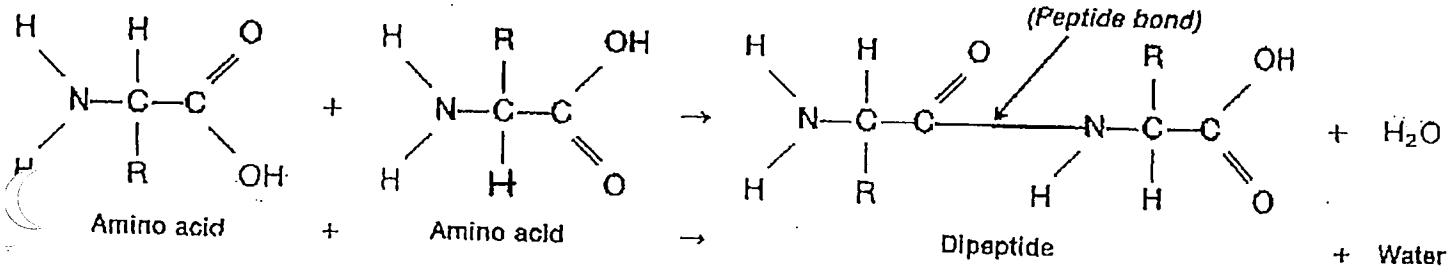
Dehydration Synthesis Reactions/Condensation Reactions:

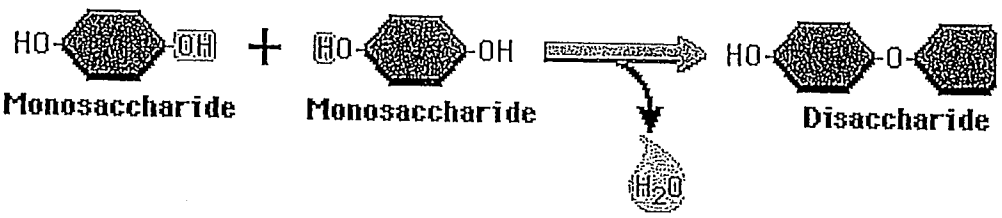
This formula shows how large molecules are built in living things. The process is called *dehydration synthesis* because water is taken out of the smaller molecules to synthesize/build a larger one. Water is produced by the reaction.

$$A + B \xrightarrow[\text{enzyme}]{} AB + H_2O$$

Example: Amino acids joining to build a protein



Example: Simple sugars (monosaccharides) joining to build a complex carbohydrate disaccharide):



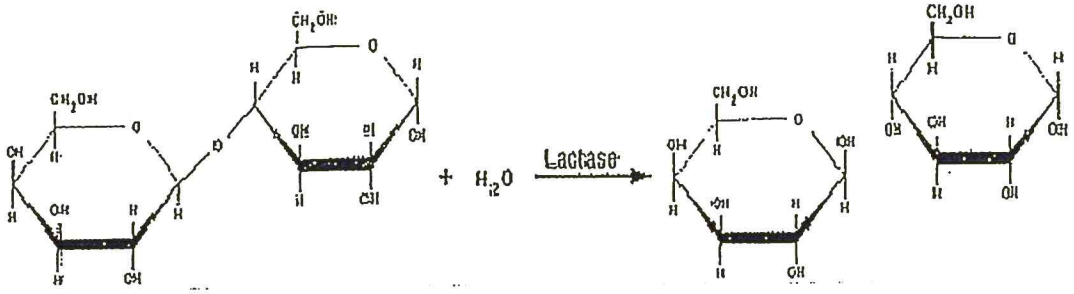
Hydrolysis Reactions:

This formula shows how large molecules are broken down in living things. The process is called hydrolysis because water is added to the larger molecule to lyse/break it down into a smaller one.

$$AB + H_2O \xrightarrow[\text{enzyme}]{} A + B$$

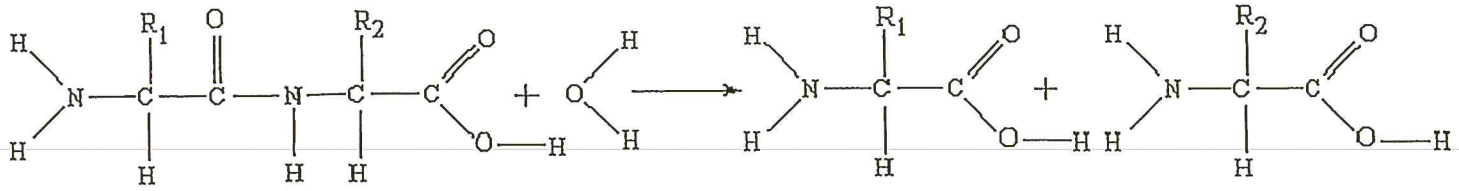
Example: The breakdown of a disaccharide (double sugar) that uses water to produce 2 simple sugars (2 monosaccharides)

$$C_{12}H_{22}O_{11} + H_2O \longrightarrow C_6H_{12}O_6 + C_6H_{12}O_6$$



Lactose + Water → Galactose + Glucose

Example: The breakdown of a dipeptide (2 amino acids) that uses water to produce 2 separate amino acids.



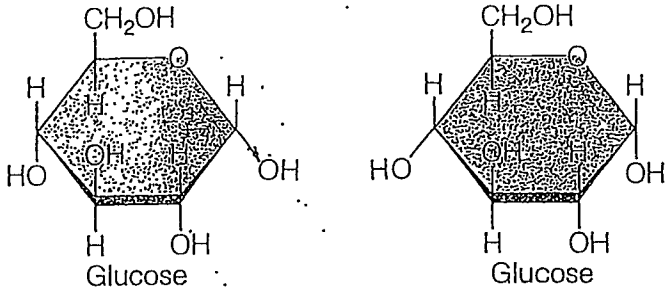
Dipeptide (the smallest possible "protein") | Water | One Amino Acid | Another Amino Acid

Protein Hydrolysis

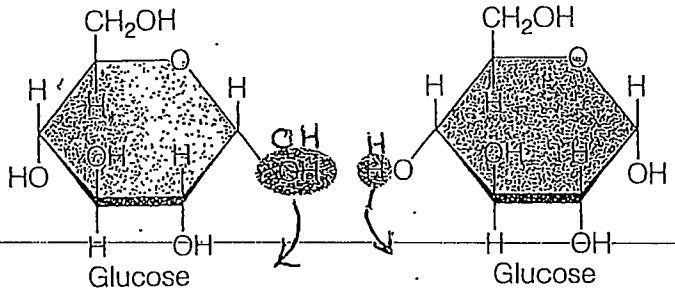
Dehydration Synthesis and Hydrolysis

DIRECTIONS: Below the diagrams are three statements that describe the action shown in the diagram, but they are scrambled up. **Rewrite** the statement that fits the action on the line under the appropriate diagram. Refer to figure 3.5 on page 38-

THE FOLLOWING DIAGRAMS SHOW THE PROCESS OF _____

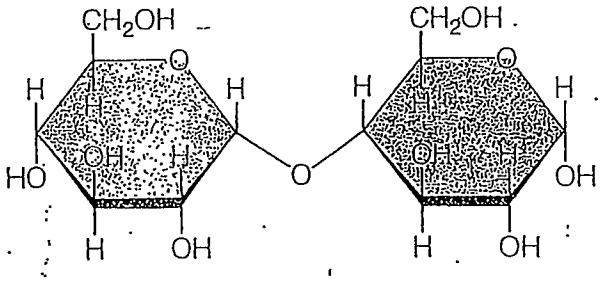


BEFORE: _____



STEP 1: _____

maltose



$+ H_2O$

STEP 2: _____

Statements to be written on the correct diagram above:

(H and OH)

-The 'parts' of water are lost from the bonding ends of the two molecules.

-Two complete, organic molecules---separate from each other (NOT Bonded Together)

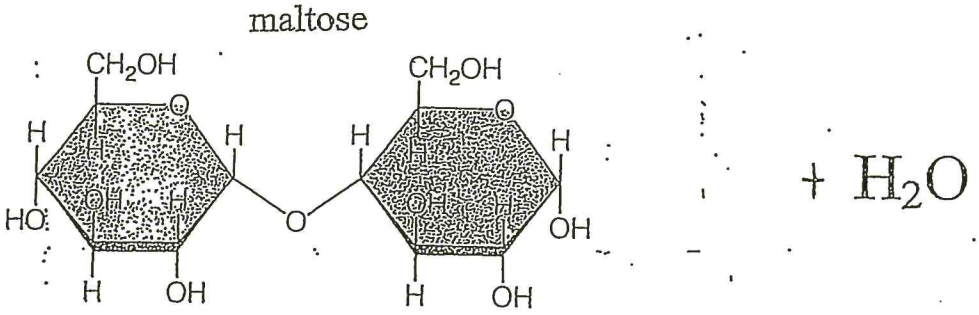
-Two molecules bond together forming one larger molecule. (polymer is formed)

DEHYDRATION SYNTHESIS AND HYDROLYSIS

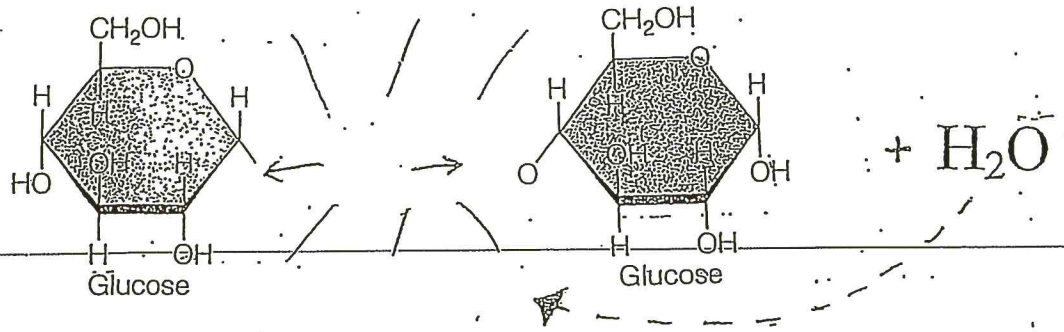
p. 3

THE DIAGRAMS BELOW SHOW THE PROCESS OF: _____

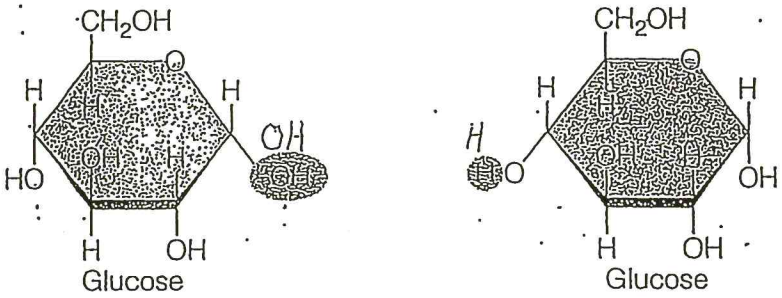
(Enzymes allow this process to happen in both process on pp. 2 and 3)



BEFORE: _____



STEP 1: _____



STEP 2: _____

Statements to match & REWRITE on the correct line above (use figure 3.3B for reference):

-Each sugar molecule gains a 'part' of water to its broken end and is now complete. (Disaccha)

-One molecule of maltose is made out of two smaller sugar molecules bonded together.

-The disaccharide molecule breaks apart (with the help of enzymes). (Forms 2 monosaccharides)