UTTARAKHAND OPEN UNIVERSITY, HALDWANI (NAINITAL)

M.Sc.First Year Chemistry

Last Date of Submission: ***15 May, 2015***

Course Title: Mathematics, Biology, Spectroscopy, and Computer
Course Code: CHE504
Year: 2014-15 **Maximum Marks: 40 Marks**

Section 'A'

Section 'A' contains 08 short answer type questions of 5 marks each. Learners are required to answers 4 questions only. Answers of short answer-type questions must be restricted to 250 words approximately.

Briefly discuss the following:

1. Find the polar coordinates of the point P whose Cartesian coordinates are $(-\sqrt{3}, 1)$.
2. Describe brief application of Ultraviolet Spectroscopy.
3. Identified a compound which gives the following data:

i. UV: 280nm, E_{max} 6600

ii. IR: 3460 (v, sh), 3035(m), 1605(m), 1585(m), 1510(s), 1360(s),, 1225(s), 740 cm^{-1}

iii. NMR: - 2.5ι (singlet) 1H and unsymmetrical pattern 2.61- 2.75 ι (4H).

4. Describe the various factors which affect the Chemical shift.
5. Explain Hook's law? What is the selection rule for harmonic and anharmonic oscillators?
6. What are different levels of structural organization of protein? Explain with sutaible examples.
7. Transform the equation 5x-2y-7=0 in to
   (i) Slope- intercepts form
   (ii) Intercept form
8. Calculate the distance between the two points P (x_1y_1) and (x_2y_2).

Section 'B'

Section 'B' contains 04 long answer-type questions of 10 marks each. Learners are required to answers 02 questions only.

1. (a) Discuss the structure and properties of DNA double helix.
   (b) What are the selection rules for harmonic and anharmonic oscillators?
   (c) Differentiate the ideal gas equaction PV= nRT.

2. Write breaf any **Four** the following:

(a) Raman effect

(b) Chromophore

(c) Mc-Lafferty rearrangement

(d) Acid hydrolysis of Protein

(e) Shielding constant

3. (a) What is zero point energy? How do you calculate the zero point energyof an anharmonic oscillator.

(b) Explain why cic-and trans- isomers differ in their infrared absorption.

(c) How are the computers classified? What are the differences between various types of computers.

4. (a) Discuss detail applications of NMR spectroscopy.

(b) What is nucleotide? Discuss the functions of nucleic acids in cell.