



ABT-2211-12-13 Seat No. \_\_\_\_\_

**M. Sc. (Sem. III) Examination**

**November / December - 2016**

**Chemistry : Paper - II**

1. CHN - 602 (O) : Organic Chemistry
2. CHN - 602 (I) : Inorganic Chemistry
3. CHN - 602 (P) : Electro Chemistry  
(New Course)

Time : 3 Hours]

[Total Marks : 70

**1. CHN - 602 (O) : Organic Chemistry**

**Instruction :** All questions are compulsory and carry equal marks.

1. Answer any two of the following questions : 14

- (1) What is the importance of safety in plant ?  
What are the precautions to be taken to prevent fire and in use of hazardous chemicals in plant ?
- (2) With illustrations, compare batch and continuous processes.
- (3) Explain drying and filtration techniques with their industrial importance.
- (4) What is unit process ? Give its importance in industrial organic chemistry. Discuss industrial importance of halogenation.

- 2 Answer any two of the following questions : 14
- (1) Give types of detergents. Discuss synthesis and uses of alkyl aryl sulphonate and alkyl sulphonates.
  - (2) Discuss the manufacture of fatty acids and fatty alcohols.
  - (3) What is fixatives ? Discuss animal fixatives.
  - (4) Write a note on 'Food Additives' and 'Preservatives'.
- 3 Answer any three of the following questions : 14
- (1) Discuss the method of production and industrial uses of cotton seed oil.
  - (2) Write a note on plant hormones.
  - (3) Describe plant nutrients.
  - (4) Give a detailed account on phosphorous containing insecticides.
  - (5) Write a note on fungicides and rodenticides.
- 4 Answer any three of the following questions : 14
- (1) Discuss the manufacture of acetate rayon.
  - (2) Explain the manufacture of paper from pulp.
  - (3) Give the process of manufacturing of sugar.
  - (4) Explain carboxylation and acetylation reactions for the manufacturing of salicylic acid derivatives.
  - (5) Give synthesis and uses of cimetidine and piperazine citrate.

5 Answer any seven of the following questions : 14

- (1) What are the reagents used for the hydroxylation reaction ?
- (2) Give major differences between unit process and unit operation.
- (3) Write some specifications for patents.
- (4) Give the structure and uses of monosodium glutamate.
- (5) Write any two characteristics of eco-friendly detergent.
- (6) Distinguish and give two examples each of drying and non-drying oils.
- (7) What is weedicides ? Classify them.
- (8) Give reaction for preparation of methoxychlor insecticides.
- (9) What is calendering ?
- (10) Give structure of phenobarbital and valium.

## 2. CHN - 602 (I) : Inorganic Chemistry

- 1 (a) Answer any two questions from the following : 8
- (1) Discuss the structure and importance of Myoglobin.
  - (2) Describe the mechanism of enzyme action in biological system.
  - (3) Explain : Hemerythrins as Oxygen carrier molecule.
- (b) Answer any one question from the following : 6
- (1) Write a short note on Iron Sulphur proteins.
  - (2) Discuss on Ferritin act as iron storage compound.
- 2 (a) Answer any two questions from the following : 8
- (1) Discuss the biological system of Zinc.
  - (2) Write a short note on Hemocyanins.
  - (3) Explain biochemistry of Molybdenum.
- (b) Answer any one question from the following : 6
- (1) Briefly account on biochemistry of Vanadium, chromium and nickel.
  - (2) Explain biochemistry of Tungsten.
- 3 (a) Answer any two questions from the following : 8
- (1) Explain Reductive Elimination process.
  - (2) Discuss briefly the role of Organo Metallic Compound in carboxylation reaction.
  - (3) Write a short note on Migration Reaction.

- 7 (b) Answer any one question from the following : 6
- (1) Discuss in detail of Water Gas Shift reaction
  - (2) Explain the Fischer Tropes process.
- 4 (a) Answer any two questions from the following : 8
- (1) Write Synthesis, Isotopes, Physical, Chemical properties of Plutonium.
  - (2) Discuss the chemistry of Americium
  - (3) Discuss the comparative study between Lanthanide and Actinide.
- (b) Answer any one question from the following : 6
- (1) Explain chemistry of Neptunium
  - (2) Write note on Extension of Modern Periodic table.
- 5 Answer any seven questions from the following : 14
- (1) Define Metallo porphyrins
  - (2) Write a electronic configuration of  $Cm^{+3}$  and  $Gd^{+3}$ .
  - (3) Which isotopes of plutonium was used in manhattan project during second world war ? Write any one synthesis reaction of Pu.
  - (4) How many elements have been discovered recent year ? Write Atomic no. and symbol of them.
  - (5) Write Allotropes of plutonium.
  - (6) What is Zeise's salt ?
  - (7) Define organo metallic compound.
  - (8) Draw the structure of haemoglobin.
  - (9) Write colour of trans urenic elements.
  - (10) What is Bioinorganic chemistry ?

### 3. CHN - 602 (P) : Electro Chemistry (New Course)

#### Instructions :

- (1) All questions are compulsory.
- (2) Figures to the right indicate maximum marks.
- (3) Answer the questions accurately and appropriately.

Constants :

$$h = 6.625 \times 10^{-34} \text{ J.S,}$$

$$R = 8.314 \text{ J/K mol,}$$

$$k_B = 1.38 \times 10^{-23} \text{ J/K,}$$

$$N_A = 6.023 \times 10^{23} \text{ per mol}$$

- 1 (a) Answer any two of the following questions : 10
- (1) What is transference number ? Describe an experimental method for determination of ionic mobility.
  - (2) Elaborate Debye-Falkenhagen effect and Wein effect with illustrations.
  - (3) Describe the electrolytic dissolution theory of solutions. Discuss influence of solvent on dissolution.
- (b) Solve any one of the followings : 4
- (1) At 25°C equivalent conductances of infinitely dilute solutions of HCl, sodium acetate and NaCl are 420, 90 and 120 mho cm<sup>2</sup>/equiv. respectively. Calculate equivalent conductance of acetic acid at infinite dilution at the same temperature.

- (2) At 25°C the limiting equivalent conductivities of barium and sulphate ions are 63.6 and 79.8 mho cm<sup>2</sup>/equiv. If the specific conductivity of saturated barium sulphate solution and ultra pure water at the same temperature are  $5.68 \times 10^{-6}$  and  $5.5 \times 10^{-8}$  mho/cm respectively, what will be solubility of the sparingly soluble barium sulphate salt in the water ?

2 (a) Answer any two of the following questions : 14

- (1) Define the term dissociation constant of an acid. Describe a conductometric method for the determination of dissociation constant of acetic acid.
- (2) Write a brief resume on the 'solvents'.
- (3) What is amphoteric electrolytes ? Describe an EMF method for determination of dissociation constant of amino acid.

3 Answer any two of the following questions. 14

- (1) Discuss the advantages and limitations of the various theories of hydrogen over voltage.
- (2) Elaborate reversible oxidation and reduction process. Describe the applications and factors effecting electrolytic reduction and electrolytic oxidation.
- (3) Write a brief resume on 'Polarization'.

4 Answer any two of the following questions : 14

- (1) Elaborate the mechanisms of various electrokinetic phenomena.
- (2) What is streaming potential ? Derive an equation for streaming potential. Explain the effect of positive ions on zeta-potential with illustration.
- (3) Discuss quantum aspects of charge transfer processes in electrode kinetic phenomena.

5 Answer any seven of the following short questions. 14

- (1) Arrange the following solvents in their increasing order of polarity : water, ethanol, toluene.
- (2) Acid-base is relative property – Justify the statement with examples.
- (3) What is iso-electric point of an amino acid ?
- (4) Which factors do affect the transport number ?
- (5) Which cation has the greatest ionic mobility in water ? Why ?
- (6) Define the terms : Decomposition and dissolution potentials.
- (7) Rusting is a chemical process – Comment on the statement.
- (8) What is the driving force in 'electro-osmosis' ?
- (9) What is moving phase in 'electro-phoresis' ?
- (10) Compare the zeta potential with streaming potential.