

**BIOL 221 – Concepts of Botany; Dr. Hardy**  
**Exam 2 Guide**

**Topic 06 – Water in Plants**

**I. Introduction**

- A. Water
  - 1. Polar
  - 2. H-bonding facilitates cohesion & adhesion
  - 3. Water as solvent in aqueous solutions
- B. Osmosis & Turgor
  - 1. Osmosis
  - 2. Turgor
- C. Water Potential
  - 1. Water potential
  - 2. Solute potential
  - 3. Pressure potential

**II. Transpiration**

- A. What
- B. Regulation by stomatal aperture
  - 1. Environmental stimuli
  - 2. Active controlled by guard cell turgor
- C. Creates a pull

**Topic 07 – Tropisms & Hormones**

**I. Tropisms**

- A. Gravitropism
  - 1. Stimulus
  - 2. Where & Why
  - 3. Mechanism
- B. Phototropism
  - 1. Stimulus
  - 2. Where & Why
  - 3. Mechanism
- C. Thigmotropism
  - 1. Stimulus
  - 2. Where & Why
  - 3. Mechanism

**II. Phytohormones**

- A. Auxins
  - 1. Chemistry
  - 2. Origin
  - 3. Transport
  - 4. Function
  - 5. Commercial Applications
- B. Gibberellins

1. Chemistry
  2. Origin
  3. Transport
  4. Function
  5. Commercial Applications
- C. Cytokinins
1. Chemistry
  2. Origin
  3. Transport
  4. Function
  5. Commercial Applications
- D. Cytokinins
1. Chemistry
  2. Origin
  3. Transport
  4. Function
  5. Commercial Applications

## **Topic 08 – Photosynthesis**

### **I. Introduction**

- A. Summary Equation
- B. Destiny of Carbohydrates
  1. ATP Needs
  2. Various Organics
- C. Light & Pigments
  1. Electromagnetic Spectrum

### **II. Details**

- A. Where (Chloroplast Structure)
- B. Light Reactions
  1. Photosystems
  2. Light Capture, Electron Transport, ATP & NADPH Production
- C. Light-Independent Reactions (Calvin Cycle)

## **Topic 09 – Secondary Metabolites**

### **I. Plant Secondary Metabolites**

- A. Definitions
- B. Examples
- C. Ecology
- D. Storage

### **II. Caffeine Case Study**

- A. Caffeine
- B. Alkaloids in General
- C. Ecological Role of Alkaloids
- D. Caffeine's Effects on Human Central Nervous System

- E. Caffeine and Parkinson's Prevention?
- F. Similarity Between Caffeine and Theobromine (both of which occur in chocolate)
- G. Caffeine Content in Some Beverages

### **III. *Coffea***

- A. Coffee as Major Commodity
- B. Coffee Breeding is Big Area of Research
- C. *Coffea* Berries and Flowers
- D. *Coffea* Seeds
- E. Coffee Origins
- F. Coffee Production Today