

GUIDELINES FOR EXAMINATION I
Exam Date: Wednesday, September 23, 2009

I. COMPOSITION

The first exam will be composed of short answers, matching, multiple choice, and true-and-false questions. Questions will be asked from materials that have been covered up to Monday, September 22, 2008.

II. SUGGESTED AREAS OF STUDY

1. Introduction (Lectures)

- a. Definition of "horticulture."
- b. Importance of horticulture in enhancing human health and emotional well-being.
- c. What is the difference between agronomy and horticulture?
- d. Know what are involved in each of the disciplinary fields of horticulture: olericulture, pomology, arboriculture, floriculture, landscape horticulture, nursery.
- e. Know some examples of professional careers for horticulturists.

2. Classification (Chapter 2, Lectures)

- a. Know how to classify plants by growth habits (succulents, vines, ground covers, trees, shrubs).
- b. Difference between deciduous and evergreen trees.
- c. Distinguish annuals, biennials, perennials with examples.
- d. Classification of plants by temperature tolerance.
- e. Difference between cool-season crop and warm-season crop.
- f. Meaning of xerophyte, shade plant, halophyte, glycophyte, acid-loving plants.
- g. Kinds of vegetables grown for aerial portions.
- h. Kinds of vegetables grown for underground portions (roots, tubers, bulbs, corms).
- i. Classification of temperate fruits (berries, brambles, vines, pome, stone fruits).
- j. Classification of florist crops (cut flowers, potted flowering plants, foliage plants, bedding plants, cut greens).
- k. Classification of landscape plants (trees, shrubs, vines, etc. with examples).
- l. The system of scientific plant classification (family, genus, species, variety or cultivar).
- m. Name the Swedish botanist who modernized plant classification.
- n. Show the family names and scientific nomenclature for 'Russet Burbank' potato, 'Red Cascade' petunia, and 'Delicious' apple (correct spelling of genus, species and cultivars).
- o. List names of five plant families that are important in horticulture.
- p. What is difference between a variety and a cultivar? What is a sport?
- q. What is meant by clone, pure-line cultivar, hybrid cultivar, open-pollinated cultivar?
- r. What is an ecospecies and how does it occur?

3. Plant Structure (Chapter 3, Lectures)

- a. Know various components of the plant cell: nucleus, nucleolus, mitochondria, chloroplast, vacuole, cell wall.
- b. Know three different types of meristems (apical, intercalary, cambium).
- c. The locations and functions of xylem, phloem and cambium tissues.
- d. Composition of phloem tissues: sieve tube member, sieve tube plate, companion cell, phloem parenchyma cell; composition of xylem tissues.
- e. The functions of root cap and root hair.
- f. Various stem modifications that are horticulturally important: crown, runner (stolon), spur, rhizome, tuber, corm, bulb.
- g. Know the anatomy of leaf tissues: upper and lower epidermis, stomata (stoma), palisade and mesophyll parenchyma cells).

- h. Know the structural parts of the flower: sepal, calyx, corolla, perianth (sepal, petal, receptacle), pistil (ovary, style, stigma), stamen (anther, filament).
- i. Know various inflorescence types with examples: head, spike, raceme, corymb, panicle, cyme, umbel.
- j. Difference between ray florets and disc florets.
- k. Difference between pedicel and peduncle.
- l. Examples of aggregate fruit (i.e. strawberry) and multiple fruit (i.e. pineapple).
- m. Identify the types of fruits (dry and fleshy) from pictures provided.
- n. Identify the external and internal components of a bean seed (raphe, hilum, micropyle, cotyledon, radicle, embryo, seed coat).
- o. What is meant by a dioecious species?
- p. Know various flower sex expressions of plants: monoecious, androecious, gynoeceous, andromonoecious, gynomonoeceous, trimonoecious.

4. **Growth and Metabolism** (Chapter 4, Lectures)

- a. What is meant by plant “growth”?
- b. Definition of plant morphogenesis, differentiation, anabolism, catabolism.
- c.. Know 3 major chemical processes of plants: photosynthesis, metabolism, respiration.
- d. What are produced from photolysis and photophosphorylation in the light phase of photosynthesis?
- e. Difference between the C₃ pathway (Calvin cycle) and the C₄ pathway of photosynthesis; give examples of plants having two different pathways.
- f. Receptor carbon compounds (RuBP or PEP) for carbon dioxide (CO₂) fixation during Calvin cycle and C₄ pathway.
- g. What is meant by photorespiration? Does it operate in C₃ or in C₄ plants? Why is it important in relation to photosynthetic efficiency?
- h. What is meant by a CO₂ compensation point? How does it differ between the C₃ and C₄ plants?
- i. Name six macronutrient and seven micronutrient elements.
- j. Contrast autotrophic and heterotrophic plants.
- k. Definition of diffusion, osmosis, translocation, transpiration.
- l. Chemical equation for respiration.
- m. What does the Q₁₀ value imply?
- n. Suggest ways to reduce respiration from stored plant parts.
- o. What is meant by ‘hypobaric’ storage and why is it used?
- p. Difference between anabolism and catabolism.
- q. Name 3 major groups of plant constituents (carbohydrate, protein, fatty acids).
- r. Know what is meant by: monosaccharides, disaccharides, oligosaccharides, polysaccharides, starch.

5. **Differentiation and Development** (Chapter 5, Lectures)

- a. What is meant by differentiation?
- b. Difference between phyto-hormones and plant growth regulators.
- c. What is meant by phototropism and how does it occur?
- d. Know the plant growth hormone that is responsible for phototropism.
- e. Know three different types of auxins (natural, synthetic).
- f. What is meant by apical dominance how does it occur?
- b. Know about the functions, occurrence and practical use of the following growth regulators: auxins, gibberellins (GA), cytokinins, ethylene, abscisic acid.
- c. What is phototropism and what growth hormone is involved in it?
- d. What is apical dominance and what plant growth hormone is involved in it? What horticultural practice requires the removal of apical dominance?
- e. Know about the kinds of auxins and cytokinins used in plant tissue culture (auxins: IAA (natural), NAA (synthetic); cytokinins: zeatin (natural), kinetin (synthetic), benzyl adenine (BA, synthetic), 2-iP (synthetic).
- f. What growth regulator is used to induce parthenocarpy (seedless fruit) in grapes?

- g. Name growth regulators used to convert flower sexes: 1) from male to female, 2) female to male in cucurbits.
- h. A growth regulator used in the enhancement of fruit ripening and flower induction in bromeliads (including pineapple).
- i. Growth regulators used in plant tissue culture for induction of: 1) shoot differentiation, 2) callus and root differentiation.
- j. Three steps of seed germination.
- k. Difference between physical (seed coat) dormancy and physiological (inhibitor induced) dormancy of seeds and suggest how these dormancies can be eliminated.
- l. What is meant by 'double dormancy'?
- m. Difference between scarification and stratification in breaking seed dormancy.
- n. Why is the phase change from juvenility and maturity important in tree fruit production?
- o. Why is chilling requirement important in fruit growing? Why is apple industry absent in Florida or other warm regions, although the plants grow well?
- p. Influence of C:N ratios on vegetative and reproductive growth.
- q. Examples (2 species) of short-day, long-day and day-neutral plants.
- r. Name of the receptor (pigment compound) responsible for photoperiodism.
- s. What is meant by 'critical dark period' and 'night break'?
- t. Why long-day plants do not bloom in the tropical regions of the equator?
- u. What is meant by vernalization? Give examples of plants that require vernalization for flowering.