AP Biology Practice Essay

Answers must be in essay form. Outline form is not acceptable. Labeled diagrams may be used to supplement discussion, but in no case will a diagram alone suffice. It is important that you read each question completely before you begin to write. Write all your answers on the pages following the questions in the pink booklet.

Describe the similarities and differences between the biochemical pathways of aerobic respiration and photosynthesis in eukaryotic cells. Include in your discussion the major reactions, the end products, and energy transfers.

AP 1982

STANDARDS: 7 points Maximum for Photosynthesis section
7 points Maximum for Respiration section

PHOTOSYNTHESIS:

___Conversion of light energy to chemical energy
___Fixation of CO_2
___Occurs in chloroplasts
___Split H_2O (photolysis)
___Chlorophyll needed
___ATP in light reaction
___NADPH produced
___Anabolic (Constructive)
___Oxygen released

LIGHT REACTION (Diagram and/or Discuss)

___Photosystem I & II
___Energy "input" (electron flow)
___Chemiosmotic

DARK REACTION (CO_2 FIXATION)

___Carboxylative phase
___Reductive phase
___Regenerative phase

NET REACTION

___ENERGY + CO_2 + H_2O -> $C_6H_{12}O_6 = O_2$
___"Uphill" Reaction possesses more free energy and/or stores 686,000 cal/mole glucose
___Coupling of light and dark reactions

RESPIRATION

___Conversion of chemical energy to metabolic
___Release of CO_2
___Occurs in mitochondria
___Form H_2O (reduction)
___Cytochromes needed

___ATP in oxidative phosphorylation
___NADH produced
___Catabolic (destructive)
OXIDATIVE PHOSPHORYLATION (Diagram and/or Discuss)
___ETS (NAD, FAD, cytochromes)
___Energy "release" (electron flow)
___Chemiosmotic
___Glycolysis ___Krebs Cycle
NET REACTION
___O_2+ $C_6H_{12}O_6$ -> CO_2+ H_2O + ENERGY
___"Downhill"Reaction - possess less free energy and/or releases 686,000 cal/mole glucose
BONUS POINTS 3 points MAX
___Dark reaction is reverse of anaerobic glycolysis
___Both processes are complementary and/or supply materials for each other
___Thorough contrast of photosynthesis and cellular respiration