NALANDA OPEN UNIVERSITY

M.Sc. Chemistry, Part-I

PAPER–I

(Physical Chemistry)

Annual Examination, 2018

Time : 3 Hours. **Full Marks : 80**

Answer any FIVE Questions.
All questions carry equal marks.

1. Explain the terms: (a) Clausius inequality (b) Entropy is state function.
2. Define the term Chemical potentional and show that : dG=Vdp–SdT.
3. State and derive the kinetics of consecutive reaction.
4. Write notes on any Two :
   (a) Flash photolysis
   (b) Concept of an ensembles
   (c) What do you mean by reactions with orders (i) (1,2) and (2,1).
5. Define and derive the term 'Partition function'. Show the relation between the partition function and the internal energy.
6. Write the short notes on micromolecues. Define the (i) No. av. (average) molecular) weight and (ii) the weight average molecular weight.
7. Write notes on any Two of the following :–
   (a) Laplace Equation
   (b) Boltzmann Distribution Law
   (c) Ilkovic Equation
8. Explain the following :–
   (a) An ensemble and types of ensembles
   (b) Lagrange's method of undetermined multipliers.
9. Express the term molecular interpretation of second and third law of thermodynamics, atleast one example in each case.
10. What do you understand by the term over potential ? Write notes on :
    (a) Oxygen overvoltage and
    (b) Hydrogen overvoltage.

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Examination Programme, 2018

M.Sc. Chemistry, Part-I

Date	*Papers*	*Time*	*Examination Centre*
24.05.2018	Paper–I	8.00 AM to 11.00 AM	Nalanda Open University, Patna
26.05.2018	Paper–II	8.00 AM to 11.00 AM	Nalanda Open University, Patna
28.05.2018	Paper–III	8.00 AM to 11.00 AM	Nalanda Open University, Patna
30.05.2018	Paper–IV	8.00 AM to 11.00 AM	Nalanda Open University, Patna
01.06.2018	Paper–V	8.00 AM to 11.00 AM	Nalanda Open University, Patna
05.06.2018	Paper–VI	8.00 AM to 11.00 AM	Nalanda Open University, Patna
07.06.2018	Paper–VII	8.00 AM to 11.00 AM	Nalanda Open University, Patna
09.06.2018	Paper–VIII	8.00 AM to 11.00 AM	Nalanda Open University, Patna

NALANDA OPEN UNIVERSITY

M.Sc. Chemistry, Part-I

PAPER–II

(Inorganic Chemistry)

Annual Examination, 2018

Time : 3 Hours. **Full Marks : 80**

Answer any FIVE Questions.
All questions carry equal marks.

1. (a) What are VSPER theory ?
   (b) Explain the shape and hybridization of the following :–
   (i) X_eF_6 (ii) IF_7 (iii) NH_4^+

2. Draw the molecular orbital diagram of following with the parameters of Bond order stability and magnetic properties :– (a) No_2 (b) Co_2

3. Write symmetric operation in the following molecules :—
   Hcl, NH_3, CH_4, H_2O, BF_3

4. (a) What are Lanthanide contractions ? Compare it with Actinide Contraction ?
   (b) What are the consequences of Lanthanide Contraction ?

5. Construct the character table of C_{2V} and C_{3V}.

6. What is Scintillation ? Describe the Scintillation Counter operation to detect radiation caused due to radio active substances. What are its advantages over Geiger-Muller Counter.

7. Explain $d\pi - P\pi$ bonding by giving suitable examples and write short notes on Bent rule.

8. Explain the following :–
   (a) Nuclear reactions and their types.
   (b) Nuclear shell model and liquid drop model.

9. Give the concept of (a) Groups, (b) sub-groups, (c) classes, (d) point group.

10. Write short notes on the following :–
    (a) Paramagnetic behaviour of lanthanide.
    (b) Structure of Boranes ?

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प्रायोगिक परामर्श कक्षा एवं प्रायोगिक परीक्षा का कार्यक्रम दिनांक 28.05.2018 को प्रकाशित किया जायेगा ।

NALANDA OPEN UNIVERSITY

M.Sc. Chemistry, Part-I

PAPER–III

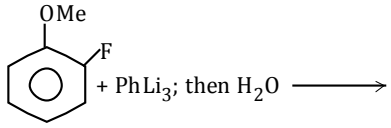
(Organic Chemistry)

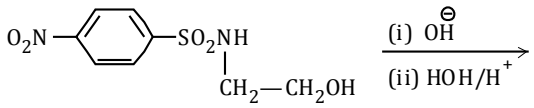
Annual Examination, 2018

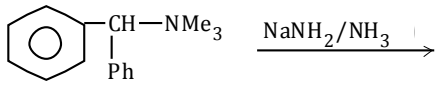
Time : 3 Hours. **Full Marks : 80**

Answer any FIVE Questions.
All questions carry equal marks.

1. Explain the mechanism of Bimolecular Elimination reaction with suitable examples.
2. Write short note on any ***Two*** of the following :—
   (a) Hammond Postulate.
   (b) Free radical rearrangement.
   (c) Sandmeyer reaction.
3. What do you understand by Carbocations ? Explain their stability.
4. Explain the mechanism of following reaction :—
   (a) Benzoin Condensation
   (b) Gattermann-Koch reaction.
5. Complete the following reaction and outline its mechanism :—

   (a) 

   (b) 

   (c) 

6. Discuss the mechanism of $ArSN_1$ Reaction. Give atleast three examples.
7. Discuss the mechanism and stereo chemistry of free radical bromination of (R) - 1 - bromo - 2 methyl butane.
8. (a) Resonance energy of benzene is much more higher than 1, 3 - butadiene, why ?
   (b) Discuss aromaticity of non-benzoid aromatic compounds.
9. What are the conditions that favour *E*1*cb* mechanism in an elimination reaction ? Illustrate with two examples.
10. Write short notes on any ***Two*** of the following :–
    (a) Aldol addition reaction.
    (b) Mannich reaction.
    (c) Perkin reaction.
    (d) Knoevenagal reaction.

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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–IV

(Solid State Chemistry & Quantum Chemistry)

Annual Examination, 2018

Time : 3 Hours. **Full Marks : 80**

Answer any FIVE Questions.
All questions carry equal marks.

1. Calculate the average distance of the electron from nucleus of Hydrogen atom in the 2s configuration ?
2. Explain the Powder method of crystal structure analysis.
3. What are perfect and imperfect crystals ? Write notes on the cohesive energy.
4. What are intrinsic and extrinsic semiconductors ? Short notes on doping of a crystal.
5. State Hermitian operator. Discuss its two important properties and explain it.
6. Write notes on the following :—
   (a) Zero-point energy.
   (b) Basic assumption of the Hückel theory of conjugated system.
7. State the variation method and show that $\int \psi^* \hat{H} \psi \, d\tau \geq E_o$, the integral can never be less than the true minimum energy of the system.
8. Define bond order. Calculate the bond-order of the following molecules :–
   (a) Ethylene
   (b) Butadiene
9. Determine the term symbol and no. of microstates of following & configuration :–
   (a) d^2 system
   (b) d^5 system
   (c) p^2 system
10. Write notes on any ***Two*** of the following :–
    (a) Difference between a conductor, semi-conductor and non-conductor.
    (b) Pauli exclusion principles.
    (c) Angular momentum operators.

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For Practical Counselling Class & Practical Examination Programme
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NALANDA OPEN UNIVERSITY

M.Sc. Chemistry, Part-I

PAPER–V

(Co-ordination Chemistry)

Annual Examination, 2018

Time : 3 Hours. **Full Marks : 80**

Answer any FIVE Questions.
All questions carry equal marks.

1. (a) Calculate the free ion ground state term and microstates of following configuration
   Ti^{+2}, Cr^{+}, Fe^{++}, Se^{++}
   (b) Explain the quenching of d-orbital contribution ?
2. (a) How does the d-orbital split in octahedral crystal field ?
   (b) Calculate the CFSE for d^3, d^4 and d^6 ion in octahedral field with strong and weak ligand ?
3. S and P terms do not split in crystal field but D and F term split. Explain.
4. Draw Molecular Orbital diagram of $[C_0(CN)_6]^{-3}$.
5. (a) Explain the selection rules for d-d transition ? When and why the selection rules break down ?
   (b) What is Spectrochemical series ?
6. (a) Discuss electronic spectra of d^1 and d^2 system in octahedral & tetrahedral electrostatic field.
   (b) Explain, by giving examples, John Tellor distortions.
7. Explain SN^1 dissociative and SN^2 associative reaction mechanism ?
8. Explain the following :–
   (a) Labile and inert complexes
   (b) Acid hydrolysis reaction
9. What is Trans-effect ? Explain the theory of Trans-effect.
10. (a) Explain magnetic moment and magnetic susceptibility and establish relation between them.
    (b) Determine the magnetic moment (μ) of following ions :–
    Fe^{+3}, V^{+2}, Co^{+2}

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For Practical Counselling Class & Practical Examination Programme
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NALANDA OPEN UNIVERSITY

M.Sc. Chemistry, Part-I

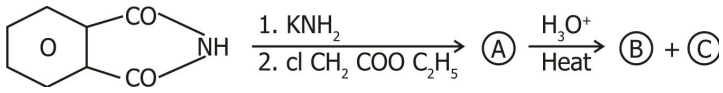
PAPER–VI

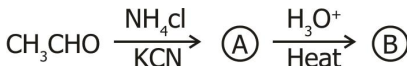
(Chemistry of Biomolecule)

Annual Examination, 2018

Time : 3 Hours. **Full Marks : 80**

Answer any FIVE Questions.
All questions carry equal marks.

1. What are Carbohydrates ? Establish the ring structure of glucose.
2. What are aminoacids ? Discuss the chemical reaction of aminoacids involving the both functional groups present in the molecule.
3. Write down the structure and synthesis of any ***Two*** of the following :—
   (a) Adenine
   (b) Guanine
   (c) Uracil
4. Write short notes on any ***Two*** of the following :—
   (a) Nicotine
   (b) Isoprene Rule
   (c) Morphine
5. What are alkaloids ? How are they classified ? Give details of Quinine.
6. Name the products of the reaction of D-glucose with the following reagents :–
   (a) NH_2OH (b) $C_6H_5NHNH_2$ (c) Br_2 / H_2O
   (d) CH_3OH / Hcl (e) CH_3I / Ag_2O
7. Predict the products of (A) and (B) in the following sequences of reactions :–
   (a) 

   (b) 

8. What are Glycosides ? Give classification of glycosides. Determine the structure of glycosides by its synthesis ?
9. What are important Lipids ? Write details about biological functions of Lipid and its metabolism ?
10. How you will carry the following conversions :–
    (a) Glucose to Fructose
    (b) Citral to Cyclocitrals
    (c) Fructose to Glucose

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For Practical Counselling Class & Practical Examination Programme
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NALANDA OPEN UNIVERSITY

M.Sc. Chemistry, Part-I

PAPER–VII

(Reaction Mechanism and Super Molecular Chemistry)

Annual Examination, 2018

Time : 3 Hours. **Full Marks : 80**

Answer any FIVE Questions.
All questions carry equal marks.

1. (a) The electron exchange reaction in $[Co(NH_3)_6]^{+2}$ to $[Co(NH_3)_6]^{+3}$ is slower than $[Fe(CN)_6]^{-4}$ to $[Fe(CN)_6]^{-3}$ why ?
   (b) Explain mixed valence complexes ?
2. (a) Describe inner and outer sphere mechanism of electron transfer reaction in complexes. Give examples.
   (b) What are non-complimentary reaction.
3. (a) Explain association and dissociative mechanism. Give examples ?
   (b) Explain $S_N CB$ mechanism by giving examples.
4. (a) What do you mean by prompt and delayed photochemical reaction ? Give examples.
   (b) Define photo substitution and explain with suitable examples.
5. Write short notes on the following :—
   (a) Excited electron transfer.
   (b) Reaction of 2-2' bipyridines.
6. Write special features of anionic bonding. Write the synthesis of crown ether ?
7. How supramolecular catalyst are similar to enzyme catalyst ? What are the difference between the two .
8. (a) Give the structure of schiffis base derived from the reaction of salicylaldehyde and ethylene diamins ?
   (b) Identify the donor sites ?
9. Write in detail about the following :–
   (a) Metal alkoxides
   (b) Acetylacetonate complexes
10. Explain the following :–
    (a) Free-ion ground state terms of d^2 configuration with its microstate number.
    (b) Optical inversion.

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For Practical Counselling Class & Practical Examination Programme
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NALANDA OPEN UNIVERSITY

M.Sc. Chemistry, Part-I

PAPER–VIII

(Natural Product)

Annual Examination, 2018

Time : 3 Hours. **Full Marks : 80**

Answer any FIVE Questions.
All questions carry equal marks.

1. What are Terpenoids ? How are they classified ? Establish the structure of Phytol.
2. Write shorts notes on the following :–
   (a) Morphine
   (b) Quinine
3. Name the different members of the class flavones, isoflavones, anthocyanins and anthocyanidins. Discuss the general method of determining the structure of flavone.
4. What are Hormones ? Draw the structure of cholesterol, cholestanol and cholestanone.
5. (a) Establish the structure of zingiberene.
   (b) Establish the structure of abietic acid.
6. Discuss biosynthesis of isoflavones.
7. (a) Discuss the structure of opianic acid.
   (b) Discuss the degradative reactions of narcotine.
8. Discuss the structure of Vitamin C and its synthesis.
9. (a) Discuss the position of the two angular methyl group in cholesterol.
   (b) Establish the structure of Vitamin B_6.
10. What are Vitamins ? Discuss the classification of Vitamins and write the important sources and their deficiency diseases ?

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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, 2018

Time : 3 Hours. **Full Marks : 80**

Answer any FIVE Questions. All questions carry equal marks.

1. (a) Which of the following nuclei do not show nuclear magnetic resonance :–
   ^{1}H, ^{2}H, ^{12}C, ^{14}N, ^{16}O, ^{13}C *and* ^{19}F.
   (b) NMR spectra are not observed in ^{12}C nuclei, because it nuclear spin quantum number :
   (i) $I = \frac{1}{2}$ (ii) $I = 0$ (iii) $I = 1$ (iv) $I = -1$.
   (c) The number of modes of bonding vibration in non-lineer molecule containing n atoms is :
   (i) 2n – 5 (ii) 3n – 5 (iii) 2n – 6 (iv) 3n – 6
   (d) The lines in a pure rotational spectrum, are not exactly equally-spaced because of the :
   (a) Decrease in bond-length (b) Large increase in bond-length
   (c) Centrifugal distortion (d) None of them
   (e) In a rotational-vibrational spectra, R-branch corresponds to transition:
   (i) $\Delta\upsilon = 1,\ \Delta J = -1$ (ii) $\Delta\upsilon = 1,\ \Delta J = 0$ (iii) $\Delta\upsilon = 1,\ \Delta J = 1$ (iv) Nome of them
2. Write notes on any two of the following :–
   (a) Selection rules for pure rotational Roman spectra of a diatomic molecules
   (b) Coupling constant
   (c) Pascal triangle
3. Express and explain the zero-point energy. Are you agree with the concept of zero-point energy ? Explain it.
4. Notes on any two of the following :
   (a) Franck-Condon Principles (b) McLaffery rearrangement (c) Beer-Lamberts law
5. Describe the basic principle of mass spectrometry. Write notes on :
   (i) Molecular ionpeak (ii) Metastable peaks
6. Explain any two of the following :–
   (a) d-d transition (b) $n \rightarrow 6$ *transition (c) Franck-condon principle
7. Answer the following :–
   (a) Coupling constant
   (b) An atom shows or gives rise to line spectra while molecules show band spectra.
8. Woodward-Fieser Rules for conjugated dienes, write and explain.
9. (a) Why TMS (Tetramethylsilane) is used as a reference compound in NMR spectroscopy.
   (b) For the detection of aldehydes and ketones, which transition is more authentic :
   $\pi \rightarrow \pi^*$ *on* $n \rightarrow \pi^*$, give the answer with reason.
   (c) Which of the following diatonic molecules do not absorb in the infra-red region :
   Hcl, ClBr, N_2, H_2, O_2
   (d) Which of the following are microwave active ?
   (i) Hcl (ii) Co_2 (iii) H_2 (iv) O_2
10. Explain the Zero-field splitting in ESR Spectroscopy.

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Examination Programme, 2018

M.Sc. Chemistry, Part–II

Date	***Paper***	***Time***	***Examination Centre***
11.06.2018	Paper–IX	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
13.06.2018	Paper–X	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
19.06.2018	Paper–XI	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
21.06.2018	Paper–XII	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
23.06.2018	Paper–XIII	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
25.06.2018	Paper–XIV	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
27.06.2018	Paper–XV	12.00 Noon to 3.00 PM	Nalanda Open University, Patna
29.06.2018	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, 2018

Time : 3 Hours. **Full Marks : 80**

Answer any FIVE Questions.
All questions carry equal marks.

1. What do you understand by the Flash photolysis ? Describe the NMR-technique in study of the flash photolysis.

2. Write notes on any ***Two*** of the following :–
   (a) Theory of acid-base catalyst.
   (b) Primary and Secondary salt effect.
   (c) Van't Hoff intermediates.

3. Describe the postulates of the Transition state theory. Compare between the collision and the transition state theories.

4. Describe the (a) Kinetic of ionic reactions (b) Kinetics of dipole-dipole reaction (c) ion-dipole reactions. Explain it with any two.

5. Write notes on any ***Two*** of the following :–
   (a) Kinetics of corrosion
   (b) Faradaic and non-Faradaic current.
   (c) Dynamic calculation vs Transition state theory.

6. Discuss the study of fast reaction ***or*** Describe the concept of the fast reaction. How the fast reaction will be studied with reference to NMR-method.

7. Describe the followings :–
   (a) Photo dissociation and recombination
   (b) Hammett equation

8. Describe the Kinetics of Corrosion. ***or*** What is Corrosion ? Describe the various factors which influence the Corrosion.

9. Explain any ***Two*** of the following terms :–
   (a) Activation Controlled Reactions.
   (b) Oscillatory Reactions
   (c) Stochiometric Number

10. A certain reaction obeys the following different law $-\frac{d[c]}{dt} = K[c]^2$: Integrate the equation if initial concentration is $[c]_0$ obtain the expression for $t^1/_2$.

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For Practical Counselling Class & Practical Examination Programme
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NALANDA OPEN UNIVERSITY

M.Sc. Chemistry, Part-II

PAPER–XI

(Molecular Thermodynamics)

Annual Examination, 2018

Time : 3 Hours. **Full Marks : 80**

Answer any FIVE Questions.
All questions carry equal marks.

1. Derive the expression for the translational partition function of a molecule.
2. Derive the expression for the internal energy and entropy in terms of the partition function.
3. Compare between the macro-canonical ensemble, canonical and the grand canonical ensembles.
4. State and derive the Bose-Einstein statistics.
5. Write notes on any ***Two*** of the following :–
   (a) Microscopic reversibility.
   (b) Legrange method's of undetermined multiplier.
   (c) Specific heat of solids.
   (d) Thermodynic reversibility.
6. Entropy production due to heat flow inside the system in irreversible processes. Explain it.
7. Compare between the Maxwell-Boltzmann's, Bose-Einstein's and the Fermi-Dirac' statistics.
8. Describe the Liouville's theorem and its mathematical interpretation.
9. $s = K_B \ln W$, where W is the thermodynamic probability. Derived it K_B is Boltzmann's constant.
10. Short notes on the following :–
    (a) Dulong and Petit's law.
    (b) Vibrational partition function.

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NALANDA OPEN UNIVERSITY

M.Sc. Chemistry, Part-II

PAPER–XII

(Ligand Field Theory)

Annual Examination, 2018

Time : 3 Hours. **Full Marks : 80**

Answer any FIVE Questions.
All questions carry equal marks.

1. How can the following be distinguished by IR spectroscopy ?
   (a) NO^{+} (b) NO^{-}

2. (a) Explain the application of IR in linkage isomerism.
   (b) Explain L - S and J - J coupling.

3. (a) Explain Hund's rules.
   (b) Find out total microstates term of d^2 system.
   (c) Calculate spin orbit coupling constant λ in a d^2 system.

4. (a) Assign the ground state term for Mn^{+2} and V^{+2} ions ?
   (b) How does the term ^4F split by spin orbit coupling.

5. Write notes on the following :–
   (a) Racah parameters
   (b) Non-crossing Rule

6. (a) Explain Tanabe-Sugano diagram of d^2 system.
   (b) The octahedral complex of Cr^{+3} has three absorption bands at 34,400, 22700 and 14900 Cm^{-1}. Calculate Δ_0 and B^1

7. (a) Explain John-Teller distortion giving example of the spectra of $\left[T_i\left(H_2O\right)_6\right]^{+3}$ and $\left[Cu\left(H_2O\right)_6\right]^{+2}$.
   (b) What is Vibronic coupling.

8. Explain the application of ESR spectroscopy in the study of Inorganic Chemistry ?

9. Explain the mode of ligand bonding and application of IR spectroscopy in its discussion ?

10. Write short notes on any ***Two*** of the following :–
    (a) Nephelauxetic Ratio
    (b) Spin cross over phenomenon
    (c) Condon shortley parameters

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NALANDA OPEN UNIVERSITY

M.Sc. Chemistry, Part-II

PAPER–XIII

(Organotransition Metal Chemistry and Metal Clusters)

Annual Examination, 2018

Time : 3 Hours. **Full Marks : 80**

Answer any FIVE Questions.
All questions carry equal marks.

1. Give the concept of the formation of multiple metal-metal bonds ? What are the evidences in support of metal-metal bond and quadruple bonds ?

2. What is metal nitrosyl ? Explain the structure of nitrosyl ? Explain the EAN for central metal atom in Nitrosyl with the example of

   (a) $\left[Fe^{-2}\left(NO^{+}\right)_2\left(Co_2\right)\right]$ (b) $\left[Co^{+3}\left(NO^{-}\right)(CN)_5\right]^{-3}$

3. What is Zeigler-Natta catalyst ? How ethylene is polymerised to produce useful material like plastic, fibres and PVC ? Discuss mechanism involved in it ?

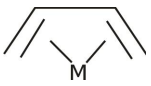
4. Give the concept of organometallic compounds ? Write the methods of preparation and structure of Zeise's salt ?

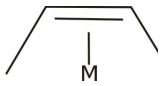
5. What are the steps involved in Wacker's process ? Explain the mechanism of wacker's process in the oxidation of ethylene ?

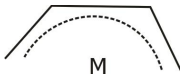
6. What is OXO process ? Give the importance of OXO process ? Explain the mechanism of Hydroformylation of olefin using $HCo(CO)_4$ catalyst ?

7. How you will synthesize the σ bonded organo-transition metal compounds ?

8. (i) Explain the following notation :–

   (a) 

   (b) 

   (c) 

   (ii) Exhibit by the notation of back bonding from the filled metal orbitals to acceptor π^* orbital ?

9. Explain the following :–
   (a) Oxidative addition and reductive elimination process.
   (b) Catalytic reaction of olefin hydrogenation using Wilkinson catalyst.

10. Write short notes on any ***Two*** of the following :–
    (a) Synthesis of metal elusters.
    (b) MO treatment for 3 centres-2 electron Bond formation in B_2H_6 molecule.
    (c) Zintal ions.

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NALANDA OPEN UNIVERSITY

M.Sc. Chemistry, Part-II

PAPER–XIV

(Photochemistry and Pericyclic Reaction)

Annual Examination, 2018

Time : 3 Hours. **Full Marks : 80**

Answer any FIVE Questions. All questions carry equal marks.

1. Give mechanism of Norrish type I process. How many types of carbonyl compounds gives this reaction ?
2. Write a note on Conrotatory motion and disrotatory motion.
3. Explain Barton reaction. Give its synthetic use and application.
4. Give the mechanism for the rearrangement of cyclo dienones and explain the rearrangement of cyclodienones involving diradical intermediate in presence of hydrogen donor and in absence of hydrogen donor.
5. Ketones mainly give four types of Photochemical reactions. Give name of the reactions with examples.
6. Discuss photochemistry of intermolecular dimerisation (2+2) cycloaddition.
7. Write short notes on the following :–
   (a) Photochemistry of aromatic compounds. (b) Franck Condon Principle.
8. Discuss Zimmerman mechanism for the rearrangement given by 2, 5-dienones.
9. Give π molecular diagram of :–
   (a) 1, 3-Pentadiene (b) 1, 3, 5 heptatriene
10. Give the mechanism of Norrish type (II) process. Which ketones are most common class of compound of β-cleavage and why ?

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M.Sc. Chemistry, Part–II Programme for Practical Counselling Classes and Practical Examination, 2018
Venue : Chemistry Lab, 4th Floor, Biscomaun Bhawan, Patna

For Enrollment No. 120250001 to 120250244, 130250001 to 130250350, 140250001 to 140250333 & 150250001 to 150250150

Counselling Class Programme		*Practical Examination Programme*		
Date	***Time***	***Paper***	***Date***	***Time***
09.07.2018 & 10.07.2018	11.00 AM to 5.00 PM	XII	11.07.2018	11:30 AM to 2:30 PM
		XIII	11.07.2018	2:45 PM to 5:45 PM
		XV	12.07.2018	11:30 AM to 2:30 PM
		XVI	12.07.2018	2:45 PM to 5:45 PM

For Enrollment No. 150250151 to 150250450

Counselling Class Programme		*Practical Examination Programme*		
Date	***Time***	***Paper***	***Date***	***Time***
13.07.2018 & 14.07.2018	11.00 AM to 5.00 PM	XII	16.07.2018	11:30 AM to 2:30 PM
		XIII	16.07.2018	2:45 PM to 5:45 PM
		XV	17.07.2018	11:30 AM to 2:30 PM
		XVI	17.07.2018	2:45 PM to 5:45 PM

For Enrollment No. 150250451 to 150250480 & 160250001 to 160250180

Counselling Class Programme		*Practical Examination Programme*		
Date	***Time***	***Paper***	***Date***	***Time***
18.07.2018 & 19.07.2018	11.00 AM to 5.00 PM	XII	20.07.2018	11:30 AM to 2:30 PM
		XIII	20.07.2018	2:45 PM to 5:45 PM
		XV	21.07.2018	11:30 AM to 2:30 PM
		XVI	21.07.2018	2:45 PM to 5:45 PM

For Enrollment No. 160250181 to 160250323

Counselling Class Programme		*Practical Examination Programme*		
Date	***Time***	***Paper***	***Date***	***Time***
23.07.2018 & 24.07.2018	11.00 AM to 5.00 PM	XII	25.07.2018	11:30 AM to 2:30 PM
		XIII	25.07.2018	2:45 PM to 5:45 PM
		XV	26.07.2018	11:30 AM to 2:30 PM
		XVI	26.07.2018	2:45 PM to 5:45 PM

For Enrollment No. 160250324 to 160250500

Counselling Class Programme		*Practical Examination Programme*		
Date	***Time***	***Paper***	***Date***	***Time***
27.07.2018 & 28.07.2018	11.00 AM to 5.00 PM	XII	30.07.2018	11:30 AM to 2:30 PM
		XIII	30.07.2018	2:45 PM to 5:45 PM
		XV	31.07.2018	11:30 AM to 2:30 PM
		XVI	31.07.2018	2:45 PM to 5:45 PM

NALANDA OPEN UNIVERSITY

M.Sc. Chemistry, Part-II

PAPER–XV

(Organic Synthesis)

Annual Examination, 2018

Time : 3 Hours. **Full Marks : 80**

Answer any FIVE Questions. All questions carry equal marks.

1. Discuss the preparation and four properties of thio-ether.
2. How organolithium compounds are prepared ? How does it react with (a) α, β unsaturated ketone, (b) Aryl halid, (c) Alkyl-Arylether. In these reactions indicate the intermediate products and mechanism involved.
3. (a) Discuss reduction of alkynes i.e. hydrogenation by using any one of the following a catalyst/reagent. (i) Landler Catalysts, (ii) $LiAlH_4$.
   (b) Write the mechanism for the reduction of Cyclo-Pentanone with Sodium borohydride in water.
4. Discuss preparation, properties and use of sulphonal and mustard gas.
5. How are organomagnesium compound prepared ? How does Grignard reagent react with :—
   (a) Acetaldehyde (b) Formaldehyde (c) Acetone (d) Carbondioxide
6. 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) Sodamide.
7. Write notes on the following :— (a) Prevost Reaction (b) Aldol reaction.
8. Elaborate the role of functional group interconversion in synthesis.
9. Write the mechanism of any two of the following :–
   (a) Claisen rearrangment (b) Cope rearrangment (c) Pinacol-Pinacolane rearrangment
10. What are Silanes ? How are they named ? Name the following compounds :–
    (a) $CH_3\ HSi\left(NH_2\right)_2$ (b) $\left(CH_3\right)_2\ SiCl_2$ (c) $\left(C_2H_5\right)_2\ SiHOOCCH_3$
    (d) $C_2H_5Si\left(OH\right)_3$ (e) $H_3Si\left(SiH_2\right)_3\ SiH_3$

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M.Sc. Chemistry, Part–II Programme for Practical Counselling Classes and Practical Examination, 2018
Venue : Chemistry Lab, 4th Floor, Biscomaun Bhawan, Patna

For Enrollment No. 120250001 to 120250244, 130250001 to 130250350, 140250001 to 140250333 & 150250001 to 150250150

Counselling Class Programme		*Practical Examination Programme*		
Date	***Time***	***Paper***	***Date***	***Time***
09.07.2018 & 10.07.2018	11.00 AM to 5.00 PM	XII	11.07.2018	11:30 AM to 2:30 PM
		XIII	11.07.2018	2:45 PM to 5:45 PM
		XV	12.07.2018	11:30 AM to 2:30 PM
		XVI	12.07.2018	2:45 PM to 5:45 PM

For Enrollment No. 150250151 to 150250450

Counselling Class Programme		*Practical Examination Programme*		
Date	***Time***	***Paper***	***Date***	***Time***
13.07.2018 & 14.07.2018	11.00 AM to 5.00 PM	XII	16.07.2018	11:30 AM to 2:30 PM
		XIII	16.07.2018	2:45 PM to 5:45 PM
		XV	17.07.2018	11:30 AM to 2:30 PM
		XVI	17.07.2018	2:45 PM to 5:45 PM

For Enrollment No. 150250451 to 150250480 & 160250001 to 160250180

Counselling Class Programme		*Practical Examination Programme*		
Date	***Time***	***Paper***	***Date***	***Time***
18.07.2018 & 19.07.2018	11.00 AM to 5.00 PM	XII	20.07.2018	11:30 AM to 2:30 PM
		XIII	20.07.2018	2:45 PM to 5:45 PM
		XV	21.07.2018	11:30 AM to 2:30 PM
		XVI	21.07.2018	2:45 PM to 5:45 PM

For Enrollment No. 160250181 to 160250323

Counselling Class Programme		*Practical Examination Programme*		
Date	***Time***	***Paper***	***Date***	***Time***
23.07.2018 & 24.07.2018	11.00 AM to 5.00 PM	XII	25.07.2018	11:30 AM to 2:30 PM
		XIII	25.07.2018	2:45 PM to 5:45 PM
		XV	26.07.2018	11:30 AM to 2:30 PM
		XVI	26.07.2018	2:45 PM to 5:45 PM

For Enrollment No. 160250324 to 160250500

Counselling Class Programme		*Practical Examination Programme*		
Date	***Time***	***Paper***	***Date***	***Time***
27.07.2018 & 28.07.2018	11.00 AM to 5.00 PM	XII	30.07.2018	11:30 AM to 2:30 PM
		XIII	30.07.2018	2:45 PM to 5:45 PM
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NALANDA OPEN UNIVERSITY
M.Sc. Chemistry, Part-II
PAPER–XVI
(Environmental Chemistry and Analytical Chemistry)

Annual Examination, 2018

Time : 3 Hours. **Full Marks : 80**

Answer any FIVE Questions. All questions carry equal marks.

1. What are heavy metals which pollute drinking water ? How will you estimate Hg and Cd in water sample.
2. Write notes on : (a) Green House Effect, (b) Arsenic in drinking water and its hazardous effect on health.
3. How SO_2, CO_2, NO_2 pollutants gas are measured. How these gasses damage our health system in society ?
4. How is soil polluted by regular addition of pesticides and fertilizers ? What is effect of these two on fertility of the soil ?
5. Explain Biogeochemical cycles in environments ? How do they sustain life in biosphere ?
6. What is smog ? What are its mechanism ? How does it harms the human life and other living World ?
7. Explain the following :— (a) Rf value (b) TLC (c) TGA
8. Write the basic principle of Colorimetry ? Derive Lambert-Beer's equations ? Write the derivation from Lambert-Beer Law ?
9. What short of Industrial Pollution is extracted from sugar, distillery and thermal power plant industry ? Explain.
10. Write notes on any ***Two*** of the following :–
    (a) Acid rain (b) Measuring of BOD and COD (c) Photochemical reaction in atomosphere

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M.Sc. Chemistry, Part–II Programme for Practical Counselling Classes and Practical Examination, 2018
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For Enrollment No. 120250001 to 120250244, 130250001 to 130250350, 140250001 to 140250333 & 150250001 to 150250150

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For Enrollment No. 150250151 to 150250450

Counselling Class Programme		*Practical Examination Programme*		
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For Enrollment No. 150250451 to 150250480 & 160250001 to 160250180

Counselling Class Programme		*Practical Examination Programme*		
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For Enrollment No. 160250181 to 160250323

Counselling Class Programme		*Practical Examination Programme*		
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For Enrollment No. 160250324 to 160250500

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