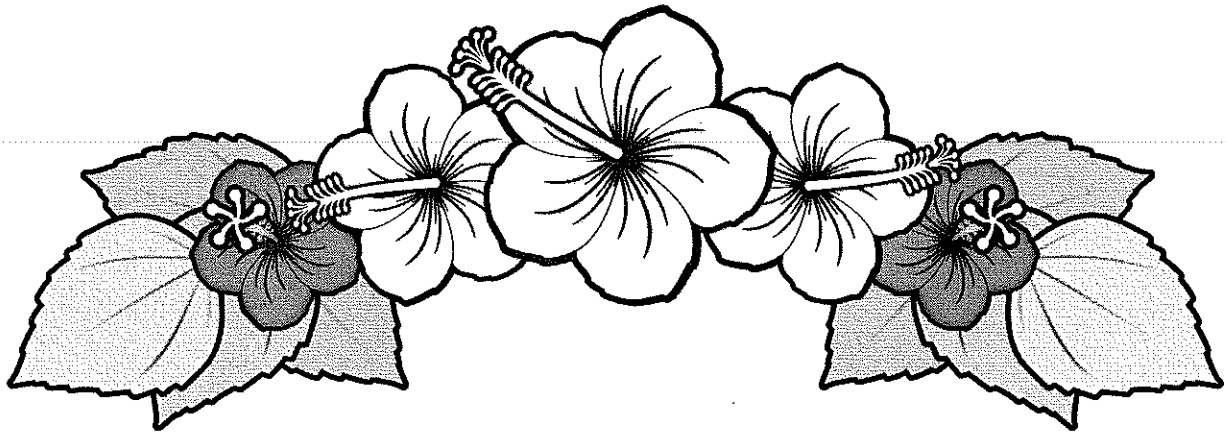
BIOL 472.05
Ethnobotany – Economic Botany Seminar

Name: Key

Final Exam

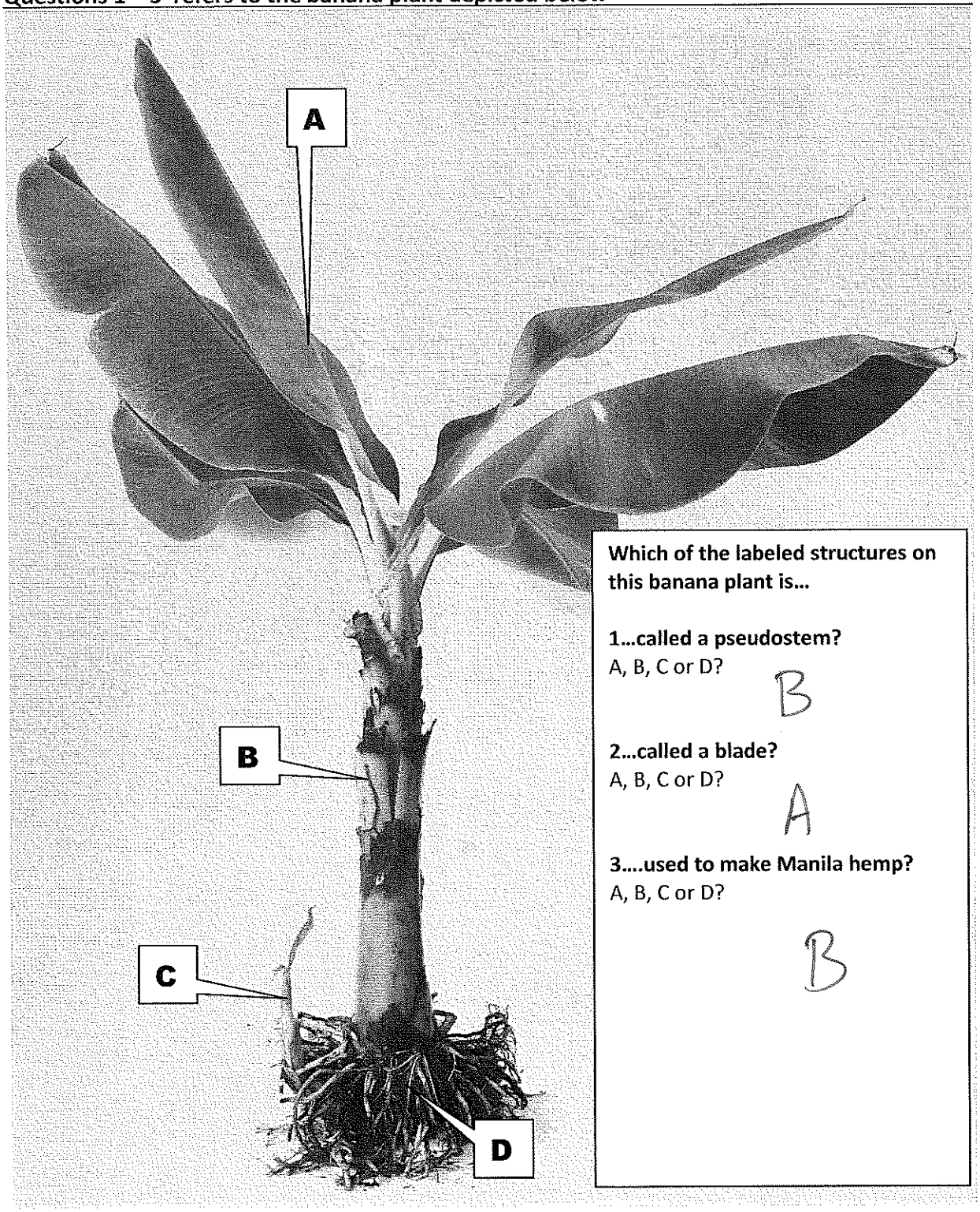
Spring 2018
50 pts

*Do not turn this page over and start until instructed to do so.



Part 1: Ethnobotanical Plant Profiles

Questions 1 – 3 refers to the banana plant depicted below



Which of the labeled structures on this banana plant is...

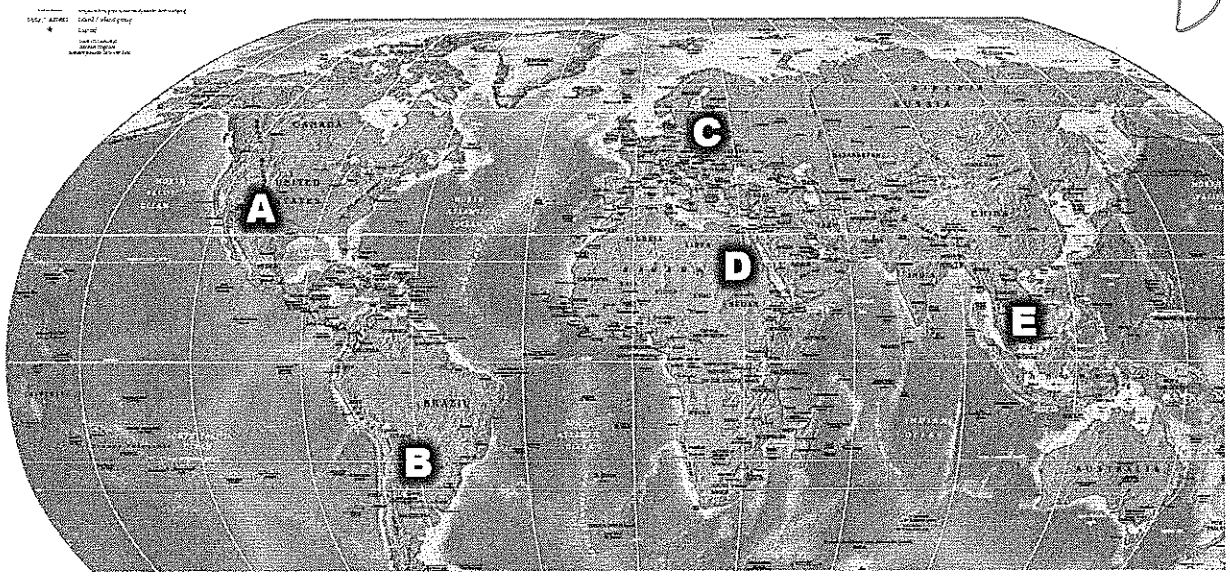
1...called a pseudostem?
A, B, C or D?
B

2...called a blade?
A, B, C or D?
A

3....used to make Manila hemp?
A, B, C or D?
B

4. Which letter on the world map below is closest to the native range of *Aloe vera*?

D



5. Which letter on the world map above is closest to the native range of *Musa acuminata*?

E

6. Which letter on the world map above is closest to the native range of the *Cocos nucifera*?

E

7. Which Doylestown, Pennsylvania native wrote the following based on his experiences with the coconut palm in his 1951 book *Return to Paradise*?

> *And everywhere there were coconut palms. This amazing tree is the life blood of the atoll. Its wood makes furniture, its plaited leaves make fine baskets or hats or carpeting or partitions....The heart of the palm makes the world's best salad...the husk is perfect insulating material...*
>
> *As if that were not enough, the liquid within the nut is a delicious substitute for drinking water and ...is so pure that it can be used medically as a completely sterile saline solution...*
> [etc, etc.]

James Michener

8. What's the technical botanical term for the coconut's "meat", dried or fresh, and what economically important product(s) is(are) obtained from it?

- (Solid) endosperm
- Oil, milk, coconut flakes / straight "meat" for eating.

9. What's the technical botanical term for the coconut's "water" and what economically important product(s) is(are) obtained from it?

- (Liquid) Endosperm.
- A Drink called "Coconut Water"

10. Describe the ways in which the coconut water different than coconut meat?

Differences in Physical Characteristics:

Water	Meat
- Liquid	vs. - solid tissue
- Clear	- Opaque

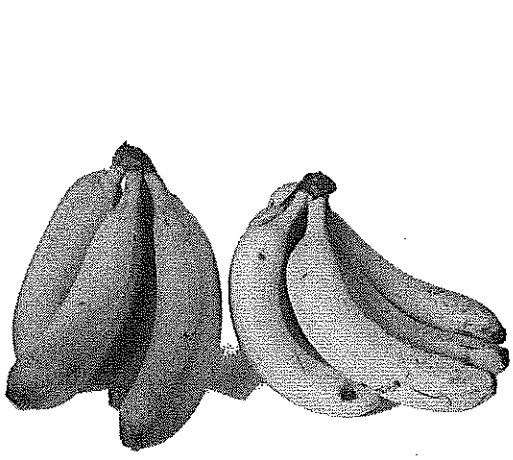
Technical (Botanical) Differences

Water = Liquid, free nuclear endosperm

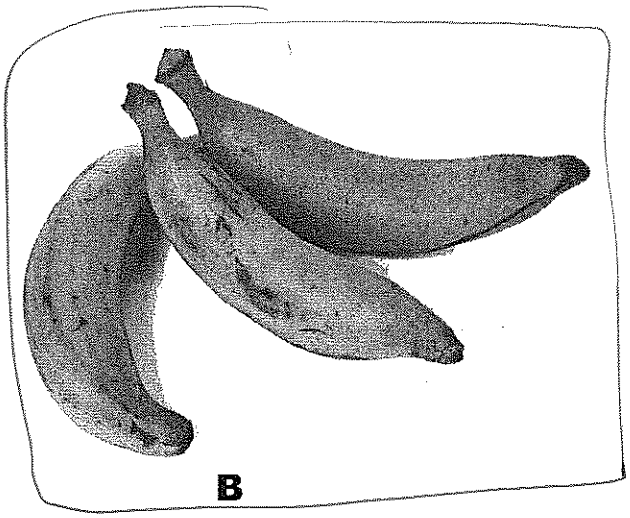
Meat = Solid, cellular endosperm

11. Bananas are often classified as "cooking bananas" and "dessert bananas". Which of those below is the cooking banana?

A or B?



A



B

12. Seedless bananas form on _____ plants and are the result of sterility caused by _____ in such plants.

A. diploid; meiotic irregularities

B. haploid; meiotic irregularities caused by a deficiency in the number of chromosomes

C. tetraploid; mitotic irregularities caused by the extra set of chromosomes

D. tetraploid; meiotic irregularities caused by the extra set of chromosomes

E. triploid; meiotic irregularities caused by the extra set of chromosomes

13. For each of the plants below, check the use categories that apply and base your answer on what was presented in class or in the posters in the hallway that you read. The categories are defined below the table. (3 pts)

	Construction/Shelter	Cosmetic	Edible (by humans)	Jewelry, Tools, Crafts	Medicinal	Ornamental	Utility Fiber
Aloe vera		✓	✓		✓	✓	
Banana Plants (all types)			✓	✓		✓	✓
Coconut Palm	✓	✓	✓	✓	✓	✓	✓

Construction = materials such as wood or leaves to build shelter.

Cosmetic = used topically (not ingested) for non-essential, non-medicinal purposes, usually for the intended purposes of beautification.

Edible = regularly eaten for sustenance, nutrition or enjoyment by one or more human cultural groups.

Jewelry, Tools, Crafts = self-explanatory applications for the production things to adorn oneself (jewelry), things to make tasks easier (tools broadly defined, including tool handles, plates, cups, utensils, baskets, etc.), or crafts (including art such as painting and sculpture, weavings).

Medicinal = use of plant or extracts to treat illness or for regenerative purposes.

Ornamental = plants planted or leaves or flowers cut to adorn one's interior or exterior surroundings.

Utility Fiber = fibers extracted for the manufacture of cordage (e.g. rope) or fiber mats for various applications. Not dietary fiber.

Part 2: Biological Classification & Naming

14. Define Biological Taxonomy.

The science of classifying & naming organisms.

15. The full scientific citation for the the familiar grocery store banana (Cavendish Banana) is

***Musa acuminata* L. cv. Dwarf Cavendish**

What does "Musa" represent in the name? Use the scientific term. (1 pt)

Genus

What does "acuminata" represent in the name? Use the scientific term. (1 pt)

Specific epithet

What does "L." represent in the citation? Use the scientific term. (1 pt)

The author of the species name (Linnaeus in this case)

What does "Dwarf Cavendish" represent in the citation? Use the scientific term. (1 pt)

The cultivar name.

16. What taxonomic rank are groups of genera placed into?

Family

17. What taxonomic rank are groups of families placed into?

Order

18. *Rhus radicans* L. is a synonym of *Toxicodendron radicans* (L.) Kuntze. Which scenario below is the simplest and therefore best fit to this species's current name?

a. Linnaeus's *Rhus radicans* was illegitimate (not validly published). In the process of applying a legitimate name to the species, Kuntze decided to place the species in a new genus, *Toxicodendron*.

C b. Linnaeus described the species first as part of the genus *Rhus*. Later Kuntze recognized that the chemistry and position of the inflorescences of *R. radicans* was different than that of other *Rhus* species and decided to place *R. radicans* in his newly created genus *Toxicodendron*.

c. Kuntze described the species first as part of the genus *Toxicodendron*. Later, Linnaeus recognized that the chemistry and position of the inflorescences of *T. radicans* was different than that of other *Toxicodendron* species and decided to place *T. radicans* in his newly created genus *Rhus*.

d. Kuntze's *Toxicodendron radicans* was illegitimate (not validly published). In the process of applying a legitimate name to the species, Linnaeus decided to place the species in a new genus, *Rhus*.

19. Pretend that you discover that mango, *Mangifera indica* L. should really be placed within the genus *Rhus*. Make that change and write the new name for this species below and include the full authorship for this new name. (2 pts)

Rhus indica (L.) C.R. Hardy

↑ Your name as author of the new combination.

Part 3: Field Work, Herbaria and Herbarium Specimens

20. Plant collections for herbaria are prepared using...

a. a printing press
b. a plant press

21. Why are plants are pressed when drying?

So they don't wrinkle or shrivel upon drying.

22. Why are plants dried when making herbarium specimens?

So they will be preserved upon death rather than being decomposed.

23. List three hypothetical scenarios in which a voucher specimen would need to be inspected by an ethnobotanist after the study reporting on the use of that species was published. (5 pts)

1. Correct identity of specics as orginally reported is in doubt,
2. What was formerly one specics has recently been split into 2 or more species. From which ~~of the~~ multiple species was the material used actually from?
3. Inspect specimens for location + to build recognition skills so that you can relocate it in the field for further study.

24. What does Nguyen (2005) recommend doing with bulky or fleshy items before pressing in order to preserve them as voucher specimens best?

1. Slicing them to make them less bulky and to better facilitate rapid drying
2. Drying them in the sun or under low heat a bit before placing them in the press.

25. What is the name for the type of facility/institution into which voucher specimens should be deposited?

Herbarium

Part 4: Medicinal Plants

26. The Pacific Yew was the original source of the chemotheraby drug

Taxol®.

27. Digoxin is the name of the toxiin produced by the Foxglove **plant and which is used to treat** congestive heart failure

28. Quinine is an alkaloid from the plant Peruvian bark **which is still used to treat or prevent** malaria **in parts of the world.**

29. Approximately what percentage of medicines in the United States are botanical in origin?

25%

30. Approximately what percentage of the world human population still rely largely on plants as medicine?

75%

31. Define secondary metabolite?

A chemical product of an organism's metabolism which is not necessary for that organisms growth or development.

32. Describe two different functions of secondary metabolites in plants (not medicinal uses, but their function in the plants that produce them).

1. Herbivory defense
2. Attraction of pollinators
3. Allelopathic suppression of competing ~~speci~~ plants.

Part 4: Ethics of Conducting Ethnobotanical Resarch

33. What are the three primary objectives of the 1992 Convention on Biological Diversity (CBD) in Rio? (3 pts)

From p. 647:

1. The conservation of Biological diversity.
2. The sustainable use of the components of biodiversity.
3. The fair and equitable sharing of benefits arising from the use of biodiversity.

34. What is the Nagoya Protocol and what aspect of the CBC did it expand upon ?

From p. 648

3 above.

35. What is Informed Consent in the context of carrying out ethnobotanical research?

Actually, Prior Informed Consent is the key. You must fully explain your methods and intended use of the information you collect from your study, and how participants will be impacted or compensated. You should explain this to participants and get their consent to conduct your study as such before starting the study.