BIOL 325 – Plant Systematics Name: _____
Sample Topics & Questions for Exam 1

Topic 01 – Introduction, Sample Topics & Questions:

1. What major topics to Rhoads and Block (2007) discuss in the introduction to their book?

2. What are the reasons that Prather et al. (2004) list for continued herbarium collecting even in places like North America the flora is thought to be well known?

3. What method(s) does Dirig (2005) discuss for mounting pressed specimens to herbarium sheets?

4. What methods does Dirig (2005) discuss for collecting plant specimens for later pressing?

5. What do the graphs used by Prather et al. (2004) show about herbarium plant collecting in the US?

6. How does one define plant systematics? Name at least one synonym for plant systematics?

7. What are practitioners of plant systematics called and what are some of their important products?

8. Be able to explain how each of these products are important to people and other scientists outside the field of systematics.

9. What is a phylogeny?

10. What is a herbarium?

11. Name the important components of a herbarium specimen.

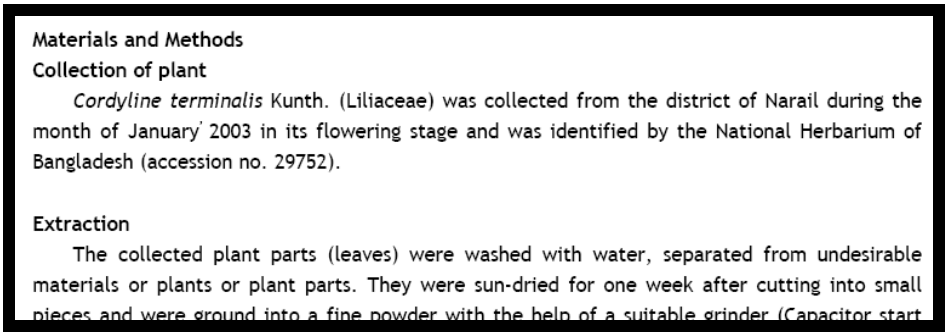
12. What are herbarium specimens used for?

13. Although taxonomy and systematics are often treated as synonyms by many, they are not actually the same thing. Which of the two is a broader term and how so?

14. The far majority of plant species are described from studies in ...
a. botanical gardens
b. herbaria
c. the field
d. plant nurseries
e. zoological museums

15. The excerpt below from an economic botany study depicts the most important step of any scientific study in which the identity of the species investigated is crucial. That is the…

a. … washing of the leaves with water.
b. … identification of the plant family.
c. … identity and location of the voucher specimen.



Materials and Methods

Collection of plant

Cordyline terminalis Kunth. (Liliaceae) was collected from the district of Narail during the month of January 2003 in its flowering stage and was identified by the National Herbarium of Bangladesh (accession no. 29752).

Extraction

The collected plant parts (leaves) were washed with water, separated from undesirable materials or plants or plant parts. They were sun-dried for one week after cutting into small pieces and were ground into a fine powder with the help of a suitable grinder (Capacitor start

Topic 02 – The PA Flora from Macroevolutionary and Physiogeographical Perspectives, Sample Topics & Questions:

1. From Moyer and Hardy (2016) order the major groups of plants in Pennsylvania (Angiosperms, Bryophytes, Ferns and Horsetails, Gymnosperms, and Lycopods) in order of their appearance in evolutionary time.

2. From Moyer and Hardy (2016): Which major group of plants would have been dominant during the early Devonian?

3. From Moyer and Hardy (2016): Which major group of plants would have been dominant between 250-200 Ma?

4. Why were these plants (Question 3) dominant during this period of time and not others of the major groups?

5. From Rhoads and Block (2007), Introduction, draw a map of Pennsylvania showing the geographic extent and position of the 4 main physiogeographic provinces.

6. Order the 3 major orogenies in the Appalachian uplift in order from oldest to most recent. When did each occur?

7. Which orogeny resulted in the formation of Pangea?

Topic 03 – The Code, Sample Topics & Questions:

1. Which reading assignment provides a real, published example of publishing new species descriptions, names and new combinations?

    a. Be able to describe how this assignment follows the steps for valid publication of new taxonomic names.

2. Which reading assignment discusses the important changes between the current Code and the Vienna Code? What are some of those changes as it relates to 1) the Codes formal name, 2) the language to be used for formal taxonomic descriptions or diagnoses, and 3) effective publication.

3. Which reading assignment provides the Preamble and Principles for the current Code of botanical nomenclature? What does the Preamble state? What are those principles?

4. The Virginia creeper, *Parthenocissus quinquefolia* (L.) Planch., has an interesting nomenclatural history. Which history below is most likely?

a. The species was originally described as *Hedera quinquefolia* by Jules Planchon, then was transferred to the genus *Parthenocissus* by Carolus Linnaeus.
b. The species was originally described as *Hedera quinquefolia* by Jules Planch, then was transferred to the genus *Parthenocissus* by Carolus Linnaeus.
c. The species was originally described through a collaborative effort between Linnaeus and Planch.
d. The species was originally described as *Hedera quinquefolia* by Linnaeus, then was transferred by Jules Planch to *Parthenocissus*.
e. The species was originally described as *Hedera quinquefolia* by Linnaeus, then was transferred to *Parthenocissus* by Jules Planchon.

5. *Halodromeda rubra* (L.) L.: Provide a logical explanation for the nomenclatural history of this taxon.

Questions 6-11, answer the following questions regarding this excerpt from Liede & Meve (1996)

Cynanchum aculeatum (Descoings) Liede & Meve, comb. nov. Basionym: *Prosopostelma aculeata* Descoings, Natur. Malgache 9: 184. 1957. *Folotsia aculeata* (Descoings) Descoings, Adansonia sér. 2, 1: 313. 1961. TYPE: Madagascar. Toliara, Cap Sainte-Marie, sur la plateforme terminale, *Descoings 1013* (holotype, P; isotype, TAN). Figure 1.

6. Does this represent the description of a new species or merely the transfer of a species to a new (different) genus?

7. Who is(are) the author(s) that originally described the species?

8. What is the original name for this species?

9. Where was the type specimen(s) collected and by whom?

10. Where does the holotype reside (abbreviation is fine)?

11. How many name changes has this species undergone?

12. Name a new cultivar of the red maple, *Acer rubrum*, after the unusually large leaves that the new cultivar has. Provide the name of the species and cultivar, correctly written, below.

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13. Pretend you are a taxonomist and transfer *Antirrhinum spurium* L. into the related genus *Linaria* Mill. *Linaria* is the toadflax genus, and includes many species, such as the alpine toadflax, *Linaria alpina*. Provide the correct and complete name of this transferred species formerly known as *Antirrhinum spurium* below.

14. The peach belongs to the species *Prunus persica* (L.) Stokes, and is a decidedly cool fruit. Which of the following is its most likely nomenclatural history?

a. The peach was originally described by Jonathan Stokesia as *Amygdalus persica*, but was transferred to *Prunus* by Carolus Linnaeus.
b. The peach was originally described by Jonathan Stokes as *Amygdalus persica*, but was transferred to *Prunus* by Carolus Linnaeus.
c. The peach was originally described by Carolus Linnaeus as *Amygdalus persica*, but was transferred to *Prunus* by Jonathan Stokesia.
d. The peach was originally described by Carolus Linnaeus as *Amygdalus persica*, but was transferred to *Prunus* by Jonathan Stokes.

15. The suffix for the rank of family is..

a. –opsida
b. –aceae
c. –ophyta
d. –idea
e. –ales

16. **If *Aesculus* L. (published in 1753), *Pavia* Mill. (published in 1754), *Macrothyrsus* Spach (published in 1834), and *Calothyrsus* Spach (published in 1834) are formally lumped into a single genus, what is the correct name of this more broadly defined genus?**

17. Name and rank the principal taxonomic ranks in order from most inclusive to least inclusive.

18. Provide the formula for a hybrid between *Lupinus grandifolius* L. and *Lupinus peruvianus* Aulestia. Be sure the name(s) you write below is(are) complete.

19. Instead, pretend that you are a taxonomist and give an actual formal, binomial name to a hybrid between *Lupinus grandifolius* L. and *Lupinus peruvianus* Aulestia. Be sure the name you write below is complete.

20. Pretend you are a taxonomist and you name a species of oak (*Quercus*) after Abraham Lincoln (1809 – 1865), using his last name. Provide this name below and be sure it is complete and correctly written according to current custom.

21. Ted Nugent decides to split the Magnoliaceae Juss. Into two families. Which of the following 4 scenarios is valid under the Code?

Classification 1:

Magnoliaceae Juss.
Liriodendron L.
Magnolia L.
Michelia L.

Classification 2:

Magnoliaceae Juss.
Magnolia L.
Michelia L.

Liriodendraceae T.Nugent
Liriodendron L.

Classification 3:

Magnoliaceae Juss.
Liriodendron L.
Magnolia L.

Micheliaceae T.Nugent
Michelia L.

Classification 4:

Magnoliaceae Juss.
Michelia L.

Liriodendraceae T.Nugent
Liriodendron L.
Magnolia L.

22. You split *Plowmanianthus* into 3 genera, keeping in mind that the type for *Plowmanianthus* is *Plowmanianthus perforans*. Be sure to include authorship on all taxa

Old Classification for 5 species

Plowmanianthus Faden et C.R.Hardy
- *Plowmanianthus dressleri* Faden et C.R.Hardy
- *Plowmanianthus panamensis* Faden et C.R.Hardy
- *Plowmanianthus grandifolius* Faden et C.R.Hardy
- *Plowmanianthus perforans* Faden et C.R.Hardy
- *Plowmanianthus peruvianus* C.R.Hardy et Faden

Your New Classificdation for the same 5 species.

23. Distinguish between the different types of types. No how to apply these distinctions in real examples.

Topic 00 – Taxonomic (family, higher group) Knowledge, Sample Questions

1. Which plant group has spicy, aromatic ethereal oil cells?

A. Asterids
B. Rosids
C. Magnoliids
D. Monocots
E. Nymphaeids

2. Which plant group consists of aquatic herbs with showy flowers and numerous, spirally arranged floral parts?

A. Asterids
B. Rosids
C. Magnoliids
D. Monocots
E. Nymphaeids

3. Which plant family has squarish stems and opposite, fragrant leaves?

A. Asteraceae
B. Rosaceae
C. Lauraceae
D. Araceae
E. Lamiaceae

4. Which plant family has a single cotyledon and a spathe and spadix?

A. Asteraceae
B. Rosaceae
C. Lauraceae
D. Araceae
E. Lamiaceae

5. Which plant family has aromatic bark, simple alternate leaves and small flowers with whorled tepals and valvate anthers?

A. Asteraceae
B. Leguminosae
C. Lauraceae
D. Ericaceae
E. Lamiaceae

6. Which plant family generally has compound leaves, pulvini, 5-merous flowers, and a fruit that dries and splits along two sutures at maturity?

A. Asteraceae
B. Fabaceae
C. Lauraceae
D. Ericaceae
E. Rosaceae

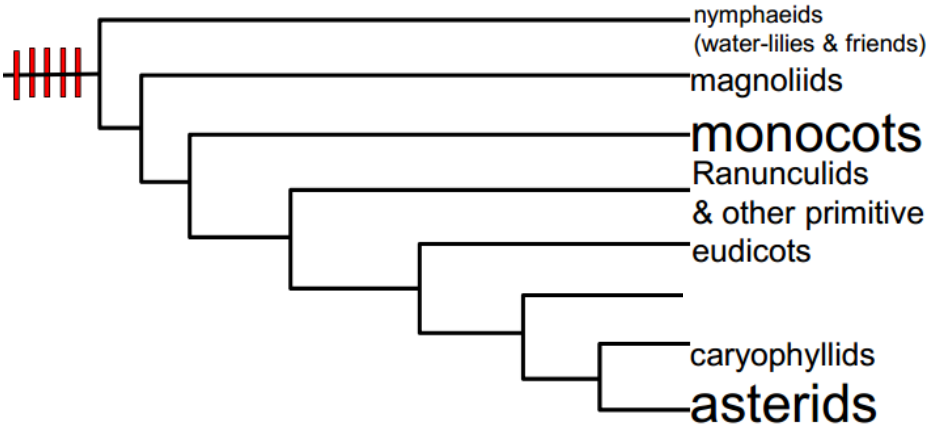
7. Which plant family generally has evergreen, entire leaves with 5 fused petals in an urceolate corolla and 10 poricidally dehiscent anthers?

A. Asteraceae
B. Leguminosae
C. Lauraceae
D. Ericaceae
E. Lamiaceae

8. To which family do apples, pears, and cherries belong?

A. Asteraceae
B. Leguminosae
C. Lauraceae
D. Ericaceae
E. Rosaceae

9. SHORT ANSWER: Fill in the missing group in the cladogram below



10. SHORT ANSWER: The cladogram above implies that the monocots are more closely related to who? <u>Provide a single word answer.</u>

11. SHORT ANSWER: Which group in the cladogram above is totally aquatic?

12. SHORT ANSWER: Which group(s) in the cladogram above comprise the "Basal Angiosperm Grade"?

13. SHORT ANSWER: The following picture is from which family?