relative configuration

1. The configuration of any stereogenic (asymmetric) centre with respect to any other stereogenic centre contained within the same molecular entity. Unlike absolute configuration, relative configuration is reflection-invariant. Relative configuration, distinguishing diastereoisomers, may be denoted by the configurational descriptors \( R^* \), \( R^* \) (or \( l \)) and \( R^* \), \( S^* \) (or \( u \)) meaning, respectively, that the two centres have identical or opposite configurations. For molecules with more than two asymmetric centres the prefix \( rel- \) may be used in front of the name of one enantiomer where \( R \) and \( S \) have been used. If any centres have known absolute configuration then only \( R^* \) and \( S^* \) can be used for the relative configuration.

See also: \( \alpha \) (alpha), \( \beta \) (beta) (1 and 3)

2. Two different molecules \( X_{abcd} \) and \( X_{abce} \), may be said to have the same relative configurations if \( e \) takes the position of \( d \) in the tetrahedral arrangement of ligands around \( X \) (i.e. the pyramidal fragments \( X_{abc} \) are superposable). By the same token the enantiomer of \( X_{abce} \) may be said to have the opposite relative configuration to \( X_{abcd} \). The terms may be applied to chiral molecular entities with central atoms other than carbon but are limited to cases where the two related molecules differ in a single ligand.

Both definitions can be generalized to include stereogenic units other than asymmetric centres.

Source:
PAC, 1996, 68, 2193 (Basic terminology of stereochemistry (IUPAC Recommendations 1996)) on page 2217