Midterm Review

Fall 2012
Which of the following molecules will have the most rapid direct transport through the plasma membrane?

A) Na+
B) O2
C) H2O
D) Glucose
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What types of molecules pass directly through the bilayer?

Small, uncharged, hydrophobic
In the overall process of glycolysis and cellular respiration, _____ is oxidized and_____ is reduced.
In the overall process of glycolysis and cellular respiration, glucose is oxidized and O₂ is reduced.

\[ \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 \rightarrow 6\text{CO}_2 + 6\text{H}_2\text{O} \]

- Oxidized to form CO₂
- Reduced to form H₂O

**OIL** = Oxidation Is Loss
**RIG** = Reduction Is Gain
In what cellular pathway is NAD+ regenerated with generation of 2 net ATP?
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Lactic acid fermentation
• With the hydroxyl group containing molecule as fuel, complete the following redox equation.

\[
\text{H-C-OH} + \text{NAD}^+ \rightarrow \text{C}=\text{O} + \_\_\_\_ + \_\_\_\_ \\
\text{dehydrogenase}
\]

• Which of the above is REDUCED?
NAD+ is reduced to NADH
In the overall process of photosynthesis, _____ is oxidized and _____ is reduced.
In the overall process of photosynthesis, water is oxidized and CO2 is reduced.

$$6 \text{ CO}_2 + 6 \text{ H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6 \text{ O}_2$$

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What type of bonds stabilizes secondary structure of polypeptide?
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HYDROGEN BONDS
Which of the following will show enhanced abundance in pancreatic cells that secrete large amounts of digestive enzymes?

A) smooth endoplasmic reticulum
B) Kinesin transport vesicles
C) Lysosome
D) Myosin motor proteins
E) Free ribosomes at the end of mRNAs
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Where do the electrons travel in photosynthesis?

A) From H2O to CO2
B) From O2 to H2O
C) From CO2 to ATP
D) From H2O to NADH
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The energy used to produce ATP in the light reactions of photosynthesis comes from...

A) Carbon fixation
B) NADPH
C) NAD+
D) H+ movement across membrane
E) Reduction of water
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A mutation in the cytochrome complex in thylakoid membrane is mutated so that it is no longer functional as a pump. Which of the following will NOT happen in the plant as a result of this mutation?

A) Decrease in carbon fixation of CO2
B) Decrease in reduction of NADP+
C) Decrease in the production of glucose
D) Decrease in chemiosmosis
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Decrease in the H+ gradient will cause
Decrease in ATP production
Decrease in CO2 fixation
Decrease in sugar production

Electrons are still being passed along PS II and PS I so NADPH production is unaffected.
Which of the following metabolic processes is an exergonic reaction?

<table>
<thead>
<tr>
<th>Reactant</th>
<th>Product</th>
</tr>
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<tr>
<td>A) ADP+Pi</td>
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Exergonic reaction

[Diagram showing free energy change during a reaction, with reactants having more free energy than products, indicating energy release ($\Delta G < 0$).]
After completion of the citric acid cycle, most of the usable energy from the original glucose molecule is in the form of _____. 
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Which of the following provide most of the NAD+ required for pyruvate to Acetyl CoA conversion?

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A) primary structural level
B) secondary structural level
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Primary=Sequence of AA connected by peptide bond
Secondary=H bonds in backbone
Tertiary=R group interaction (H bonds, disulfide bond etc)
Quaternary= 2 or more polypeptide
Celery stalks that are immersed in fresh water for several hours become stiff. Similar stalks left in a salt solution become limp. From this, we can deduce that the cells in the celery stalks are:

_________________ to fresh water
but ____________ to the salt solution

(Hypertonic, Hypotonic, Isotonic)
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1. Circle the R group on the amino acids
2. Draw a box around the amino acid that will decrease pH
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donate H+ = acidic
The binding of a signal molecule to a ligand-gated ion channel does which of the following?

A) affect voltage across the membrane
B) promote binding of steroid hormone to its receptor in the cytoplasm
C) result in formation of ion-channel dimers
D) causes the ion channel to phosphorylate a target enzyme
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A peptide bond is

A) The hydrogen bond joining two adjacent amino acids
B) The result of hydrolysis reaction
C) The covalent bond between a carboxyl group of an amino acid to a hydroxyl group of an adjacent amino acid
D) The major type of bond in the primary structure of a polypeptide
C) A hydrogen bond between the polypeptide backbone
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Hydrolysis of GTP to GDP inactivate Ras