Practise Midterm Test

I. Fill in the blanks to make true statements [1 point per blank, 23 pts total]

1. Sucrose synthase is thought to be involved in sucrose _____, whereas sucrose phosphate synthase is required for sucrose _____.

2 . Stachyose is an oligosaccharide containing glucose and _____subunits. 2. In the vacuoles of bulbs such as onions and lilies, you can expect to find storage sugars based on short polymers of _____ (give monosaccharide) joined by _____ linkages (give example).

3. Common 5-carbon sugars found in the hemicellulose (xyloglucan) fraction of the cell wall are _____ and _____.

4. Cellulose is comosed of long chains of glucose linked by _____ (give linkage).

5. Plants make a lipid-derived hormone called _____. The fatty acid that is its most immediate biosynthetic precursor is _____

6. A structural protein found in the cell wall is _____.

7. During fatty acid biosynthesis, the first desaturation is introduced at position _____ of the carbon chain. The resulting fatty acid is called _____.

8. The melting temperature of a vegetable oil is inversely correlated with the number of _____ and directly correlated with the number _____atoms of its constituent fatty acids.

In one or two sentences each, answer the following questions. You may also use point form [3 pts each, 15 pts total]

1. How many cellulose chains make one microfibril? What is the structure that gives rise to the microfibrils, and where is it located?

2. Where in the cell (which compartment) do you find fructose 2,6 bisphosphate? What is it used for by the plant?

5. To genetically modify canola to make lauric acid (C12:0), what modification would you make, or what gene would you introduce? Briefly explain your rationale.

Answer the following. Use the back of the page for extra space if you need to
[6 pts each, 12 pts total] (about 1/2 pp.)

1. Plants adjust their metabolism using many feedbacks. If sucrose cannot be exported from the leaf quickly enough, the leaf switches to starch accumulation. Briefly explain the mechanism by which a build up of triose-P in the cytosol of leaf cells is able to switch on starch synthesis in the chloroplast. (Hint: Mention the key regulatory protein for starch synthesis and its effectors.)