1 pts

0.1 pts Scenario 1: A 16 kDa protein is monomeric in apo (no ligand bound, soluble) form but forms a transient, symmetric tetramer only when bound to the tight-binding small molecule ligand. The tetramer lifetime is seconds to minutes (slow exchange), and you need both i) atomic detail of the ligand pose in the tetramer and ii) which surfaces mediate oligomerization. Which method/methods are required to achieve this purpose?

XRC
* site specific disulfides to further stabilize the tetramer
* co-crystalized with high conc. of the ligand

0.1 pts Scenario 2: You have a 700 kDa multi-subunit membrane complex, but the catalytic domain of interest is only 30 kDa and is flexible tethered. You need atomic detail of the catalytic site (metal coordination and water network) for inhibitor design. Which method/methods are required to achieve this purpose?

Cryo-EM + XRC
* Fab-stabilized XRC

0.2 pts Scenario 3: A 35 kDa metalloprotein has a paramagnetic Fe center and exists in two conformations that interconvert on the micro-to-mili second timescale. You need i) the precise metal coordination geometry that is important for redox drug design, ii) which residues shift populations upon ligand binding. Which method/methods are required to achieve this purpose?

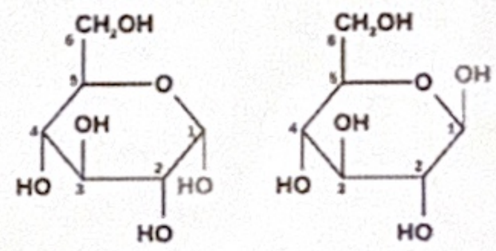
NMR + XRC → metal geometry

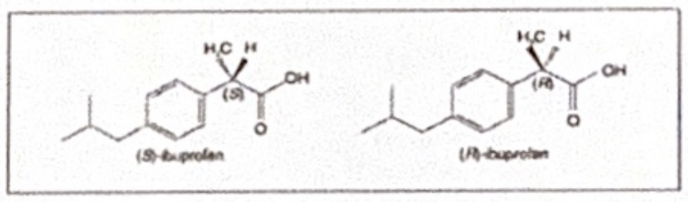
0.05 each
0.6 total Cord

Read the statement below and indicate which of the following terms is suitable for it: conformation, configuration, or ensemble.

C 6 E

1. A β-lactam antibiotic binds an enzyme in open vs closed states of a flexible loop.
6 2. The same sugar exists as α-D-glucose and β-D-glucose in water (they interconvert via mutarotation).
E 3. A protein NMR PDB entry provides 20 models representing the solution variability.
6 4. A peptide bond is cis for Proline in one structure but trans in another.
6 5. (R)-ibuprofen vs (S)-ibuprofen.
C 6. A ligand in a pocket has gauche vs anti around a single C–C bond.





E 7. An MD trajectory at 300 K samples folded, molten-globule, and partially unfolded states with Boltzmann weights.
6 8. A substituted alkene exists as E vs Z isomers.
C 9. Chair vs boat cyclohexane; same substituents.
C 10. Atropisomers of a biaryl (e.g., hindered BINOL) that interconvert only over hours at room temp.
C 11. Yeast actin shows "open" and "closed" ATP cleft" 3D classes in a cryo-EM heterogeneous refinement.
6 12. D- vs L-glyceraldehyde.