelauxetic ratio.

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NALANDA OPEN UNIVERSITY

M.Sc. Chemistry, Part-II

PAPER-XIII

(Organotransition Metal Chemistry and Metal Clusters)

Annual Examination, 2016

Time : 3 Hours.

Full Marks : 80

Answer any FIVE Questions.
All questions carry equal marks.

1. How ethylene is polymerized to produce useful materials like plastic, fibers and other materials by using Ziegler-Natta Catalyst ? Discuss mechanism involved in it.
2. Explain the formation of multiple metal-metal bonds.
3. Write the methods of preparation, properties, structure and bonding of Zeise's salt.
4. Define and explain organo metallic compounds. Write the classification of organo metallic compounds with suitable examples. Write the synthetic application of organo copper compound.
5. Write the mechanism of Fischer-Tropsch reaction.
6. How you will synthesize the σ bonded organo-transition metal compound.
7. Give an account of chemistry, structure and bonding π -allyl complexes of transition metals. Show the aromatic behaviour of cyclopentadienyl complexes.
8. Discuss the mechanism of oxidation of ethylene using Wacker process.
9. Prepare dinuclear clusters $(\text{Re}_2 \text{X}_8)^{2-}$ from ReO_4^- . How $\sigma_1 \pi$ and δ bonds are formed in $(\text{Re}_2 \text{O}_8)^{2-}$? Explain in details.
10. (a) What do you understand by metal nitrosyl ? How are nitroferrous and sodium nitroprusside prepared.
(b) How carbonyl of E.A.N. an 18 electron rule ? Explain it.

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NALANDA OPEN UNIVERSITY
M.Sc. Chemistry, Part-II
PAPER-XIV
(Photochemistry and Pericyclic Reaction)
Annual Examination, 2016

Time : 3 Hours.

Full Marks : 80

Answer any FIVE Questions.
All questions carry equal marks.

1. Give the mechanism of Norrish type(II) process. Which ketones are most common class of compound of β -cleavage and why ?
2. Give mechanism of Norrish type I process. How many types of carbonyl compounds gives this reaction ?
3. Discuss Zimmerman mechanism for the rearrangement given by 2, 5-dienones.
4. Give the mechanism of the chelotropic cycloaddition reaction between, (a) Alkene and Carbene, (b) Alene and SO_2 .
5. Write a note on Conrotatory motion and disrotatory motion.
6. Explain Barton reaction. Give its synthetic use and application.
7. Give the mechanism for the rearrangement of cyclo dienones. And explain the rearrangement of cyclo dienones involving diradical intermediate in presence of hydrogen donor and in absence of hydrogen donor.
8. Answer the following question for π molecule orbitals of 1, 3, 5-hexatriene.
 - (a) Which are the bonding orbitals and antibonding orbitals.
 - (b) Which orbitals are HOMO and LUMO in ground state and excited state.
 - (c) Which orbitals are symmetric and asymmetric with respect to mirror plane and C_2 axis.
9. Ketones mainly give four types of photochemical reactions. Give name of the reactions with examples.
10. Discuss photochemistry of intermolecular dimerization by (2+2) cycloaddition.

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NALANDA OPEN UNIVERSITY
M.Sc. Chemistry, Part-II
PAPER–XV
 (Organic Synthesis)
Annual Examination, 2016

Time : 3 Hours.

Full Marks : 80

Answer any FIVE Questions.
All questions carry equal marks.

- Elaborate the role of functional group inter conversion in synthesis.
- (a) Compare relative acidities of following pair
 (i) Benzene Sulphonic acid and benzoic acid.
 (ii) Alcohol and thio alcohol.
 (b) Discuss preparation, properties and use of sulphonal and mustard gas.
- Discuss the preparation and four properties of thio-ether.
- Explain the synthetic use of H₂O₂ in the oxidation of alkene to glycol.
- How organolithium compounds are prepared ? How does it react with (a) α, β unsaturated ketone, (b) Aryl halide, (c) Alkyl-Arylether. In these reactions indicate the intermediate products and mechanism involved.
- Compare the reduction using LiAlH₄ and NaBH₄. Write the mechanism for the reduction of cyclopentanone with sodium hydroxide in water.
- (a) Discuss reduction of alkyne i.e. hydrogenation by using any one of the following a catalyst/reagent. (i) Lindlar Catalysts, (ii) LiAlH₄, (iii) Dibal H.
 (b) Write the mechanism for the reduction of Cyclo-Pentanone with sodium borohydride in water.
- How sulphonic acid is prepared in Laboratory ? Give the reaction and mechanism. How does it react with following when fused at 200–300°C ?
 (a) Sodium hydroxide (b) Sulfamide.
- How are organo magnesium compound prepared ? How does Grignard reagent react with :—
 (a) Acetaldehyde (b) Formaldehyde (c) Acetone (d) Carbon dioxide
- Write notes on the following :—
 (a) Favorskii Reaction (b) Silanes.

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M.Sc. Chemistry, Part–II Programme for Practical Counselling Classes and Practical Examination, 2016
Venue : Chemistry Lab, 4th Floor, Biscamaun Bhawan, Patna
For All Old Batch Students

Counselling Class Programme		Practical Examination Programme		
Date	Time	Paper	Date	Time
01.08.2016 & 02.08.2016	11.30 AM to 5.30 PM	XII	03.08.2016	11:30 AM to 2:30 PM
		XIII	03.08.2016	2:45 PM to 5:45 PM
		XV	04.08.2016	11:30 AM to 2:30 PM
		XVI	04.08.2016	2:45 PM to 5:45 PM

For Enrollment No. 140250001 to 140250145

Counselling Class Programme		Practical Examination Programme		
Date	Time	Paper	Date	Time
05.08.2016 & 06.08.2016	11.30 AM to 5.30 PM	XII	08.08.2016	11:30 AM to 2:30 PM
		XIII	08.08.2016	2:45 PM to 5:45 PM
		XV	09.08.2016	11:30 AM to 2:30 PM
		XVI	09.08.2016	2:45 PM to 5:45 PM

For Enrollment No. 140250146 to 140250350

Counselling Class Programme		Practical Examination Programme		
Date	Time	Paper	Date	Time
10.08.2016 & 11.08.2016	11.30 AM to 5.30 PM	XII	12.08.2016	11:30 AM to 2:30 PM
		XIII	12.08.2016	2:45 PM to 5:45 PM
		XV	13.08.2016	11:30 AM to 2:30 PM
		XVI	13.08.2016	2:45 PM to 5:45 PM

NALANDA OPEN UNIVERSITY
M.Sc. Chemistry, Part-II
PAPER–XVI
 (Environmental Chemistry and Analytical Chemistry)
Annual Examination, 2016

Time : 3 Hours.

Full Marks : 80

Answer any FIVE Questions.
All questions carry equal marks.

1. What are the chemical species present in atmosphere ? What are photochemical reactions taking place in the atmosphere at different attitude ? Write equations and condition to explain you answer.
2. How the polymer and cement industry pollute our environments ? Explain it.
3. Explain Biogeochemical cycles in environments ? How do they sustain life in biosphere ?
4. Write notes on the following :—
 (a) Rf Value (b) Green House Effect
5. How SO_2 is measured in air ? How will you estimate the fluoride in the sample of water.
6. Explain D.T.A. Write instructional method for D.T.A. Explain the D.T.A curve of Leonite $\text{NiSO}_4 \cdot 6\text{H}_2\text{O}$.
7. What are heavy metals which pollute drinking water ? How will you estimate Hg and Cd in the sample of water.
8. Write the principle of Colorimetry. Derive Lambert-Beer's equations. Write the derivations from Lambert-Beer law.
9. How is soil polluted by regular addition of pesticides and fertilizers ? What is effect of these two on fertility of the soil ?
10. What 5 TGA technique ? Write the basic principle of thermo-gravimetric analysis with examples. Also discuss its principle and application.

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M.Sc. Chemistry, Part–II Programme for Practical Counselling Classes and Practical Examination, 2016
Venue : Chemistry Lab, 4th Floor, Biscomaun Bhawan, Patna
For All Old Batch Students

<i>Counselling Class Programme</i>		<i>Practical Examination Programme</i>		
<i>Date</i>	<i>Time</i>	<i>Paper</i>	<i>Date</i>	<i>Time</i>
01.08.2016 & 02.08.2016	11.30 AM to 5.30 PM	XII	03.08.2016	11:30 AM to 2:30 PM
		XIII	03.08.2016	2:45 PM to 5:45 PM
		XV	04.08.2016	11:30 AM to 2:30 PM
		XVI	04.08.2016	2:45 PM to 5:45 PM

For Enrollment No. 140250001 to 140250145

<i>Counselling Class Programme</i>		<i>Practical Examination Programme</i>		
<i>Date</i>	<i>Time</i>	<i>Paper</i>	<i>Date</i>	<i>Time</i>
05.08.2016 & 06.08.2016	11.30 AM to 5.30 PM	XII	08.08.2016	11:30 AM to 2:30 PM
		XIII	08.08.2016	2:45 PM to 5:45 PM
		XV	09.08.2016	11:30 AM to 2:30 PM
		XVI	09.08.2016	2:45 PM to 5:45 PM

For Enrollment No. 140250146 to 140250350

<i>Counselling Class Programme</i>		<i>Practical Examination Programme</i>		
<i>Date</i>	<i>Time</i>	<i>Paper</i>	<i>Date</i>	<i>Time</i>
10.08.2016 & 11.08.2016	11.30 AM to 5.30 PM	XII	12.08.2016	11:30 AM to 2:30 PM
		XIII	12.08.2016	2:45 PM to 5:45 PM
		XV	13.08.2016	11:30 AM to 2:30 PM
		XVI	13.08.2016	2:45 PM to 5:45 PM