

Subject: LS4201 Structural Biology. End semester 2019
Answer all the questions. Total Marks: 40

1. Explain following in terms of the electron microscopy field: (8)
 - a. Amplitude contrast
 - b. Phase contrast
 - c. Dark field microscopy
 - d. Bright field microscopy

2. Compare SEM, TEM and X-Ray crystallography in terms of instrumentations, working principles, and applications. (9)

3. "Resolution attained for biological molecules in the cryo-EM field is now comparable with resolutions in the x-ray crystallography field" - Is this statement true or false? Provide scientific explanations to support your answer. (5)

4. Explain point groups of biological macromolecules with examples. (4)

5. Explain the principles of cryo-Electron Tomography. Explain its applications with examples. (6)

6. Mention suitable technique(s) to solve the following with brief explanations: (8)
 - a. Sub-cellular localization of chloroplast and mitochondria together
 - b. Visualization of isolated chloroplast
 - c. Dynamic nature of a small protein (20kDa) in solution
 - d. Dynamic nature of a very large protein or macromolecule
 - e. Intrinsically disordered region of a 400kDa protein
 - f. Atomic structure of a 300kDa protein
 - g. Atomic structure of a 15kDa protein
 - h. Close to native structure of a biological macro-molecule

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