K-399

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MCH-504

Spectroscopy/Computers/Biology and Mathematics-I

M.Sc. Chemistry(MSCCH)

1st Semester Examination, 2023 (Dec.)

Time : 2 Hours] **[Max. Marks : 35**

Note : This paper is of Thirty Five (35) marks divided into two (02) Sections A and B. Attempt the questions contained in these sections according to the detailed instructions given therein. Candidates should limit their answers to the questions on the given answer sheet. No additional (B) answer sheet will be issued.

SECTION–A

(Long Answer Type Questions)

Note : Section 'A' contains Five (05) long answer type questions of Nine and Half (9½) marks each. Learners are required to answer any Two (02) questions only. (2×9½=19)

1. Write a note on any *two* of the following :

(a) Cartesian coordinates.

(b) Spherical polar coordinates.

(c) Mutarotation.

(d) Prostaglandins.

2. Derive the relationship between spherical polar and cartesian coordinates.

3. Discuss the structure and functions of cell organelles.

4. What are the different types of structural protein? Explain with suitable examples.

5. What is partial differentiation? Find the partial derivatives of $f(x, y) = x^3y^2 - y \sin x$.

SECTION–B

(Short Answer Type Questions)

Note : Section 'B' contains Eight (08) short answer type questions of Four (04) marks each. Learners are required to answer any Four (04) questions only. (4×4=16)

1. Find the derivatives of composite functions.

(a) dy/dx, if $y = x^x$.

(b) dy/dx, if $y = (\tan x)^{\sin x}$.

2. What is diagonal matrix? Give an example of diagonal matrix.

3. Write a brief note on structure and properties of nucleotides.

4. Explain the structure and function of cholesterol.

5. Define the inverse of a matrix and find the inverse of the given matrix

$$A = \begin{bmatrix} 1 & 2 & 1 \\ 3 & 2 & 3 \\ 1 & 1 & 2 \end{bmatrix}$$

6. Expalin the glycogen metabolism in the cell.

7. Explain the structure and properties of DNA.

8. By using the variable separable method, find the equation for reversible adiabatic process in a perfect gas *i.e.*, $(T_2/T_1) = (V_1/V_2)^{R/C_v}$, *m*.