

Roll No.

41256

**B. Sc. (Hons.) Mathematics 4th Semester
Examination – May, 2019**

CHEMISTRY-IV

Paper : BHM-245 Opt.-ii

Time : Three hours]

] Maximum Marks : 60

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting not more than *two* questions from each Section.

SECTION – I

1. (a) Define auto-ionisation. Write self ionization reaction of : H_2O , NH_3 , SO_2 . 4
- (b) Explain the nature of $SOCl_2$, Na_2SO_3 as acid /base in liquid SO_2 as a solvent. 4
- (c) Write down the general characteristics of Lanthanides. 4
2. (a) Give points of similarities between lanthanides and actinides. 5

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- (b) Explain Bronsted-Lowry Acid & Base concept with example. 5
- (c) Why Actinides have more tendency to form complexes than actinides. 2
3. (a) Define Lewis acid and Lewis base with an example. 3
- (b) Select following as acid and base with reason : $AlCl_3, H_2O, NH_3, HCl$. 4
- (c) Explain Hard & Soft Acid & Base concept with example. 3
- (d) Name the Lanthanide which is radioactive. 1
- (e) Define Transuranic elements with example. 1

SECTION – II

4. (a) Explain 3rd law of thermodynamics along with their application. 3
- (b) Derive Clausius-Claypeyron equation. 5
- (c) Write a note on : 4
- (i) Weston standard cell
- (ii) Standard Hydrogen Electrode
5. (a) Explain the spontaneity of the process in terms of : 6
- (i) Free energy
- (ii) Enthalpy
- (iii) Entropy
- (b) Define : 2
- (i) Standard electrode potential
- (ii) Activity

(2)

8. (a) What is the structure of : 2
- (i) Formalin
 - (ii) Acetophenone
- (b) Explain reactivity order among aldehydes and ketones towards nucleophilic addition reaction on the basis of : 4
- (i) Inductive effect
 - (ii) Steric effect.
- (c) Explain the mechanism of following reaction : 6
- (i) Aldol condensation
 - (ii) Wittig reaction
- (a) Write the following reactions : 8
- (i) Gabriel Phthalimide reaction
 - (ii) Hofmann bromamide reaction
 - (iii) Benzoin condensation
 - (iv) Diazotisation reaction
- (b) Do the following conversions : 4
- (i) Aniline into Acetanilide
 - (ii) Ethanamine into Ethyl-isocyanide
 - (iii) Ethanal into Acetone
 - (iv) Propanone into Iodoform