PG – 229

I Semester M.Sc. Examination, January/February 2018
(CBCS Scheme)
CHEMISTRY
C-104 : Biophysical, Bio-Organic and Medicinal Chemistry

Time : 3 Hours Max. Marks : 70

PART – A
(Biophysical Chemistry)

Time : 1½ Hours Marks : 35

***Instruction**: Answer question no. **1** and **any three** of the remaining.*

1. Answer **any five** of the following : **(5×1=5)**
   a) How do you account for a spontaneous process based on change in free energy ?
   b) Define isoelectric point of a amino acid with an example.
   c) What are hydrophobic interactions ?
   d) Write Vant Hoff equation and explain the terms involved in the equation.
   e) What is the role of semipermeable membrane ?
   f) If equimolar solutions of NaOH and CH_3COOH is titrate. Determine the value of pKa at half equivalence point. Given pH = 3.56.

2. a) Calculate the standard change in redox potential of the following biological redox system.

   $X \rightarrow X^+ + e^-$, $E^\circ = -2.89\,V$

   $Y^+ + e^- \rightarrow Y$, $E^\circ = -1.12\,V$

   b) Describe the hydrolytic reactions in biological system with an example.
   c) Define ionic product of water. Explain the method for its determination. **(3+3+4=10)**

3. a) What is pKa ? Write the relevance of pH and pKa in biopolymers.
   b) What is meant by buffer ? Explain the buffer action and its importance in biological system.
   c) Explain the effect of pH on ΔG° in biochemical reaction. **(4+3+3=10)**

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4. a) Explain the concept of average molecular weight of biopolymers. How is osmometry used to determine the average molecular weight ?

   b) Discuss the various bonding forces in biological molecules. (5+5=10)

5. a) Explain the mechanism of ion transport phenomena through the cell membrane.

   b) Write a note on the following :

      i) Hydrogen ion titration curve.

      ii) Significance of chemical potential. (5+5=10)

PART – B

(Bio-organic and Medicinal Chemistry)

Time : 1½ Hours Marks : 35

***Instruction** : Answer question no. **1** and **any three** of the remaining.*

1. Answer **any five** of the following : (5×1=5)

   a) What are cyclophones ? Give an example.

   b) Distinguish between fatty acids and lipids.

   c) What are liposomes ? Point out their biological significance.

   d) What are metabolites and antimetabolites ?

   e) Give an example for homologation.

   f) What are soft drugs ? Give an example.

2. a) Write a note on calixarenes.

   b) What are micelles ? Discuss their biological significance.

   c) What are crown ethers ? Explain their selective binding with cations taking suitable examples. (4+3+3=10)

3. a) What are ketone bodies ? How they are produced ? Mention their biological significance.

   b) Sketch the biosynthesis of lipids.

   c) Give an example for : even and odd chain fatty acids, saturated and unsaturated fats. **(3+5+2=10)**

4. a) What are biological and chemical deterences ?

   b) What is IC_{50} value ? How it can be determined ?

   c) How drugs are classified based on their therapeutic action ? Explain. **(4+3+3=10)**

5. a) Explain the procedure followed in the drug design.

   b) What is bioisosterism ? With suitable example explain how bioactivity can be improved ?

   c) What are prodrugs ? How are they classified ? Give examples for each type with site of bioactivation. **(4+3+3=10)**