BT 501: Biotechniques

Quiz-II **{10 marks}** **Nov 06, 2023** **Time: 10:05-10:35 A.M.**

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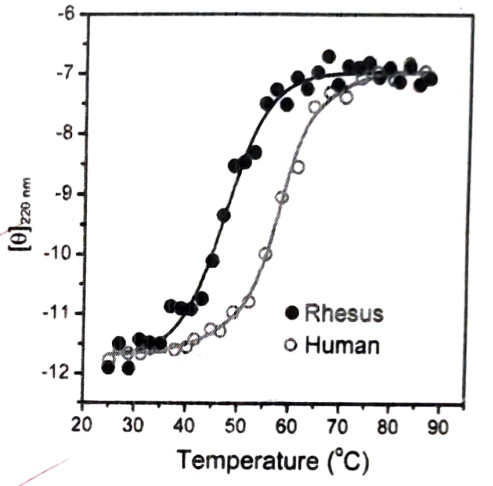
1. If you shine linearly polarized light at a material, what would happen to the polarization of the light that emerges out if the material is circularly birefringent but not circularly dichroic? {1 mark}

2. You study two similar proteins, one from human and the other one from Rhesus macaque. In an attempt to compare their thermodynamic stability, you carry out thermal denaturation and study it using CD spectroscopy. The data for the two proteins is show here. Which of the two proteins, human or Rhesus macaque, is more thermostable? {1 mark}

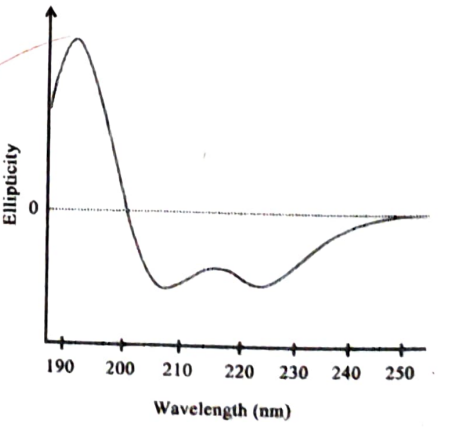


Human protein

3. Name any two mass analyzers. {2 marks}

A. Time of flight (ToF)
B. Quadrupole

4. The far-UV CD spectrum recorded for a protein in water is shown here.



   a. What can you say about the protein structure from the spectrum? (*Mention only the name of the most predominant conformation*). {1 mark}

α-helix

   b. What is the most predominant chromophore that has contributed this spectrum? {1 mark}

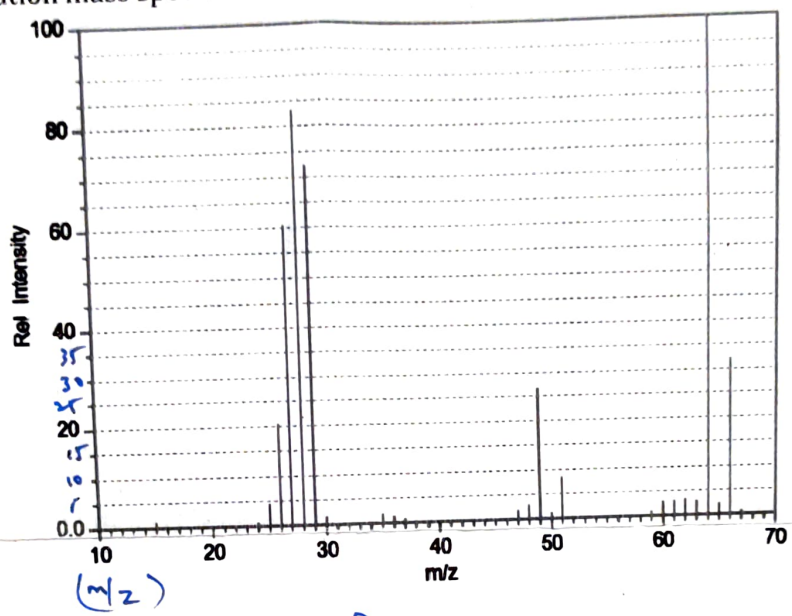
5. Arrange the following ionization method in the order of their hardness (or softness). {1 mark}
Write the softest one first and hardest one last.

(3) Chemical Ionization Electrospray Ionization (1)

(2) Fast Atom Bombardment Electron Impact Ionization (4)

Electronspray Ionization < Fast Atom Bombardment < Chemical Ionization < Electron Impact Ionization

6. Determine the molecular formula of the compound from the following Electron impact ionization mass spectrum. {3 marks}



(m/z)

(Ans) M = 64 (100%.)

M+1 = 65 (2.5%.)

M+2 = 66 (32%.)

1. # C = $\frac{M+1}{1.1} = \frac{2.5}{1.1} = 2.27$ (2 (or) 3)

C_2H_{40} (or) C_3H_{28}

2. Since m is even, there may be no 'N' (or) even 'N'

$C_2N_2H_{12}$ (or) C_3N_2

3. (M+2) intensity is ~30%, it confirms the presence of 'Cl'.

∴ C_2H_5Cl

∴ The molecular formula of the compound is "C_2H_5Cl".