

# SHRI RAMSWAROOP MEMORIAL UNIVERSITY

## Problem Set-I

Session	2018-2019 (Odd Sem.)	Semester	III
Course	B. Tech.	Subject code	BBT3009
Branch	BT	Subject Name	Biochemistry
Group	31,32	Name of Faculty member	Prof. Sanjiv Kumar Maheshwari
Unit	I	Topic covered	Water, acid, base, pH, Henderson and Hasselbalch's equation, Vitamins

**Note: All questions are compulsory.**

### Section-A Very Short Answers type questions.

(10x1=10)

1. Define acid and base.
2. What do you mean by pH?
3. Write relationship between pH and pKa.
4. Enlist fat soluble vitamins along with their chemical names.
5. Write down some biological fluids having pH of acidic, neutral and alkaline range.
6. Describe importance of hydrogen bonds.
7. Differentiate between co-valent and non-covalent bonds.
8. Write briefly about conjugate base and acid pair with example.
9. Define buffers with at least two examples.
10. Why water is rated as Universal solvent?

### Section-B Short Answer type questions.

(5x4=20)

1. Derive Henderson and Hasselbalch's equation for weak acid.
2. What are buffers? Write note on Buffering capacity.
3. Calculate pH of  $10^{-8}$  M HCl solution. Calculate concentration of  $[\text{OH}^-]$  in a solution of a compound which has pH = 4
4. Enumerate some properties of water which makes it suitable for biological systems.
5. Arrange the following bonds on the basis of their stability - hydrogen, covalent, non-covalent and ionic bonds, also explain the reasons for the stability.

### Section-C Long Answer type questions.

(2x10=20)

1. Describe the structure of water molecule. Explain the reasons for its polar nature. Why do chemical reactions takes place so quickly in aqueous environment.
2. What are vitamins? Classify vitamins on the basis of solubility. Enumerate various functions and diseases caused by various vitamin deficiency.

### Text Book / Reference Book:

1. Conn, E. & Stumpf, P. (2009) Outlines of Biochemistry, John Willey Publications, USA
2. Berg, J.M., Tymoczko, J.L. and Stryer, L. (2012) Biochemistry (5<sup>th</sup> Ed), WH Freeman New-York

(Signature of Faculty with date)

*Sanjiv*  
28/8/18

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28/8/18