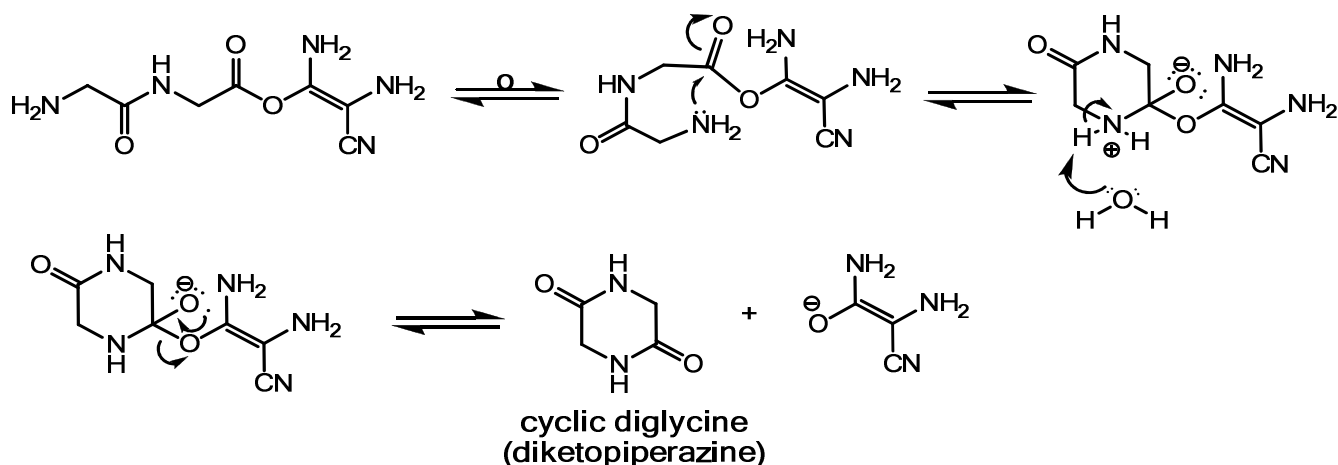


### 26-1.

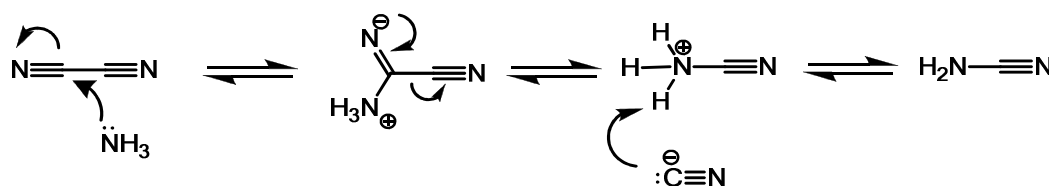
(a) Activated diglycine is likely to cyclize before reacting with another monomer of glycine (an intramolecular vs intermolecular reaction)



(b) In laboratory and cellular syntheses of peptides intramolecular amidation reactions are prevented through the use of protecting groups and solid phase attachment.

### 26-2.

(a)



(b)  $\text{HN}=\text{C}=\text{NH}$

A tautomer of cyanamide is carbodiimide. This is the functional unit of the laboratory peptide coupling reagent DCC (dicyclohexylcarbodiimide)

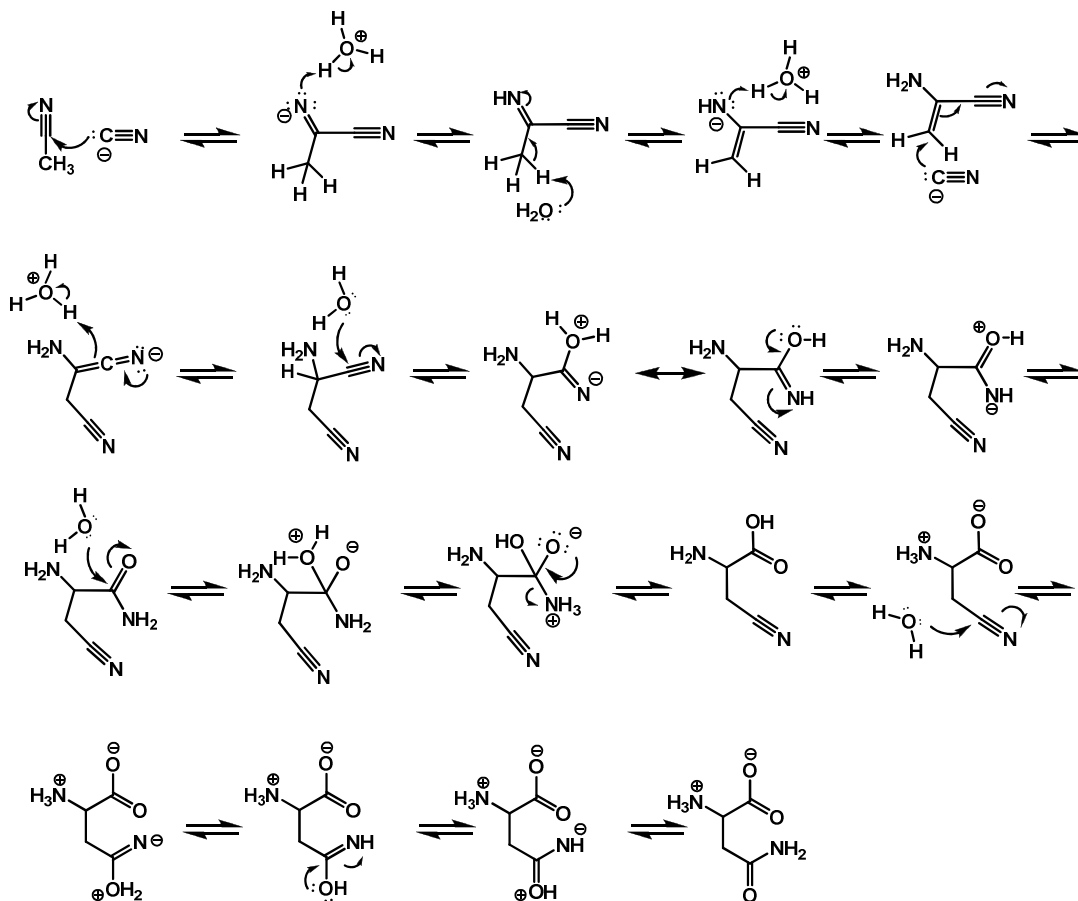
### 26-3.

(a) The Strecker Reaction contains only achiral starting materials. It will produce a racemic mix of both amino acid enantiomers.

(b) The cyanamide will not racemize stereochemically pure amino acids. Its coupling mechanism works just like DCC. The  $\text{O}=\text{C}=\text{S}$  method would racemize amino acids. It has an intermediate that is very similar to the N-phenylthiohydantoin intermediate seen in protein sequencing. The R group is on an acidic carbon alpha to a carbonyl. Enol formation would scramble stereochemically-pure amino acids into a racemate.

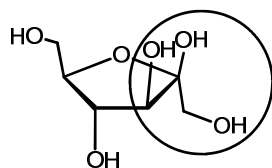


26-4. Although there appear to be a lot of steps, there is a lot of repetition of imine formation and hydrolysis.



26-5.

(a)



$\beta$ -fructofuranose

(b) There are 4 stereocenters, thus a total of  $2^4 = 16$  different stereoisomers are possible.