



UTTARAKHAND OPEN UNIVERSITY, HALDWANI (NAINITAL)
उत्तराखण्ड मुक्त विश्वविद्यालय, हल्द्वानी (नैनीताल)

M.Sc.First Year Chemistry

Last Date of Submission:

15 May, 2014

Course Title: Mathematics, Biology, Spectroscopy, and Computer

Course Code: CHE504

Year: 2013-14

Maximum Marks: 40 Marks

Section 'A'

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

Briefly discuss the following:

1. What is Spectroscopy? Give detail the types of molecular Spectroscopy.
2. Explain Hook's law? What is the selection rule for harmonic and anharmonic oscillators?
3. What is Born-Oppenheimer approximation?
4. Describe brief application of Infrared Spectroscopy.
5. What is Ramman effect? Explain Selection rule and application of pure rotational Ramman and Vibrational Ramman spectral line.
6. What are the biological Significance of Amino Sugars.
7. Transform the equation $5x-2y-7=0$ in to
 - (i) Slope- intercepts form
 - (ii) Intercept form
8. Find the second order derivation of $e^x \sin x \cos 2x$.

Section 'B'

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

1. (a) What nucleotide? Discuss the functions of nucleic acid in the cell.
 - (b) Explain structure and function of cholesterol.
 - (c) What are the difference between function and a subroutine?
2. Write brief any **Four** the following:

- (a) Nitrogen Rule
 - (b) Metastable peak
 - (c) McLafferty rearrangement
 - (d) Chemical shift
 - (e) Hypochromic shift
3. (a) What is zero point energy? How do you calculate the zero point energy of an anharmonic oscillator.
- (b) Write the applications of IR Spectroscopy
 - (c) Discuss structure and function of deoxy sugars.
4. (a) Discuss detail applications of NMR spectroscopy.
- (b) How are Carbohydrates classified? Give account of the structure and function of Polysaccharides.

