Nalanda Open University
Annual Examination - 2014
B.Sc. Chemistry (Honours), Part-I
Paper-I

Time: 3.00 Hrs. **Full Marks: 80**

*Answer any **Five** questions. All questions carry equal marks.*

1. Mention the postulate of Kinetic theory of gases. Deduce Kinetic gas equation and establish Charl's and Avogadro Law from it.
2. How does Vander Waal equation explain the behaviour of real gas? Deduce expression for reduced equation of state for gas.
3. What do you understand by ionic product of water? Establish relation between ionic product of water and degree of hydrolysis of a salt of strong acid and weak base?
4. (a) Explain the meaning and significance of ψ and $\psi 2$.
   (b) Write a brief note on Panli exclusion principle.
5. (a) Write down the electronic configuration of the following ion :-

   Fe^{3+}, Fe^{++}, Cu^{+}, Hg^{++}, Pb^{++}, K^{+}, Cr^{+++}

   atomic number → 26, 26, 29, 80, 82, 19, 24

   (b) What are the values of *n*, *l*, *m* and *s* for the last electron that enters in the following atoms:

   Cr, CO, K, Br

   atomic number → 24, 27, 19, 35
6. (a) What is the origin of line spectra in atoms?
   (b) Even though hydrogen atom has only one electron, its spectra have many line. Why?
7. What are Chief ores of Silver. How silver extracted from silver ion. How does silver chloride react in the aqueous solution of sodium cynide and the product so obtained is allowed to react with zinc in alkaline medium?
8. Write down the important ores of Boron. How is boron extracted from its ore? Describe the diagonal relationship between boron & Silicon. How does boron react with : (i) H_2SO_4 (ii) NaOH
9. Define inisation potential, electron affinity and electronegativity. Discuss the factors which affect these three.
10. (a) NaCl has f.c.c. structure. How many Na^+ and Cl^- are there in unit cell.
    (b) CsCl has a body centred cubic (b.c.c) structure. How many Cs^+ and Cl^- are there in unit cell.

Examination Programme, 2014
B.Sc (Part – I) All Honours Subjects
Except Home Science and Geography Honours

Date	Papers.	Time	Examination Centre
12/6/2014	(Hons) P-I	8 to 11 am	Nalanda Open University, Patna
14/6/2014	(Hons) P-II	8 to 11 am	Nalanda Open University, Patna
16/6/2014	Rastrabhsha-100 or Hindi +Urdu 100	8 to 11 am	Nalanda Open University, Patna
18/6/2014	Botany (Sub) P-I	8 to 11 am	Nalanda Open University, Patna
19/6/2014	Math (Sub) P-I	8 to 11 am	Nalanda Open University, Patna
20/6/2014	Geography (Sub) P-I	8 to 11 am	Nalanda Open University, Patna
21/6/2014	Chemistry (Sub) P-I	8 to 11 am	Nalanda Open University, Patna
23/6/2014	Physics (Sub) P-I	8 to 11 am	Nalanda Open University, Patna
24/6/2014	Home Scince (Sub)-P I	8 to 11 am	Nalanda Open University, Patna
25/6/2014	Zoology (Sub) P-I	8 to 11 am	Nalanda Open University, Patna

Nalanda Open University
Annual Examination - 2014
B.Sc. Chemistry (Honours), Part-I
Paper-II

Time: 3.00 Hrs. **Full Marks: 80**

*Answer any **Five** questions. All questions carry equal marks.*

1. What do you mean by relative lowering of vapour pressure? How it is related with molecular weight of non-volatile substance? Describe Oswald and Walker method for the determination of relative lowering of vapour pressure.
2. Why does a solution exhibit abnormal osmotic pressure? What is Van't Hoff factor and how is it related to degree of dissociation of an electrolyte?
3. What are alcohols and how are they classified? How will you distinguish between primary, secondary and tertiary alcohols? Give equations wherever possible.
4. (a) Give the I.U.P.A.C of the following compounds
   (i) $CH_3–CH_2–CH=CH–CH–CH_2–COOH$
   (ii) $CH_3\ C(CH_3)_2\ CH_2\ CH_2–\underset{\displaystyle P}{\underset{|}{C}}–CH_3$
   (iii) $CH_3\ CH=\ \underset{\displaystyle CH_2CH_3}{\underset{|}{CH}}–CH_2\ CH=CH$
   (iv) $CH_3–CH–C=C–CH_3$
   (b) Write the structural formulae of the following compounds: -
   (i) 3 - Bromohex -1, 3, 5 triene (ii) 1 - Chloro-4-mellyl - pentane zone
   (iii) 3 - mellyl -1 methoxy butane (iv) Hexane -1, 6 - dioic acid
5. How is ethylace to acetate prepared? Give the mechanism of the reaction. How are the following compounds obtained from Ethiylacetoacetate
   (i) Methyl ethyl ketone (ii) Propionic Acid
   (iii) Succinic Acid
6. What is the chief source of Citric Acid? How is it obtained in the pure state establish the structure of citric acid?
7. Discuss any three general methods of preparing corboxylic acids. How will convert:
   (i) RCOOH into RCH_2COOH (ii) RCOOH into RCH_2OH
8. Write the methods of preparation, proportions of thio alcohol and thioelker.
9. Write notes on any two of the following :-
   (i) Hyper Conjugation (ii) Electromeric effect (iii) Inductive effect
10. Explain the form :-
    (i) Isothermal Change (ii) Adiabetic Change
    (iii) State function (iv) Reversible process

Practical Programme

Programme of B.Sc. Part-I Chemistry (Hons.) Practical Counselling and Examination-2014

Venue- Chemistry Lab, 4th Floor, Biscomaun Bhawan, Patna

Counselling Class

Date	Time	Batch	Roll no.
30/06/2014 to 02/07/2014	11:15 to 3:15 PM	C1	120470009 to 120470037 130470001 to 130470017
03/07/2014 to 05/07/2014	11:15 to 3:15 PM	C2	130470018 to 130470047

Practical Examination

Date	Time	Batch	Paper	Roll No.
07/07/02014	11:30 to 2:30 PM	C1	I	120470009 to 120470037 130470001 to 130470017
	2:45 to 5:45 PM		II	"
08/07/02014	11:30 to 2:30 PM	C2	I	130470018 to 130470047
	2:45 to 5:45 PM		II	"

Nalanda Open University

Annual Examination - 2014

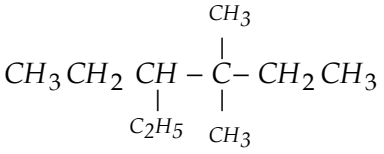
B.Sc. Chemistry (Subsidiary), Part-I

Paper-I

Time: 3.00 Hrs. **Full Marks: 80**

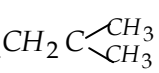
*Answer any **Five** questions. All questions carry equal marks.*

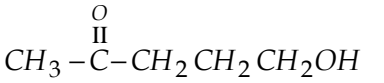
1. Deduce an expression for work done in an ideal gas in a reversible Isothermal process.
2. What do you understand by concentration cell ? How is cell constructed ? Deduce expression for a concentration cell prepared by silver electrode using different concentration in canode and cathode.
3. Give I.U.P.A.C names of the following compounds :-

(a) 

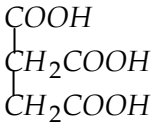
(b) $(CH_3CH_2).{}_4C.$

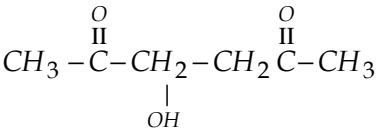
(c) $CH_3CH(Cl_2)CH(C_2H_5)CH_3$

(d) 

(e) 

(f) $C_2H_5.CH.CH.CH_2CHO$

(g) 

(h) 

4. (a) Why is Carbon tetravalent ?
   (b) Choose the correct option from the following statement.
   (i) Which of the following properties of carbon is mainly responsible for its ability to form a large number of compounds:
   (m) Tetravalency (n) Ability to form multiple bonds (o) Ability to form ring compounds (p) Catenation.
   (ii) Which of the following methods is employed for the estimation of nitrogen in an organic compounds ?
   (m) The Liebig method (n) The carious method (o) The Duma's method (p) Lassaigne's method.
   (iii) In Lassaigni's test for nitrogen in an organic compound, The prussian blue colour is obtained due to formation of
   (m) $Na_4[Fe(CN)6]$ (n) $Fe_4[Fe(CN)6]_3$ (o) $Na_2[Fe(CN)6]$ (p) $Fe_3[Fe(CN]6$
   (iv) H-C-H bond angle in CH_3 is
   (m) 120^o (n) 180^o (c) 109^o (p) Slightly less chain 109^o
5. Distinguish between order of reaction and molecularity of reaction ? Derive an expression of rate constant of first order reaction ? What is its unit ?
6. Explain the terms (a) Components (b) Phases (c) degree of freedom.
7. What is the chief source of citric acid ? How is it obtained in pure state ? Establish the structure of citric acid.
8. How is oxalic acid obtained ? How does it react with following :
   (a) Glycerol (b) Pcl_5 (c) $KMno_4$ in acid medium.

9. Define isomerism. What are the types of structural isomerism ? Give suitable example to explain them.

10. Write short notes on :
    (i) Addition reaction (ii) Substitution reaction (iii) Elimination reaction.

Programme of B.Sc. Chemistry (Subsidiary), Part-I
Practical Counselling Class and Examination, 2014
***Venue :* 4th Floor, Biscomaun Bhawan, Patna**

Programme of B.Sc. Part-I Chemistry Subsidiary Practical Counselling Class-2014

Date	*Time*	*Batch*	*Subsidiary Paper*	*Honours Papers & Roll No.*
12.07.2014	11:30 to 3:30 PM	S1	Chemistry	All Old Students of Math (Hons.) & 130490001 to 130490025
14.07.2014	11:30 to 3:30 PM	S2	Chemistry	130490026 to 130490054
15.07.2014	11:30 to 3:30 PM	S3	Chemistry	130490055 to 130490090
16.07.2014	11:30 to 3:30 PM	S4	Chemistry	130490091 to 130490136
17.07.2014	11:30 to 3:30 PM	S5	Chemistry	All Botany (Hons.) Students
18.07.2014	11:30 to 3:30 PM	S6	Chemistry	All B.Sc. Geography (Hons.) Students
19.07.2014	11:30 to 3:30 PM	S7	Chemistry	All Old Students of Physics (Hons.) & 130500001 to 130500028
21.07.2014	11:30 to 3:30 PM	S8	Chemistry	130500029 to 130500068
22.07.2014	11:30 to 3:30 PM	S9	Chemistry	130500069 to 130500111
23.07.2014	11:30 to 3:30 PM	S10	Chemistry	All Old Students of Zoology (Hons.) & 130510001 to 130510036
24.07.2014	11:30 to 3:30 PM	S11	Chemistry	130510037 to 130510085

Programme of B.Sc. Part-I Chemistry Subsidiary Practical Exam-2014

Date	*Time*	*Batch*	*Subsidiary Paper*	*Honours Papers & Roll No.*
25.07.2014	11:30 to 2:30 PM	S1	Chemistry	All Old Students of Math (Hons.) & 130490001 to 130490025
25.07.2014	2:45 to 5:45 PM	S2	Chemistry	130490026 to 130490054
26.07.2014	11:30 to 2:30 PM	S3	Chemistry	130490055 to 130490090
26.07.2014	2:45 to 5:45 PM	S4	Chemistry	130490091 to 130490136
28.07.2014	11:30 to 2:30 PM	S5	Chemistry	All Botany (Hons.) Students
28.07.2014	2:45 to 5:45 PM	S6	Chemistry	All B.Sc. Geography (Hons.) Students
30.07.2014	11:30 to 2:30 PM	S7	Chemistry	All Old Students of Physics (Hons.) & 130500001 to 130500028
30.07.2014	2:45 to 5:45 PM	S8	Chemistry	130500029 to 130500068
01.08.2014	11:30 to 2:30 PM	S9	Chemistry	130500069 to 130500111
01.08.2014	2:45 to 5:45 PM	S10	Chemistry	All Old Students of Zoology (Hons.) & 130510001 to 130510036
02.08.2014	11:30 to 2:30 PM	S11	Chemistry	130510037 to 130510085

Nalanda Open University
Annual Examination - 2014
B.Sc. Chemistry (Honours), Part-II
Paper-III

Time: 3.00 Hrs. **Full Marks: 80**

*Answer any **Five** questions. All questions carry equal marks.*

1. Explain work function and Gibb's free energy. Derive Gibb's-Helmbltor equation.
2. How is potential developed in a cell? What is function of a salt bridge in a cell? What is difference between primary and secondary cell?
3. Discuss the position of chromium in the periodic table. Write the name & formula of natural ores of chromium. How can you obtain $K_2Cr_2O_7$ from chromite iron ore? How can you obtain chromyl chloride from $K_2Cr_2O_7$? Write important alloys of chromium.
4. Write short notes on :-
   (a) Silica Gel (b) Silicones (c) Sodium thio sulphate
5. Prepare hydroxyl amine by two methods. Discuss its oxidising and reducing behaviours. What are its uses.
6. What are important ores of Nickel? Isolate large amount of Nickel in pure state from its Sudbury ore. Explain that nickel shows properties of transaction elements.
7. (a) Write down the IUPAC name of the following complexes:-
   (i) $K_4[CrF_6]$ (ii) $[Pb(OH)_4]^{2-}$ (iii) $[Pt(NH_3)_4]$ $[PtCl_4]$ (iv) $[Ag(NH_3)_2]Cl$
   (b) Write down the formula of following given complexes according to IUPAC :-
   (i) Tetra hydroxozineate (II) ion
   (ii) Pentammineaquo Cobalt (III) chloride
   (iii) Tetraquodichloro chromium (III) nickel
   (iv) Tris (ethylene diamine) Cobalt (III) chloride
8. What are salient feature of valence theory for the complex formation. Write down its limitation. Explain, why $[Ni\ (CN)_4]^{2-}$ is diamagnetic and squar plannar?
9. (a) How copper is estimated volumetrically by iodometric titralim.
   (b) Write down the principle and process to estimate the amount Ba^{++} in the given solution $BaCl_2$.
10. What do you understand by terms given below used in Nuclear Chemistry.
    (i) Nuclear Stability (ii) Packing faction and (iii) Mass defeet

Examination Programme, 2014
(Bachelor Of Science (Part-II)
All Subjects Except B.Sc Geography & Home Science (Honours)

Date	Paper	Time	Name of Examination Centre
21/5/2014	HONOURS PAPER – III	3.30 to 6.30 pm	Nalanda Open University, Patna
23/5/2014	HONOURS PAPER – IV	3.30 to 6.30 pm	Nalanda Open University, Patna
27/5/2014	(SUB.) (Mathematics - II)	8.00 to 11.00 am	Nalanda Open University, Patna
28/5/2014	(SUB.) (Home Science- II)	**12.00 to 3.00 pm**	Nalanda Open University, Patna
29/5/2014	(SUB.) (Chemistry - II)	8.00 to 11.00 am	Nalanda Open University, Patna
30/5/2014	(SUB.) (Zoology - II)	8.00 to 11.00 am	Nalanda Open University, Patna
31/5/2014	Hindi 100 orUr 50+Hn50	**3.30 to 6.30 pm**	Nalanda Open University, Patna
02/6/2014	(SUB.) (Botany - II)	8.00 to 11.00 am	Nalanda Open University, Patna
02/6/2014	(SUB.) (Physics- II)	8.00 to 11.00 am	Nalanda Open University, Patna
04/6/2014	(SUB.) (Geography -II)	8.00 to 11.00 am	Nalanda Open University, Patna

For Practical Exam Programme Please See Back Page

Nalanda Open University
Annual Examination - 2014
B.Sc. Chemistry (Honours), Part-II
Paper-IV

Time: 3.00 Hrs. **Full Marks: 80**

*Answer any **Five** questions. All questions carry equal marks.*

1. State and explain conformation. Explain conformations of Ethane and Cyclohexane.
2. Write notes on :-
   (a) Brownian movement (b) Tyndal effect (c) Hardy-Schultz rules
3. What is Grignard Reagent? How Grignard reagents can be prepared. How can you obtain the following with the help of Grignard reagents :-
   (i) Primary alcohol (ii) Secondary alcohol (iii) Tertiary alcohol (iv) Carboxylic acid
4. How is the structure of D-glucose established?
5. What are amino acids? Give formulae and names of any two amino acids. Give general methods for the preparation of amino acids. Write a short notes on Strecker's synthesis of amino acid.
6. How nitrobenzene is prepared in the laboratory? And also prepare it from benzene diazonium chloride. Give its reduction products in acid/alkaline/neutral medium. And also give equations in support of your answer.
7. (a) How is benzaldelyde prepared from :
   (i) Benzene (ii) Benzoyl chloride (iii) Toluene
   (b) Write notes on :-
   (i) Benzoin condensations (ii) Cannizzaro reaction
8. Write notes on following reaction :-
   (i) Sand meyer reaction (ii) Claisen condensation
9. What do you understand by Kohlrausch Law. What are the application of Kohlrausch Law.
10. How would you introduce the following in an aromatic ring?
    (i) $-Cl$ (ii) $-COOH$ (iii) $-COCH_3$

Examination Programme, 2014
(Bachelor Of Science (Part-II)
All Subjects Except B.Sc Geography & Home Science (Honours)

Date	Paper	Time	Name of Examination Centre
21/5/2014	HONOURS PAPER – III	3.30 to 6.30 pm	Nalanda Open University, Patna
23/5/2014	HONOURS PAPER – IV	3.30 to 6.30 pm	Nalanda Open University, Patna
27/5/2014	(SUB.) (Mathematics - II)	8.00 to 11.00 am	Nalanda Open University, Patna
28/5/2014	(SUB.) (Home Science- II)	**12.00 to 3.00 pm**	Nalanda Open University, Patna
29/5/2014	(SUB.) (Chemistry - II)	8.00 to 11.00 am	Nalanda Open University, Patna
30/5/2014	(SUB.) (Zoology - II)	8.00 to 11.00 am	Nalanda Open University, Patna
31/5/2014	Hindi 100 orUr 50+Hn50	**3.30 to 6.30 pm**	Nalanda Open University, Patna
02/6/2014	(SUB.) (Botany - II)	8.00 to 11.00 am	Nalanda Open University, Patna
02/6/2014	(SUB.) (Physics- II)	8.00 to 11.00 am	Nalanda Open University, Patna
04/6/2014	(SUB.) (Geography -II)	8.00 to 11.00 am	Nalanda Open University, Patna

Programme of B.Sc. Part-II Chemistry (Hons.),
Practical Counselling Class and Examination, 2014

Venue:- ***Chemistry Lab, 4th Floor, Biscomaun Bhawan, Patna***

(A) Practical Counselling Class

Date	*Time*
05.06.2014 to 07.06.2014	11:30 AM to 3:30 PM

(B) Practical Examination

Date	*Time*	*Paper*
09.06.2014	11:30 AM to 2:30 PM	III
	2:45 PM to 5:45 PM	IV

Nalanda Open University

Annual Examination - 2014

B.Sc. (Honours), Part-II

Paper - Chemistry (Subsidiary)

Time: 3.00 Hrs. **Full Marks: 80**

*Answer any **Five** questions. All questions carry equal marks.*

1. Choose the correct answer from the following statements and given option :-
   (i) Transition elements are :
   (a) s-block elements (b) p-block elements
   (c) d-block elements (d) f-block elements
   (ii) Which of the following compounds is expected to exhibits colour :
   (a) $CaCl_2$ (b) KCl (c) $AlCl_3$ (d) $FeCl_3$
   (iii) Which of the following has maximum number of unpaired electrons :
   (a) Zn (b) Cu (c) Ni (d) Mn
   (iv) Oxidation number of central metal ion in the $[Fe(CN)_6]^{-4}$ is :
   (a) +4 (b) –4 (c) +2 (d) Zero
   (v) As lung cancer may be caused by :
   (a) Dust of Asbestos
   (b) Small particles of Silica
   (c) Dust & Smoke & exhaust produced from textiles industry
   (d) Dust and exhaust produced from paper industry
   (vi) Which acid in the following, is present maximum in acid rain :
   (a) HNO_3 (b) HCl (c) H_2CO_3 (d) H_2SO_4
   (vii) The killer in "Bhopal Disaster" was :
   (a) Carbon Monoxide (b) Phosgen
   (c) Methyl Isocynide (d) Hydrogen Sulphide
   (viii) Pyrolusite is the ore of :
   (a) Co (b) Mn (c) Cr (d) Fe
2. (a) Write the IUPAC name of the following complex :
   (i) $[Co(NH_3)_6]\ [Cr(CN)_6]$ (ii) $[Co(CO)_6]$
   (iii) $[Cr(en)_3]Cl_3$ (iv) $K_4[Fe(CN)_6]$
   (b) Write the formulae for the following according to IUPAC rules :
   (i) Potassium troxalato cobaltate (III) (ii) Tetrammine chlro nitro cobalt (III)
   (iii) Hexammine nickel (II) ion (iv) Tetracynonickelate (II) ion
3. (a) Define the following terms :
   (i) Double salt (ii) Ligand (iii) Co-ordination number
   (b) Differentiate between double salt and co-ordination compounds. Give an example of each.
4. Explain giving reasons :
   (i) Most of transition metals are paramagnetic.
   (ii) Transition metals exhibits variable valency.
   (iii) Compounds of transition metals are usually coloured.
   (iv) Zn and Cd are soft metals.
5. Write short notes on any **Two** of the following :-
   (a) Allotropy (b) Zeolites (c) Fullerenes
6. Discuss the position of halogen in periodic table. What are reasons in late isolation of fluorine? Give properties and uses of fluorine.
7. What are the ores of Cobalt? How cobalt in pure state is obtained from its ore? Describe its oxidation states.
8. What do you understand by Water Pollution? How are water pollutants classified? Discuss the various methods available for waster water treatment.
9. What is precipitation titration? Give the principle for the volumetric estimation of Ag.
10. Describe the principle involved in the determination of nickel ion in the solution gravimetrically.

Nalanda Open University
Annual Examination - 2014
B.Sc. Chemistry (Honours), Part-III
Paper-V

Time: 3.00 Hrs. **Full Marks: 80**

Answer any five questions. All questions carry equal marks.

1. (a) State and explain the following terms :-
   (i) Phase (i) Component (iii) degree of freedom, used in the study of heterogenous equilibria.
   (b) Find the number of phases, number of components and degree of freedom in the following system :
   $CaCO_3(s) \rightleftharpoons CaO(s) + 2CO_2(g)$
2. What is meant by enzyme catalysis? Why are they specific in their action? How will you explain that enzymes catalysed reaction has an optimum pH at which the activity of enzymes is maximum.
3. (a) What is fluorescence and phosphorescence?
   (b) Describe fluorescence and phosphorescence on the basis of Jablonski diagram.
4. (a) What do you mean by the 'Void' in the crystal lattice? Explain the difference between tetrahedral void and octahedral void.
   (b) What do you mean by co-ordination number of constituents of a crystal? Explain it with example.
5. What do you understand by adsorption? Discuss Freundlich adsorption isotherm. To what extent it explains experimental data.
6. Deduce expression for the 3rd order reaction given that the initial concentration of all the three reactants are same and stoichiometric co-efficient is one for each of the three reactants.
7. What is meant by polariability of a molecule? Derive the Clausius-Mossotti equation for determining molar polarization in terms of relative permittivity of the medium and induced polarizability of molecule.
8. What is Miller indices of the planes of a crystal lattice? Show that all parallel planes of any crystal lattice have same Miller indices.
9. Write short notes on :-
   (i) Molar refractivity (ii) Crystal defect (iii) Lambert Beez Law
10. What are the postulates of the theory of absolute rate of reaction? Deduce expression for the rate constant.

Examination Programme-2014
B.Sc (Part–III)
Botany, Chemistry, Mathematics, Physics and Zoology (Honours)

Date	3.30 to 6.30 P.M.	Examination Centre
20/5/2014	Honours Paper–V	Nalanda Open University, Patna
22/5/2014	Honours Paper–VI	Nalanda Open University, Patna
24/5/2014	Honours Paper–VII	Nalanda Open University, Patna
26/5/2014	Honours Paper–VIII	Nalanda Open University, Patna
28/5/2014	Paper –XV (General Studies)	Nalanda Open University, Patna

For Practical Exam Programme Please See Back Page

Nalanda Open University
Annual Examination - 2014
B.Sc. Chemistry (Honours), Part-III
Paper-VI

Time: 3.00 Hrs. **Full Marks: 80**

Answer any five questions. All questions carry equal marks.

1. What are the basic postulates of valence bond theory for the formation of complex compounds. Describe on the basis of this theory of complexes (having their co-ordination number of four or six) with suitable examples. What are the differences between inner and outer complexes? What are limitations of this theory?
2. What do you mean by the dual nature of a particle? Derive an expression for the de-Broglie relationship. How was it verified.
3. What are the important ores of Vanadium? Give the details of extraction of pure vanadium from its ore? Explain the important oxidation state of vanadium and also assign reason or reasons for it.
4. What is Ferrocene? How it is prepared? Give the structure ferrocene? Discuss its important reactions.
5. Write down the important ores of Platinum? How platinum is extracted from sudburry ore? Why platinum metal is called noble metal? Discuss its important types of platinum metal and their uses.
6. Write down notes on the following :-
   (a) Symmetry Operation (ii) Point Group (iii) Element of Symmetry
7. Elaborate role of Sodium, Potassium and Magnesium in the plants and animals.
8. Explain on the basis of Molecular orbital theory as why :-
   (a) Oxygen molecule is a paramagnetic and a nitrogen molecule is diamagnetic.
   (b) Hydrogen forms diatomic molecules where as helium forms monatomic molecules only.
9. Discuss the main postulates of Quantum Machinery.
10. Discuss the reasons which make liquid NH_3 suitable medium for carrying out reactions. Explain the following type of reaction in liquid NH_3.
    (i) Precipitation Reaction (ii) Solvolysis Reaction

Examination Programme-2014
B.Sc (Part–III)
Botany, Chemistry, Mathematics, Physics and Zoology (Honours)

Date	3.30 to 6.30 P.M.	Examination Centre
20/5/2014	Honours Paper–V	Nalanda Open University, Patna
22/5/2014	Honours Paper–VI	Nalanda Open University, Patna
24/5/2014	Honours Paper–VII	Nalanda Open University, Patna
26/5/2014	Honours Paper–VIII	Nalanda Open University, Patna
28/5/2014	Paper –XV (General Studies)	Nalanda Open University, Patna

Programme of B.Sc. Part-III Chemistry (Hons.),
Practical Counselling Class and Examination, 2014

Venue:- ***Chemistry Lab, 4th Floor, Biscomaun Bhawan, Patna***

(A) Practical Counselling Class

Date	*Time 11:30 AM to 1:30 PM*	*Time 1:30 PM to 3:30 PM*	*Time 3:30 PM to 5:30 PM*
29.05.2014	Paper-VII	Paper-VI	Paper-V
30.05.2014	Paper-VII	Paper-VI	Paper-V
31.05.2014	Paper-V	Paper-VIII	Paper-VIII

(B) Practical Examination

Date	*Time 11:30 AM to 2:30 PM*	*Time 2:30 PM to 5:30 PM*
02.06.2014	Paper-VI	Paper-V
03.06.2014	Paper-VII	Paper-VIII

Nalanda Open University
Annual Examination - 2014
B.Sc. Chemistry (Honours), Part-III
Paper-VII

Time: 3.00 Hrs. **Full Marks: 80**

Answer any five questions. All questions carry equal marks.

1. Explain the following statement :-
   (a) Cyclobutaidene is not an aromatic compound.
   (b) Cyclopropenly cation is aromatic but cyclopropenyl anion is not aromatic.
   (c) Methyl group in toluene is an activator and ortho and para director for further substitution.
   (d) Pyrrole is a weakly acidic where as pyridine is weakly basic.
2. How has constitution of uric acid been determined. Also give synthetic evidence in favour of the accepted structure of uric acid.
3. How will you prove the presence of two fused benzene rings in napthalen. How will you convert napthalene into (i) β napthol (ii) α napthylamine
4. What are flavones? Discuss the degradative and synthetic method to establish the structure of flavone. How is a flavone related to a flavanil?
5. Discuss preparation, mechanism and application of any two of the following reagents:
   (i) Lithium aluminium hydride (ii) Hydrogen peroxide
   (iii) Periodic acid
6. Discuss with suitable examples:-
   (a) Plane of symmetry (b) Reflection of symmetry
7. Describe the synthesis of quinoline by Skraup and Fridlander method. How does quinoline react with (a) Mixture of funring $HNO_3 + H_2SO_4$ and (b) Sodamide
8. Give the synthesis of the following dye :
   (i) Methyl Orange (ii) Malachite Green
   (iii) Congo red (iv) Phenolphthalein
9. Discuss the theory of orientation based on the stability of intermediate carbonium ion to interpret the ortho-para and meta directing influence if substituents already present in benzene ring.
10. (a) What is meant by anti-Markovnikov i.e. Kharssh Peroxide effect.
    (b) Explain interms of inductive effect on acidity order as given below $ClCH_2COOH > HCOOH > CH_3COOH$.

Programme of B.Sc. Part-III Chemistry (Hons.),
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(A) Practical Counselling Class

Date	*Time* *11:30 AM to 1:30 PM*	*Time* *1:30 PM to 3:30 PM*	*Time* *3:30 PM to 5:30 PM*
29.05.2014	Paper-VII	Paper-VI	Paper-V
30.05.2014	Paper-VII	Paper-VI	Paper-V
31.05.2014	Paper-V	Paper-VIII	Paper-VIII

(B) Practical Examination

Date	*Time* *11:30 AM to 2:30 PM*	*Time* *2:30 PM to 5:30 PM*
02.06.2014	Paper-VI	Paper-V
03.06.2014	Paper-VII	Paper-VIII

Nalanda Open University
Annual Examination - 2014
B.Sc. Chemistry (Honours), Part-III
Paper-VIII

Time: 3.00 Hrs. **Full Marks: 80**

Answer any five questions. All questions carry equal marks.

1. What do you understand by term acid rain? What are the sources of acid rain? Give the theory & mechanism of the acid-rain formation. What are the effects of acid rain?
2. List the different regions of the electro-magnetic spectrum with (i) wave number range (ii) the wave length in Å.
3. How are water pollutants classified? Discuss the important characteristic of waste water. Discuss the various methods suitable for primary waste water treatment. What are the major objectives of the secondary waste water treatments.
4. Define the term 'Chromopohre'. How will you detect the presence of >C = 0 group in aldehyde and ketone.
5. What are the composition of soil and which soil is essential for plant growth. Discuss micro and macro elements necessary for the growth of the plants.
6. Explain the effect of an harmonicity on vibrational spectra of diatomic molecule.
7. Write the difference between Fertilizer and mannure. Write four characteristic of fertilizer. What is the process of production of urea from ammonia.
8. Differentiate between addition polymerization and condensation polymerization with suitable example. Write the repeating units in Neoprene and Teflon polymers.
9. (a) What is meant by the term chemical shift in an nmr spectrum?
   (b) Describe the splitting of signals with suitable example.
10. (a) What are chemical fuel? Describe how the Calorific value of a solid fuel is determined by using a bomb calorimeter.
    (b) What are advantages of gaseous fuel over liquid fuel?