KKI-6262-63-64-65-66-67 Seat No._____

M.Sc. (Sem. III) Examination

November/December – 2014

Paper - CHN-604(B), (D), (RM), (NEW), (C) & (E)

1. CHN-604(B) : Inorganic (Photoinorganic Chemistry) (ELE-Course)
2. CHN-604(D) : Chemistry - (Environmental Chemistry)
3. CHN-604(RM) : Chemistry - (Research Methodology)
4. CHN-604(New) : Chemistry - (Organic Photochemistry) (Elective)
5. CHN-604(C) : Physical Chemistry - (Biophysical Chemistry)
6. : CHN-604(E) : Chemistry - (Bioorganic Chemistry)

Time : Hours] [Total Marks : 50

1. CHN-604(B) : Inorganic (Photoinorganic Chemistry) (ELE-Course)

1 Answer any **three** : 20

(1) Discuss the chemical kinetics for rediative process.

(2) Give the comparison of excited states of metal complexes with organic compounds.

(3) Explain the charge-transfer spectra with proper example.

(4) Develop the equation for redox potentials of the excited states.

(5) Write a note on photosubstitution and photooxidation reactions.

2 Answer any **three** : 20

(1) Give the comparisition of excited state of Ruthenium complex for reducing and oxidising character.

(2) Discuss the metal complexes of 1,10-Phenonthroline complexes.

(3) Discuss the effect of dipole moment on strengths of acid and base.

(4) Write a note on flash photolysis and its stopped flow techniques.

(5) Explain the franck-condon principle for photochemical process.

3 Answer any **five** : 10

(1) Write the two metals heaving semiconducting property ?

(2) What is dipole moment ?

(3) What is bimolecular deactivation ?

(4) What is redox potential ?

(5) What is semi conductor ?

(6) What is charge-transfer spectra ?

(7) What is sensitizer ?

2. CHN-604(D) : Chemistry - (Environmental Chemistry)

Instructions : (1) All questions are compulsory.

(2) Figures given on right side indicates marks.

(3) There is no overall choice. However, an internal choice has been provided in each question.

Section - I

Que. 1 **Answer the following.**

a. Define biogeochemical cycle and explain their significance to living organisms. **05**

b. Explain the hydrological cycle on the Earth and give its importance. **05**

OR

a. Briefly explain the carbon cycle and its importance. **05**

b. Write a note on heat budget of the Earth. **05**

Que. 2

a. Define BOD and COD. Explain their significance in determining water pollution. 05

b. Enlist aquatic pollutants and discuss their fate in the environment. 05

OR

a. Describe the analytical method for determining BOD and give its advantages and ;limitations. **05**

b. Describe the principle of COD measurement and give merit and limitations of the method. **05**

Que. 3			
	a.	What is residual chlorine and chlorine demand with reference to potability of water?	**05**
	b.	Discuss the micro and macro nutrients in soil and their importance to the living world.	**05**
		OR	
	a.	What are fertilizers? Differentiate between chemical and biofertilizers with their advantages and limitations.	**05**
	b.	What are pesticides? Why these compounds are considered recalcitrant? How these are threat to the environment?	**05**
Que. 4	**a.**	Write a note on chemical composition of atmosphere.	**05**
	b.	What is photochemical smog? How it is harmful to the environment?	**05**
		OR	
		Write short notes on the following :	**05**
	a.	Chlorofluorocarbons	
	b.	Acid rain	**05**
Que. 5	**a.**	Explain briefly the pollution effects of cement industry on human and agriculture crops.	**05**
	b.	How pharmaceutical industry is hazardous to environment?	**05**
		OR	
		Write short notes on the following:	
	a.	Green chemistry	**05**
	b.	Biological degradation and decomposition of wastes	**05**

3. CHN-604(RM) : Chemistry - (Research Methodology)

Instruction: Attempt all the questions.

Que-1 Write the answer of any three. **(20)**

a) Give an account on Fundamental and Applied research.
b) How the sample collection and data generation play a key role in research?
c) Write a note on the importance of Literature survey.
d) Discuss the significance of Research.
e) Give the details of basic features of a good research design.
f) Give a difference between quantitative and qualitative research.

Que-2 Write the answer of any three. **(20)**

a) Write a note on Dependent and Independent variables.
b) On which basic postulates the research hypotheses are created?
c) Discuss the types of research in brief.
d) Give a note on the comparison of research activities of state universities with central universities.
e) How the sophisticated instruments and subjective software are helpful in research?
f) Give a brief note on the problems face in India for research.

Que-3 Write the answer of any ten. **(10)**

a) What is ISRO? Give the name of its present chairman.
b) Write the full name of DST and CSIR.
c) Give only names of type for DATA collection methods.
d) What is independent variable?
e) What is good research design?
f) Write the full name of ICC and ICS, which are working for popularization of chemical sciences.
g) What is the maximum amount is allotted for Minor and Major Research Project by UGC.
h) Write the two names of software used for research in chemistry.
i) Write the names of two Gujarati scientist who have provided their contribution in research.
j) Write the name of any funding agency at the Gujarat level.
k) Give two names of international repute Indian Research Journal in Chemistry.
l) What is ISSN number?

4. CHN-604(New) : Chemistry - (Organic Photochemistry) (Elective)

1 (a) Answer any two of the following : **10**

(1) Explain the Dual nature of matter of electromagnetic radiation.

(2) Discuss the measurement of Quantum yield.

(3) Explain geometrical isomerism with example.

(b) Answer any two of the following : **6**

(1) Give a determination of rate constants of reaction.

(2) Write a note on actinometry.

(3) Write a note on photodissociation.

(c) Answer any one of the following : **4**

(1) Explain the mechanism of transfer of excitation energy.

(2) Short note : Rearrangement of 1, 4-Diene.

2 (a) Answer any two of the following : **10**

(1) Explain the intramolecular reaction of cyclo hexadienones.

(2) Discuss photoaddition reactions in aromatic compounds.

(3) Explain Barton reaction.

(b) Answer any two of the following : **6**

(1) Discuss the formation of oxetane.

(2) Explain substitution reaction of aromatic compounds.

(3) Explain singlet molecular oxygen reactions.

(c) Answer any one of the following : **4**

(1) Explain photochemistry of vision.

(2) Explain Photo-fries rearrangement.

3 Answer the following in short : **10**

(1) Give a types of excitation in organic molecules.

(2) What is Phosphorescene ?

(3) Give a reasons for low quantum yield.

(4) Define Adiabatic reaction.

(5) Define Photo degradation of polymer.

(6) Distinguish intermolecular and intramolecular reactions.

(7) Define Smog.

(8) Define Homolytic and Heterolytic cleavage.

(9) Give two reactions of cope rearrangement.

(10) What is Dimerization ?

5. CHN-604(C) : Physical Chemistry - (Biophysical Chemistry)

Instruction : All questions are compulsory.

1 Answer any three of the following : **20**

(1) Discuss Role of DNA and RNA in living system.

(2) Explain Hydrolysis of ATP.

(3) Give introduction to protein folding problem.

(4) Describe structures of polypeptide and protein.

(5) Discus hydrogen ion titration curves.

2 Answer any three of the following : **20**

(1) Explain thermodynamics of biopolymer solution.

(2) Discuss ion transport through cell membrane.

(3) Describe light scattering method.

(4) Discuss electrophoresis and rotational motions.

(5) Explain muscular contraction and energy generation in mechanochemical system.

3 Answer any two of the following : **10**

(1) Describe chain configuration of macro-molecules.

(2) Write a note on hydrophobic forces.

(3) Discuss diffusion method for biopolymers.

6. : CHN-604(E) : Chemistry - (Bioorganic Chemistry)

1 (a) Answer any **two** : **10**

(1) Write short note on "Proximity effects".

(2) Discuss the Chemical and Biological properties of enzymes.

(3) Discuss the Fischer's Lock and Key model.

(4) Write a short note on use of Inhibitors.

(b) Answer any **two** : **10**

(1) Describe transition state theory.

(2) Explain typical enzyme mechanisms for chymotrypsin.

(3) Nucleophilic displacement on a phosphorous atom in enzymes.

(4) Describe enolic intermediates in isomerization reaction.

2 (a) Answer any **two** : **10**

(1) Write a short note on structure and biological function of coenzyme A.

(2) Discuss the biological function of Vitamin B_{12}.

(3) Explain in detail prosthetic groups.

(4) Explain the function of the following :
(a) NAD^+ (b) $NADP^+$ (c) FAD

(b) Answer any **two** : **10**

(1) What are crown ethers ? Which function group Linkage is involved in crown ethers ? Draw structure for crown ether 14 and crown ether 18.

(2) What is Host Guest Chemistry ?

(3) Define Enzyme. Give clinical uses of enzymes.

(4) Explain in brief the formation of syrup from corn starch.

3 Answer the following questions : **10**

(1) Write the full form of ATP.

(2) Difference between carboxylation and decarboxylation.

(3) Is removal of water molecule known as condensation ? Yes/No

(4) Which metal is present in Vitamin B_{12}.

(5) Which enzyme is used in cheese making ?

(6) Difference between NAD^+ and $NADP^+$.

(7) What are Calix arenas ?

(8) Thiamine pyrophosphate is a coenzyme. True or False

(9) What is acid-base catalysis ?

(10) What are bio-mimetic ?