

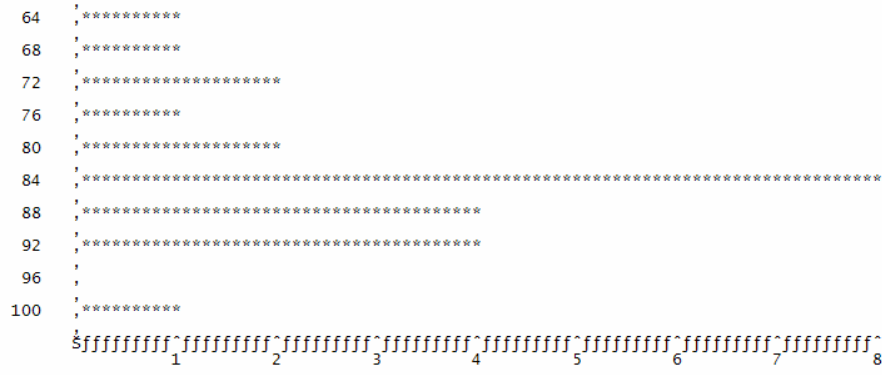
Exam02 (out of 50)	Exam02 %	MU Number, last 4 digi
35	70	0004
41	82	0345
42	84	0425
49	98	0496
42	84	0925
36	72	1448
34	68	1808
43	86	2668
42	84	3149
42	84	3681
45	90	4104
45	90	4746
38	76	5257
39	78	5503
45	90	5839
45	90	5850
41	82	6819
43	86	7188
40	80	7441
44	88	8140
32	64	8459
42	84	9090
42	84	9214
44	88	9764

Avg.	82.58333333
Standard Deviation	7.945010284
Min	64
Max	98

Grade distribution by percent right

2002 Tuesday, November 27, 10

Percent
Midpoint



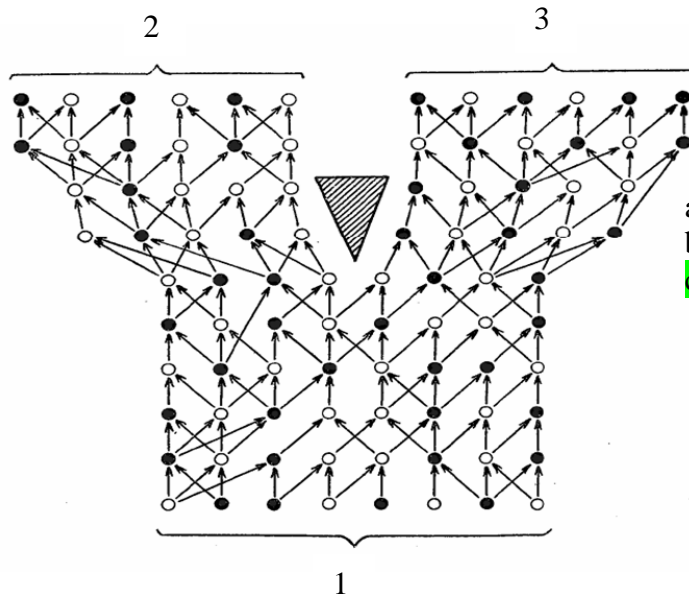
Freq	Cum. Freq	Percent	Cum. Percent
1	1	4.17	4.17
1	2	4.17	8.33
2	4	8.33	16.67
1	5	4.17	20.83
2	7	8.33	29.17
8	15	33.33	62.50
4	19	16.67	79.17
4	23	16.67	95.83
0	23	0.00	95.83
1	24	4.17	100.00

Frequency

BIOL 325-625. Exam 2 – Fall 2006
 CHOOSE THE BEST SINGLE ANSWER FOR EACH

Name: _____.

1. If the black and white circles below represent individuals, and the lines connecting them represent how they are related to one another, then lineages 2 and 3 are said to be



- a. phylogenetic species
 b. biological species
 c. both A and, potentially, B

2. Using the diagram above from Question 1, if lineage 2 has blue flowers and grows only at high altitudes and lineage 3 has red flowers and grows only at low altitudes, then lineages 2 and 3 are:

- a. potentially separate biological species
 b. separate phylogenetic species
 c. separate ecological species
 d. all of the above.
 e. B and C, but not A

3. The species represented by lineages 2 and 3 above in the diagram from Question 1 are:

- a. each sexual species b. asexual species

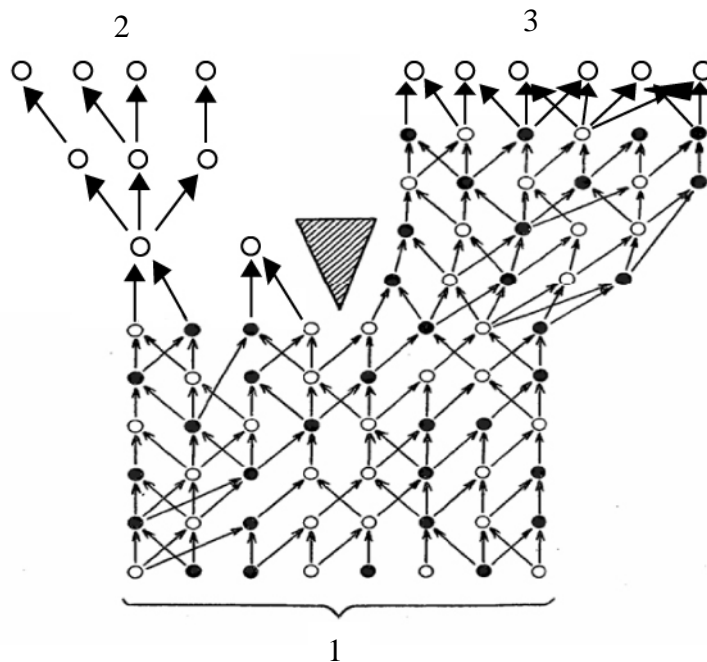
4. For sexual plant and animal species, speciation is often seen as ...

- a. the transition from tokogeny to phylogeny.
 b. the establishment of reproductive isolation.
 c. the establishment of some barrier to gene flow.
 d. all of the above.

5. What we call the “dandelion” (*Taraxacum officinale*) poses a problem for which of the species concepts below?

- a. a morphological species concept
 b. the Biological Species Concept
 c. Ecological Species Concept

6. Which group of organisms in the diagram BELOW is currently asexual?



a. left (group 2)

b. right (group 3)

7. Under the Biological Species Concept, gene flow...

- a. is the cohesive force within a species.
- b. is not important in defining species.
- c. occurs between populations both within and between species.
- d. A and C

8. Even if one could establish that two populations were 100% reproductively isolated from one another, a practical taxonomist might also require which of the following in order to call the two populations two separate species?

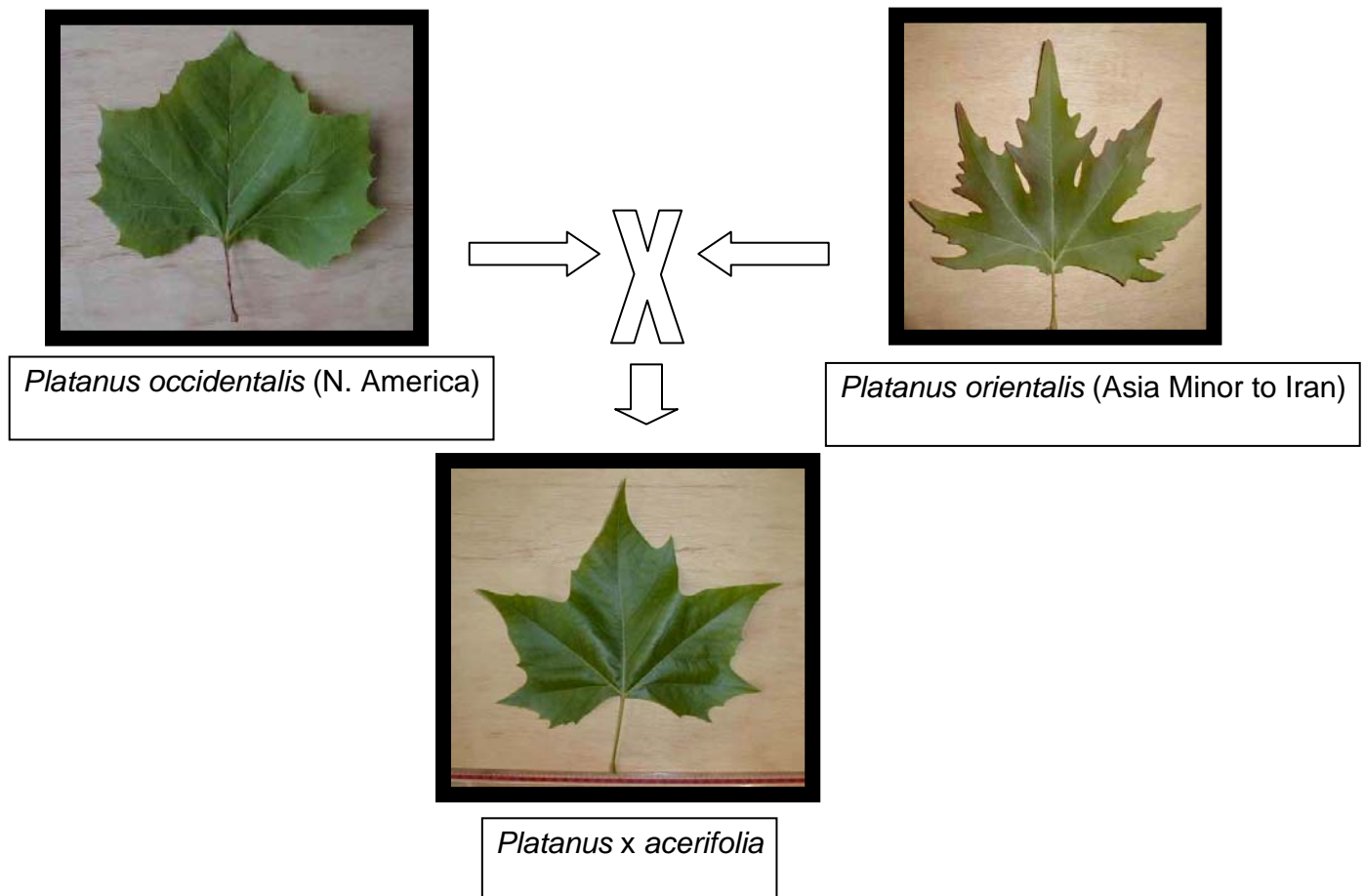
- a. morphological divergence.
- b. the possibility of forming fertile hybrids between the two populations.
- c. approximately 1 million years since the last fertile offspring produced between the two populations.

9. Name two potential non-geographical barriers to gene flow:

- a. shift in pollinators; or separation by an ocean.
- b. shift in flowering time; or a change in ploidy level
- c. shift in pollinators; or a change in ploidy level
- d. both B and C
- e. both A and C

10. The N American and Asian species of sycamore have been geographically isolated beyond the possibility for gene flow for long enough for them to diverge morphologically from one another. However, it is possible to artificially cross them to produce fertile hybrids (*P. x acerifolia*) as shown below. Under the strictest interpretations, *Platanus occidentalis* and *P. orientalis* are...

- distinct species *sensu* the Biological Species Concept.
- part of the same species *sensu* the Biological Species Concept.
- in nature, separate species *sensu* the Phylogenetic Species Concept.
- all of the above.
- both B and C.



11. The hybrid above is named *Platanus x "acerifolia"* because its leaves resemble the leaves of which family?

- Arum family
- Maple family
- Palm family
- Willow family

12. If the hybrid *P. x acerifolia* produced above was sterile instead, and these sterile hybrids are only produced by artificial means, then *Platanus occidentalis* and *P. orientalis* are...

- distinct species *sensu* the Biological Species Concept.
- part of the same species *sensu* the Biological Species Concept.
- separate species *sensu* the Phylogenetic Species Concept.
- both B and C.
- both A and C.

13. Species are...

- a. the smallest consistently named units of taxonomy
- b. usually the units of conservation and biodiversity studies
- c. more inclusive than the rank of genus.
- d. all of the above
- e. **both A and B.**

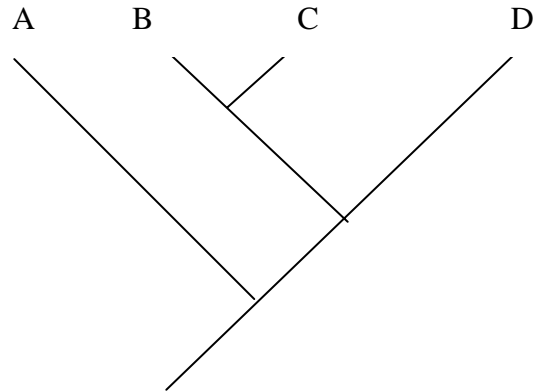
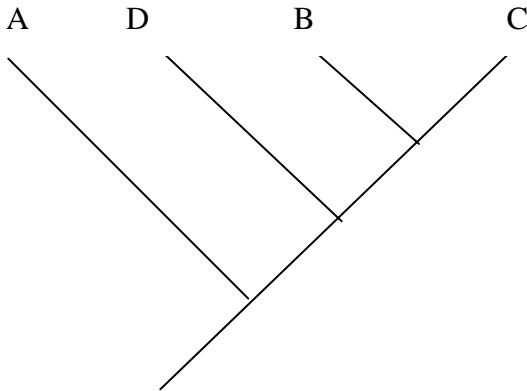
14. Speciation is...

- a. **the process by which we have accumulated at least about 1.8 million named species on the planet.**
- b. thoroughly unimportant to our understanding of evolution.
- c. all of the above.

15. The two cladograms below express the same set of phylogenetic relationships.

a. True

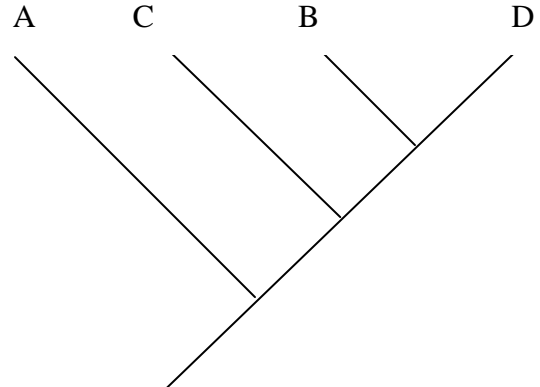
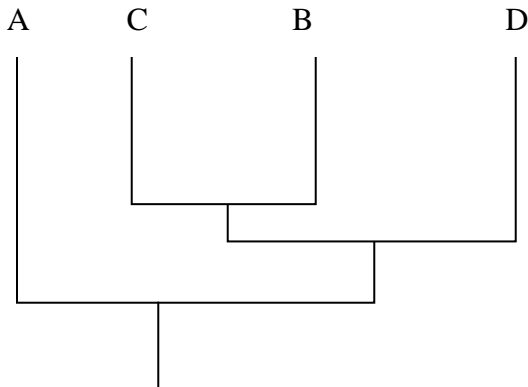
b. False.



16. The two cladograms below express the same set of phylogenetic relationships.

a. True

b. False.



17. A clade is the same thing as a monophyletic group.
a. True b. False
18. Although most herbals of the 1500's are from Mediterranean Europe, an example of an American (Aztec) herbal from about this same time is
a. *De Materia Medica*.
b. *Die Natürlichen Pflanzenfamilien*
c. **The Badianus Manuscript**.
d. *Useful Plants of the Aztecs*
19. Criticisms like “[such] loathsome harlotry as several males with one female would not be permitted in the vegetable kingdom by the Creator!” is likely to have been directed at
a. Theophrastus and his classification based primarily on habit.
b. **Carl von Linné (aka., Carolus Linnaeus)**.
c. Arthur Cronquist.
d. Bessey
20. Phenetic Approaches to Classification burst onto the scene in the 1950-70's in part due to
a. the influence of two biologists: Sokal & Sneath.
b. the theoretical and now computational foundation for crunching large amounts of data and having quantitative and/or statistical means of assessing species-species relationships.
c. **all of the above**.
d. The pioneering work of de John Ray.
21. The fused leaves of “boneset” (*Eupatorium perfoliatum*) were once thought to heal broken bones. This is an example of...
a. a joke Linnaeus used to tell his botany students at Uppsala University, Sweden.
b. **the Doctrine of Signatures, subscribed by many early herbalists**.
c. a synapomorphy.
22. Linnaeus's contribution to systematics..
a. **spans both botany and zoology**.
b. is negligible.
c. is ongoing, as he is still actively producing floras.
23. Linnaeus lived during
a. the 1500's
b. **the 1700's**
c. the 1900's
24. Linnaeus's system of classification was rejected outright by many prominent French botanists because
a. **however convenient, it was highly artificial**.
b. they had personal disputes with Linnaeus.
c. the Frenchmen could not read Latin.

25. French or French-Swiss such as de Jussieu and Adanson were influential in

- a. developing the first Herbals.
- b. developing more natural systems of classification.
- c. developing explicitly evolutionary classification schemes.

26. Arrange the following taxonomic traditions in chronological sequence (order of their appearance):

- a. folk taxonomy ==> evolutionary taxonomy ==> Linnaeus's sexual system.
- b. Linnaeus's sexual system ==> folk taxonomy ==> evolutionary taxonomy.
- c. folk taxonomy ==> Linnaeus's sexual system ==> evolutionary taxonomy.

27. The earliest botanical encyclopedic works discussed in class were produced by

- a. Numerical taxonomists.
- b. Evolutionary taxonomists.
- c. Herbalists.
- d. Carolus Linnaeus.
- e. Theophrastus

28. Dioscorides wrote *De Materia Medica*. This is generally attributed as...

- a. providing the first natural classification of plants.
- b. being the first herbal.
- c. being the longest used botanical encyclopedic work ever (being used and copied for over 1,000 years).
- d. both B and C.

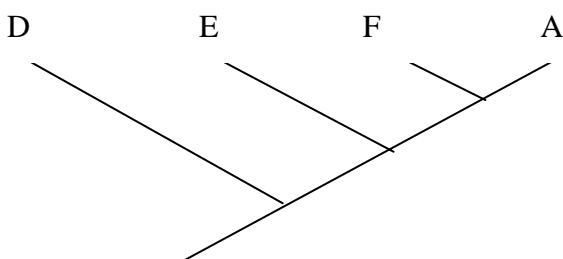
29. The primary goal of the early herbals was

- a. to present all the then-known plant species in a logical sequence that followed natural relationships among the taxa.
- b. to provide a means to identify herbaceous plants to species.
- c. to facilitate the proper identification and use of medicinal or otherwise useful plants.

30. The Doctrine of Signatures was...

- a. an Aztec herbal signed by the then Aztec ruler and the Pope. Kept in the Vatican.
- b. a manuscript written by Dioscorides.
- c. the concept that taxonomic relationships were to reflect God's plan of creation.
- d. the concept that the key to humanity's use of various plants was indicated by the form of the plant.
- e. none of the above.

31. The Italian Caesalpino is considered the first or one of the first taxonomists because
- His work (*De Plantis Libri*) provided a description and classification of ca. 1500 plant species based on morphological characters of functional or ecological significance.
 - His work represented the first clear break from the medicinal perspective of herbals.
 - both A and B.
32. Darwin's ideas expressed in his *On the Origin of Species by Means of Natural Selection* (1859) were influential in establishing the arena for
- "evolutionary" classifications by the likes of the Americans Bessey and Cronquist.
 - "evolutionary" classifications by the likes of Linnaeus.
 - "evolutionary" classifications by the likes of Engler and Prantl.
 - all of the above.
 - A and C.
33. In what way was Arthur Cronquist's 1981 *An integrated system of classification of flowering plants* "integrated"?
- Massive amounts of data from all sources including chemistry, cytology, & morphology.
 - It was a hybrid system combining elements of the classifications produced by Linnaeus and Theophrastus the Greek.
34. Prior to the standardization of binomial nomenclature by Linnaeus in 1753, names of many species were
- polynomials.
 - single word descriptors.
 - in Chinese.
35. A binomial species name consists of
- A specific and subspecific epithet.
 - A unique 5-letter word.
 - a genus name followed by a specific epithet.
36. Phenetics defined:
- the use of shared derived characters to express relationships.
 - the use of measures of similarity to express relationships.
37. What is the proper way to interpret the following dendrogram derived from a phenetic analysis?



- A and F are more closely related to each other than either is to E.
- A and F share a more recent common ancestor than either do with E.
- A and F are more similar to one another than either is to E or D.

38. Who is often credited with developing the foundation for modern cladistic thinking and methods?

- a. Theophrastus.
- b. Sokal.
- c. Hennig.
- d. Cronquist
- e. Takhtajan, a German soldier during World War II.

39. Cladistics is the theory and practice of reconstructing (inferring)

- a. phylogeny
- b. tokogeny
- c. phenetic relationships.

40. The genus *Ophrys* includes species that are

- a. clearly good ecological species
- b. clearly good phylogenetic species, under the strictest interpretation
- c. clearly good biological species, under the strictest interpretation
- d. A and B
- e. A and C

41. There are 5 species defined by differences in inflorescence morphology. Although they do not produce offspring in nature, they can be artificially crossed in the greenhouse to produce fertile offspring. The number of species that one might recognize according to strict interpretations of the phylogenetic species concept, the biological species concept, and the morphological (phonetic) species concept are as follows:

- a. 5, 5, and 5
- b. 5, 5, and 1
- c. 1, 1, and 5
- d. 5, 1, and 5
- e. 5, 1, and 1

42. Herbaria

- a. function much like "plant libraries"
- b. are essentially well-managed living collections of plants useful for systematics research
- c. are essentially collections of pressed, dead plants useful for systematics research.
- d. A and B
- e. A and C

43. Standard archival herbarium sheet paper is typically

- a. 100% cotton, neutral pH, and 11.5 x 16.5 inches
- b. 100% cellulose fiber, neutral pH, and 11.5 x 16.5 inches)
- c. 100% cotton, acid pH, and 11.5 x 16.5 inches

44. According to your reading on herbaria, _____ is typically diluted _____ to _____ to attach both pressed, dried plants and labels to herbarium sheets.

- a. Elmer's glue, 60% water, 40% glue
- b. Elmer's glue, 50% water, 50% glue
- c. Elmer's glue, 60% glue, 40% water
- d. An archival oil-based glue, 60% glue, 40% water
- e. An archival oil-based glue, 50% glue, 50% water

45. To control against specimen damage by cigarette (dermestid) beetles, it is recommended by the Bailey Hortorium to

- a. freeze specimens coming in or suspected of containing beetles.
- b. keep all herbarium case doors closed when one is not working
- c. use pesticides to keep beetles away.
- d. B and C
- e. A and B

46. Herbarium labels should be fixed to the lower right of a herbarium sheet to

- a. facilitate efficient searches for specimens after filing in the collection
- b. make room for the plant specimen
- c. none of the above.

47. Lamarck's contribution to plant systematics is as follows

- a. *Flora Francoise*, keys, and the theory of evolution via natural selection
- b. *Flora Francoise*, invention of the genus concept
- c. keys, *Flora Francoise*

48. The big important starting date for modern botanical nomenclature is

- a. 1743
- b. 1789
- c. 1753
- d. 1932
- e. the 1st Century AD.

49. Vicariant speciation is speciation caused by the

- a. dispersal of a species across a pre-existing barrier, followed by genetic and morphological divergence.
- b. interruption of a once widespread species distribution by the emergence of some barrier to dispersal, followed by genetic and morphological divergence.
- c. a form of sympatric speciation.
- d. a form of polypoidy-driven speciation.

50. The genus *Dioscorea* includes many herbaceous vines as well as the cultivated yam (not the sweet potato) that is popular in the cuisine of tropical countries, especially the Caribbean. This genus is named after...

- a. An important 16th century Italian taxonomist.
- b. A 1st century Greek physician in the Roman army.
- c. An important 18th century Swedish naturalist / taxonomist.
- d. The author of the first British flora.
- e. The author of *Prodromus Systematis*, the first and last attempt to do a World flora.