unit 1 Biomolecules & Bioenergetics

Biomolecules: Introduction, classification, chemical nature and biological role of carbohydrate, lipids, nucleic acids, amino acids and proteins. Bioenergetics: Concept of free energy, endergonic and exergonic reaction, Relationship between free energy, enthalpy and entropy; Redox potential. Energy rich compounds; classification; biological significances of ATP and cyclic AMP

Here is a **puzzle** that covers the key topics from Unit 1 Biomolecules & Bioenergetics, including biomolecule classification, their roles, and concepts of free energy and bioenergetics:

Biomolecules & **Bioenergetics Puzzle**

Match each description to the correct term from the list below. Each term is used only once.

Terms:
ATP, Carbohydrate, Lipid, Protein, Nucleic Acid, Exergonic Reaction, Endergonic Reaction, Redox Potential, Cyclic AMP

Descriptions:

This biomolecule is the primary source of quick energy for most cells and includes monosaccharides like glucose .

Made of amino acids, this biomolecule is responsible for catalyzing reactions and building cellular structures .

These molecules are hydrophobic, store long-term energy, and form the structural basis of cell membranes .

DNA and RNA are examples of this class of biomolecules, which store and transmit genetic information.

This molecule is known as the "energy currency" of the cell, providing energy for many cellular processes .

A reaction type that **releases free energy** and occurs spontaneously (ΔG 0

A reaction type that **requires an input of energy** and is non-spontaneous (ΔG 0 .

This is a measure of a molecule's tendency to gain or lose electrons in redox reactions

A secondary messenger derived from ATP, important in signal transduction

Bonus Question:
Write the equation that relates free energy (ΔG , enthalpy (ΔH , and entropy (ΔS) in bioenergetics .

Answers:

Description Number	Correct Term
1	Carbohydrate
2	Protein
3	Lipid
4	Nucleic Acid
5	ATP
6	Exergonic Reaction
7	Endergonic Reaction
8	Redox Potential
9	Cyclic AMP

Bonus Answer:

$$\Delta G = \Delta H - T\Delta S$$

where

- ΔG = change in free energy
- ΔH = change in enthalpy
- T = temperature (in Kelvin)
- ΔS = change in entropy

This puzzle encourages understanding of both **biomolecule classification** and **bioenergetics concepts** in a concise and engaging way.

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