

Student Name \_\_\_\_\_

KEY TO YELLOW EXAM

Student Number \_\_\_\_\_

## BIOL/APBI 210

In-class test #1- (50 marks total, worth 12% of grade)  
February 9, 2011

MC	1	2	3	Essay	Total
20	7	7	6	10	50

**PART I – Multiple Choice (2 marks each) – Circle the letter that corresponds to the BEST answer.**

- The \_\_\_\_\_ undergoes anticlinal divisions only.
  - cork cambium
  - vascular cambium
  - c. tunica**
  - corpus
  - pericycle
- Which statement is **false** about the fate of primary phloem during secondary growth?
  - It is pushed outward as secondary growth proceeds in roots.
  - It is pushed outward as secondary growth proceeds in stems.
  - Primary phloem is often only observed as fibres.
  - d. It remains between the arms of primary xylem.**
  - It ceases to function in conduction.
- Which statement is **false** about primary meristems?
  - Procambium gives rise to pericycle, primary phloem, and primary xylem.
  - Procambium can give rise to vascular cambium.
  - c. Ground meristem gives rise to cork cambium in the stem.**
  - Protoderm is usually one cell layer thick.
  - Protoderm gives rise to the dermal tissue system in primary plant structures.
- Which statement is **true** about support cells or tissues?
  - Tracheids are only found in gymnosperms.
  - b. Fibres provide support in angiosperm wood.**
  - Vessels play an important role in support.
  - Collenchyma is a complex tissue that provides support for growing parts of the shoot.
  - Turgor pressure doesn't play a role in supporting primary structures.

5. Which set of terms applies to most primary stems of angiosperms?
- endarch, eustele**
  - exarch, protostele
  - endarch, protostele
  - endarch, attack-o-stele
  - exarch, atactostele
6. Which statement is **true** about water absorption in roots?
- Water is absorbed throughout the entire dermal tissue system.
  - Water is primarily absorbed in the region of differentiation of a primary root.**
  - Water can only move into the root through the symplasm.
  - Water absorption is facilitated by *Rhizobium*.
  - Water is absorbed through the phelloderm.
7. Which statement is **false** about the pericycle?
- It originates from the procambium.
  - It is the innermost layer of the cortex.**
  - It is made up of parenchyma cells.
  - It is the site of lateral root initiation.
  - It contributes to vascular cambium in plants that have secondary growth.
8. Which statement about plant tissues is **true**?
- Xylem contains sclerenchyma tissue.
  - Epidermis is a complex tissue.**
  - All tissues contain some living cells at functional maturity.
  - All tracheary elements have perforation plates.
  - Cells of parenchyma tissue often have chromoplasts that store anthocyanins.
9. Which statement about cellulose microfibril synthesis is **false**?
- The orientation of cellulose microfibrils determines final cell shape.
  - Cellulose synthase is embedded in the plasmamembrane.
  - Cellulose synthase complexes are called rosettes.
  - Cellulose is secreted by tonoplast.**
  - Cellulose microfibrils are laid down parallel to microtubules in the underlying cytoplasm.
10. Which statement about bark is **true**?
- Bark only occurs in secondary stems.
  - Bark has stomata for gas exchange.
  - Bark includes secondary phloem, primary phloem, periderm, and sometimes cortex.**
  - Bark is composed of everything outside the vascular cambium except periderm.
  - Bark is synonymous with periderm.

## PART II – Short Questions:

1. **Describe** periderm in terms of cell types and functions. **Contrast** the initiation of cork cambium in secondary stems and secondary roots. Include in your answer the cell types and tissue systems involved. (7 marks)

*Periderm is made up of phelloderm (1/2), cork cambium(1/2) (or phellogen), and cork(1/2) (or phellem) - may indicate cork cells as other cell types.*

*It is the outer layer of secondary plant structures (1/2) (dermal tissue system) (1/2) that protects(1) the plant from elements of the environment (pathogens, insects/herbivores, desiccation, mechanical damage - must include at least two stresses for a full mark for protection.*

*Stem: initiated in the outer layer of the cortex (1)*

*(ground tissue system(1/2)) from parenchyma cells (1/2)*

*Root: initiated from the pericycle (1) (or parenchyma cells (1/2)) of the vascular tissue system (1/2)*

**Maximum 7 marks**

2. **Describe** the differentiation of a fusiform initial into:

(a) a sieve tube member (include its relationship to the accompanying parenchyma cell)

**OR**

(b) a vessel element. (7 marks)

*Sieve tube member:*

*Text: Fig. 22-23 (assigned reading)*

*- periclinal division → derivative(1)*

*- division → sieve tube member and companion cell (sister cells) (1)*

*- sieve areas and sieve plates form - may discuss plasmodesmata, callose(1)*

*- degeneration: tonoplast, nucleus, etc (1)*

*- remains alive (has plasmamembrane, cytoplasm etc) (1)*

*- sieve tube member dependent metabolically on companion cell(1)*

**(1) – organization, accuracy**

**OR** *Vessel Element:*

*Text: Fig. 23-16 (assigned reading)*

*Periclinal division → derivative (1)*

*- secondary cell wall deposited (2)*

*- perforation plate forms (2)*

*- cell dies (all cell contents and plasmamembrane degrades) (1)*

**(1) – organization, accuracy**

3. Make a quick sketch of your favourite cell with lignified secondary cell wall. Label with the following terms: middle lamella, secondary cell wall, primary cell wall, pits, and lumen. Indicate which component(s) contain pectin. (4 marks)

*The Grading scheme will depend on cell type selected:*

*Drawing to include:*

*middle lamella (1/2) - pectin (1/2)*

*secondary cell wall (1/2)*

*primary cell wall (1/2) - pectin (1/2)*

*pits (1/2)*

*lumen (1/2)*

*Accuracy and quality of drawing (1/2)*

For the cell you have drawn, indicate the following features:

Cell type \_\_\_\_\_ (0.5 marks)

Cell Shape \_\_\_\_\_ (0.5 marks)

Dead or alive at functional maturity \_\_\_\_\_ (0.5 marks)

Function(s) \_\_\_\_\_ (0.5 marks)

## **PART III – Short Essay Question (10 marks, bonus marks too!)**

**Bob is Buggy:** Life has not been good for Bob (Shona's bean buddy....he is an angiosperm). Not only does he suffer bouts of desiccation, but he is also having problems with pests! Aphids! Aphids are sap-sucking insects with mouthparts (stylets) that can pierce primary shoots, gain access to the tissue that conducts photosynthates, and suck up the contents.

**Essay:** Describe, in sequence, the tissues that the stylets must pass through to get to the conducting tissues in a stem. Discuss the functions of each of the tissues. Explain the potential impacts the insects have on Bob (hint: consider the substances the tissue is conducting).

### **Be sure to include:**

**- The specific tissue types and cell types impacted by the insect**

[**Note:** Before you start to write, take a moment to plan. Then write 3-4 paragraphs using a clear thesis statement and supporting information in paragraph form. Be concise and use precise terminology. Give your essay a **title.**]

Restrict your answer to the **bottom of this page and following page** (a piece of paper will be handed out that can be used for drafting).

*Title and Introduction 1/2*

*Pierces through:*

1. *Epidermis<sup>1/2</sup> with cuticle<sup>1/2</sup> - protection from water loss, herbivores, etc<sup>1/2</sup>*

*- various kinds of parenchyma cells (pavement cells, etc)<sup>1/2</sup>*

2. *cortex/ground tissue system<sup>1/2</sup>*

*parenchyma tissues<sup>1/2</sup> - parenchyma cells<sup>1/2</sup>:*

*photosynthesis, storage<sup>1/2</sup>*

*collenchyma<sup>1/2</sup> - collenchyma cells<sup>1/2</sup> and/or*

*sclerenchyma (fibres) - support<sup>1/2</sup>*

3. *vascular bundle<sup>1/2</sup>*

*- phloem<sup>1/2</sup> (sieve tube members, companion cells, fibres, parenchym)<sup>1/2</sup> - conduction of photosynthates etc (aerial to roots)<sup>1/2</sup>*

*- phloem - destination of stylets<sup>1/2</sup>*

4. *Impact to Bob:*

*- must discuss loss of carbohydrates/energy as well as losses of other phloem cell constituents<sup>1</sup>*

*- vulnerable to water loss and pathogens<sup>1/2</sup>*

**Max 1 bonus mark for organization. Marks deducted: inaccurate information**