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

M.Sc. CHEMISTRY (MSCCH-12)

ASSIGNMENT- FIRST YEAR

Last Date of Submission: ***15 May*** जमा करने की अन्तिम तिथि: **15 मई**

Cosurse Title: Spectroscopy, Computers and Mathematics/ Biology **Course code:** CHE504

Year: 2012-13 **Maximum Marks : 40**

Section 'A'
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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-(a) Find the slope of a straight line passing through the points(1,-2) and (-2, 3).

(b) If y = x^x , find $\frac{dy}{dx}$

(c) Find $\int$ log x dx

(d) Solve $\frac{dy}{dx} = \frac{y^2-2xy}{x^2-xy}$

2- What is a matrix? What do you understand by order of matrix? How many types of matrix do you know? And what is a determinant?

3- What is catabolism and anabolism? Support your answer with examples. Also explain ATP as biological energy currency.

4- Explain the structure and function of cholesterol.

5- What do you understand by 'Spectroscopy' ? What are selection rules? The microwave spectrum of $^{79}Br^{19}$F exhibits a series of absorption lines0.714 cm-¹. Using the masses ^{79}Br = 78.92 and ^{19}F =19.00, calculate the moment of inertia and inter-nuclear distance of the molecule.

6- What is Raman effect? Explain the origin of Raman lines using classical and quantum mechanical theories.

7- what is the origin of NMR spectrum? Explain (i) chemical shift (ii) shielding constant (iii) coupling constant

8- Write a program for the calculation of lattice energy of a crystal.

Section 'B'

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

1- (a). Differentiate the ideal gas equation PV= nRT with respect to T

(b) Find the determinant of matrix $\begin{bmatrix} 11 & 12 \\ -4 & 6 \end{bmatrix}$

(c) Form the partial differential equation from $z = f(x^2 - y^2)$, by eliminating functions.

2- (a) Discuss intercellular organelles and their functions.
(b) What is a nucleotide? Discuss the functions of nucleic acids in cells.

3- (a) Explain with examples the use of UV-Visible spectrophotometry in quantitative estimations.
(b) What is the origin of a mass spectrum? What are metastable peaks and their utility in structure elucidation?

4- (a) Write a program for the calculation of critical controls of van der Waal's Gases.
(b) Write a flow chart and C language program for the calculation of rate constant of a first order reaction using linear least squares method.