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Bio 221 – Concepts of Botany
Dr. Hardy
Exam 2 (Spring 2013)

Name: Key

Instructions:

-PLEASE DO NOT TURN THIS PAGE OVER UNTIL PROF. HARDY HAS INSTRUCTED YOU TO DO SO.

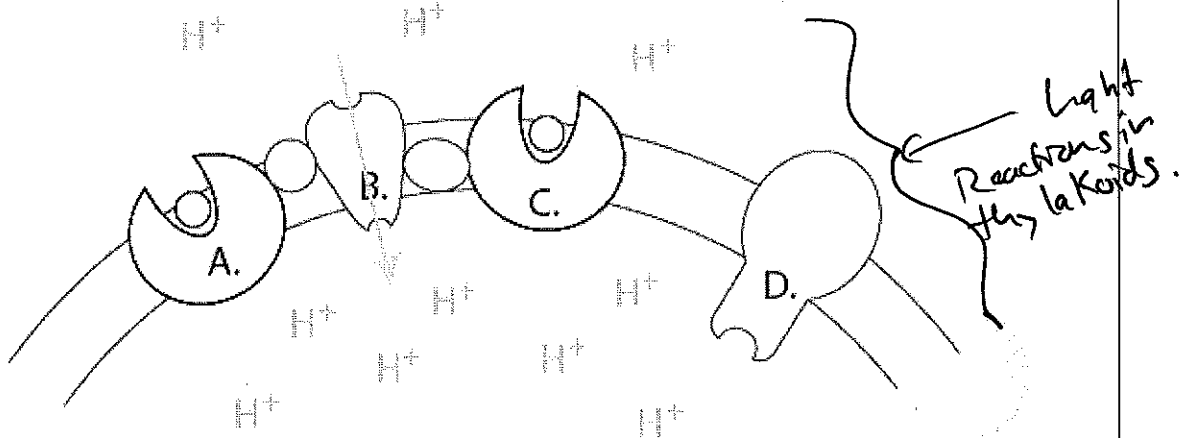
- You must hand in this question packet with your name on it at the end of the period with your scantron.
- Scantron answer bubbles should be completely filled in with a number 2 pencil.
- Start by filling in your complete last name and both first and middle name initials.
- Fill in your MU number in the Social Security number slot.
- Read ALL possible answers, then choose THE BEST single answer.
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- The majority of the carbon atoms in our bodies can be traced ultimately to
 - the CO_2 molecules taken in by a plant and into the Krebs cycle.
 - the CO_2 molecules taken in by a plant and into the light reactions.
 - the CO_2 molecules taken in by a plant and into the dark (light-independent) = Calvin cycle reactions.
 - the hydrolysis of ATP during photosynthesis.
 - the dehydration of ATP during photosynthesis.
- The production of free oxygen that contributes to the O_2 in our atmosphere comes from which of the following molecules during photosynthesis?
 - H_2O During the light reactions. Nearest to Photosystem II
 - CO
 - $\text{C}_6\text{H}_{12}\text{O}_6$
 - CO_2
 - O_2
- Light Reactions ...
 - Fix carbon
 - Make ATP
 - Make NADPH
 - Both A and B
 - Both B and C
- What pigment makes photosynthesis possible?
 - Eumelanin
 - Pheomelanin
 - chlorophyll — Specifically, chlorophyll 'a'
- Photosynthesis is a process that naturally takes which of the following greenhouse gasses out of our atmosphere?
 - N_2
 - CO
 - CH_4
 - CO_2 Cool. eh?
 - O_2

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Questions 6-9, refer to diagram below.



6. Protons are being pumped against their concentration gradient by the protein complex labeled "B". This is a form of _____ and _____.
 - A) passive transport; no energy is required
 - B) passive transport; ATP provides the energy required
 - C) passive transport; electrons provide the energy required
 - D) active transport; ATP provides the energy required
 - E) active transport; electrons provide the energy required
7. Assuming electrons are moving from left to right in the figure, structure "C" is which?
 - A) Photosystem I
 - B) Photosystem II.
 - C) ATP Synthase.
 - D) Reaction Center.
 - E) Both Photosystem I and II.
8. O₂ is formed closest to which structure above?
 - A) structure A.
 - B) structure B.
 - C) structure C.
 - D) structure D.
9. ATP is formed closest to which structure above?
 - A) structure A.
 - B) structure B.
 - C) structure C.
 - D) structure D.

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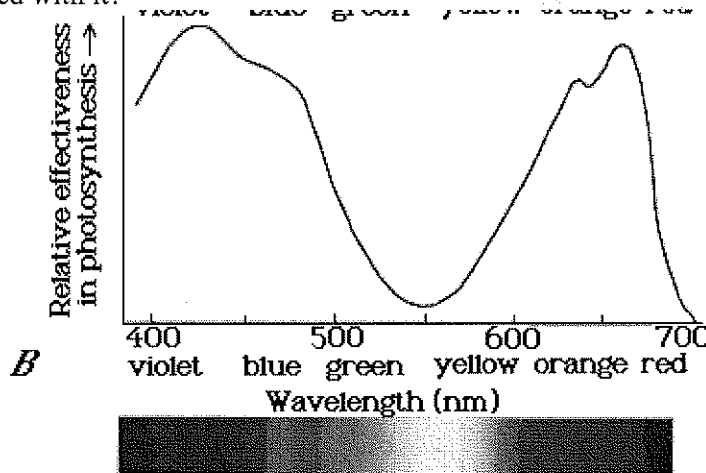
10. The class consensus in lecture was that a forest sequesters carbon in the bodies of its trees and other plants and that this is a good thing to help mitigate Global Warming. Specifically what type of molecules sequester the carbon?

- A. Water
- B. Organic molecules**
- C. Carbon dioxide
- D. Carbon monoxide
- E. Oxygen

11. What type of process(es) would not release this carbon from the body of a tree?

- A. Decomposition of the tree
- B. Combustion of the tree
- C. Carbon fixation in the tree**
- D. Cellular respiration of tree molecules by an herbivore

12. Using the figure below, tell me which of the following wavelengths of light has the lowest energy associated with it?



- A. 430 nm
- B. 480 nm
- C. 635 nm
- D. 550 nm
- E. 665 nm**

13. Using the figure in 12 above, tell me approximately which wavelength of light is least effective in driving photosynthesis?

- A. 430 nm
- B. 480 nm
- C. 635 nm
- D. 550 nm**
- E. 665 nm

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14. Using the figure in 12 above, tell me approximately which wavelength of light is most effective in driving photosynthesis?

- A. 430 nm
- B. 480 nm
- C. 635 nm
- D. 550 nm
- E. 665 nm

15. Which of the following hormones is/are involved in fruit ripening?

- A. Cytokinins
- B. Gibberellic Acids
- C. Ethylene
- D. Auxins
- E. Alkaloids

Distinguish from 'development' & auxin's role in that.

16. Synthetic versions of which of the following hormones is or has been used as an herbicide?

- A. Cytokinins
- B. Gibberellic Acids
- C. Ethylene
- D. Auxins
- E. Alkaloids

e.g. Agent Orange +, today, 2,4-D

17. Which of the following hormones can suppress the growth of lateral buds?

- A. Cytokinins
- B. Gibberellic Acids
- C. Ethylene
- D. Auxins
- E. Alkaloids

same thing

18. Which of the following hormones can suppress the growth of axillary buds?

- A. Cytokinins
- B. Gibberellic Acids
- C. Ethylene
- D. Auxins
- E. Alkaloids

19. Which of the following hormones is used by horticulturists to root stem cuttings?

- A. Cytokinins
- B. Gibberellic Acids
- C. Ethylene
- D. Auxins
- E. Alkaloids

20. In phototropism in the stem, auxin is differentially transported to which side of the stem?

- A. the side away from the light
- B. the side toward the light

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21. In gravitropism in the root, auxin is differentially transported to which side of the root?

- A. the side away from the dominant source of gravity
- B. the side toward the dominant source of gravity

22. Hormones called _____ are made by fertilized ovules (developing seeds) and induce the _____ to grow.

- A. Ethylenes; fruit wall
- B. Ethylenes; seeds
- C. Cytokinins; fruit wall
- D. Auxins; fruit wall
- E. Cytokinins; axillary buds

23. Shoots or stems generally show....

- A. positive gravitropic responses
- B. negative gravitropic responses
- C. negative phototropic responses.
- D. both B and C.
- E. both A and C.

24. The leaf of the venus flytrap exhibits

- A. positive thigmotropism
- B. negative thigmotropism
- C. turgor movement
- D. positive gravitropism

Did not cover this

25. The suppression of the growth of axillary buds is called

- A. metabolic inhibition.
- B. dioxin toxic syndrome.
- C. recessive meristem induction.
- D. cytokinin-gibberellin negation.
- E. apical dominance.

26. Organelles thought to facilitate the perception of gravity by root caps and in shoot parts such as coleoptiles are

- A. chloroplasts
- B. gravitropiles
- C. taxes.
- D. amyloplasts.
- E. plebiscites.

27. Apical dominance can be offset with an exogenous application of auxin to axillary buds.

- A. True
- B. False

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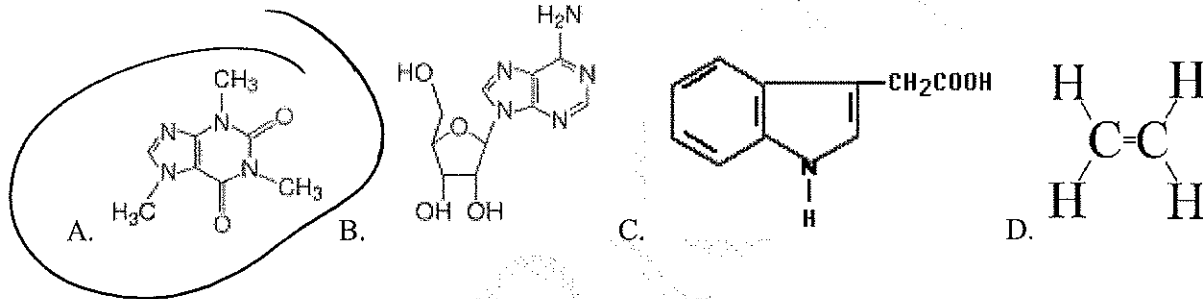
28. What is not thought to be true of caffeine?

- A. Caffeine is an alkaloid.
- B. It is psychoactive.
- C. It promotes cellular growth.
- D. It is an antagonist to adenosine.
- E. It deters herbivory.

29. Caffeine is synonymous with

- A. Adenine.
- B. Adenosine.
- C. Theobromine.
- D. Alkaloid
- E. None of the above.

30. Which of the following chemicals is caffeine?



31. Which has more caffeine?

- A. a 1 oz cup of drip coffee.
- B. a 1 oz cup of espresso
- C. a 1 oz cup of Coca-cola.

32. *Coffea arabica* is native to where?

- A. South America
- B. Asia
- C. Arabia
- D. Africa
- E. Australia

33. As far as is known, where were coffee beans first used to make the drink "coffee"?

- A. Italy
- B. Ethiopia
- C. Brazil
- D. Holland
- E. Yemen

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34. Which compound(s) could be considered to be primary metabolites?

- A. Auxin
- B. Nicotine
- C. quinine
- D. A and C
- E. B and C

35. Which of the following are all alkaloids?

- A. Tannin, Lignin, Salicin, Caffeine
- B. Codeine, Nicotine, Cocaine, Quinine
- C. Caffeine, Morphine, Tannin, Nicotine,
- D. Caffeine, Tannin, Lignin, Salicin
- E. Camphor, Menthol

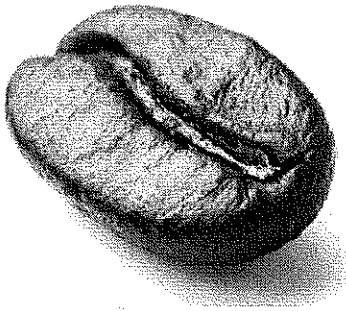
Questions 36 deleted

37. A coffee berry ("cherry" in the industry) typically contains ...

- A. 5 seeds
- B. 4 seeds
- C. 3 seeds
- D. 2 seeds
- E. 1 seed

38. The groove on the coffee "bean" is the...

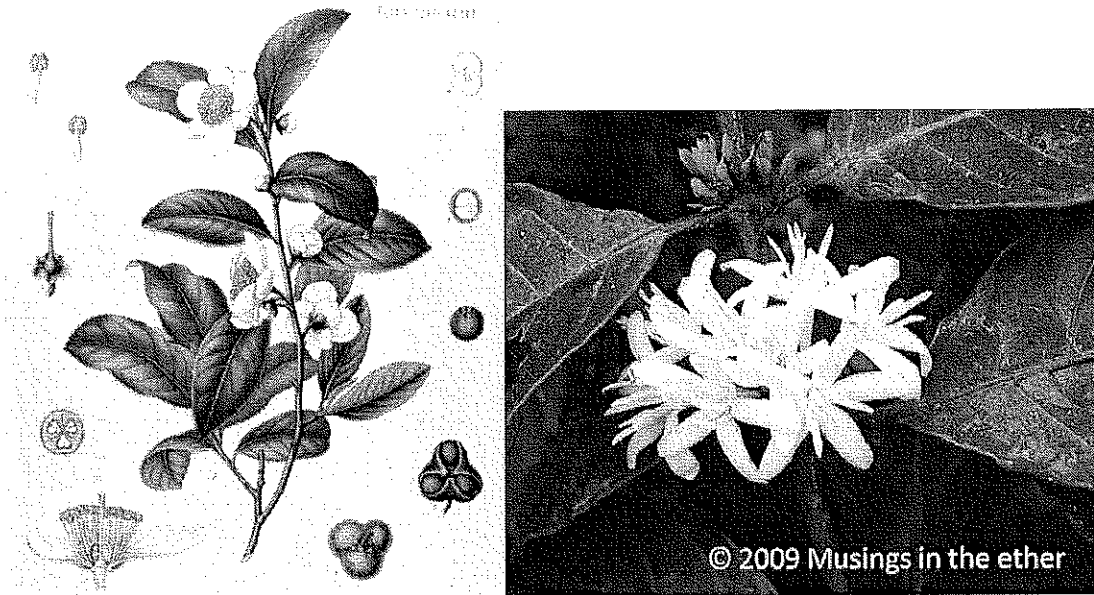
- A. Scar from its attachment to the maternal (fruit) tissue. (hilum)
- B. Scar from its contact with another seed in the fruit.
- C. Scar formed during the roasting process.
- D. An etching made by coffee roasters to facilitate the removal of caffeine (decaffeination).
- E. A etching made by coffee roasters to facilitate the extraction of flavor.



39. Which of the following pictures is of a coffee plant?

- A. left
- B. Right

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40. Water moves from areas of _____ water potential to _____ water potential.

- A. high, low
- B. low, high
- C. isotonic, hypotonic
- D. hypertonic, hypotonic

41. Which is not an expected effect of adding potassium ions to a cell?

- A. That cell's water potential will increase.
- B. That cell will become turgid
- C. That cell's water potential will decrease.
- D. That cell's solute potential will decrease.
- E. That cell will gain weight.

42. When a small herbaceous plant wilts, its cells have become

- A. Flaccid
- B. Turgid
- C. Hydrated
- D. Lysed.
- E. Firm

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43. For water to be transported up a tree, the water potential of the atmosphere must be

- A. higher than that of the stem and soil
- B. higher than that of the stem, but not the soil
- C. lower than that of the stem and soil
- D. lower than that of the soil, but not the stem
- E. lower than that of the stem, but not the root or soil

See intro to water lab.

44. Water molecules in vessel elements lower in the stem...

- A. push water (via hydrogen bonds) in vessel elements higher in the stem up the stem
- B. push water (via ionic bonds) in vessel elements higher in the stem up the stem
- C. pull water in vessel elements higher in the stem up the stem
- D. are pulled up the stem by their hydrogen bonding to water molecules higher in the vessel.
- E. are pulled up the stem by their ionic bonding to water molecules higher in the vessel

45. Water is a non-polar molecule.

- A. True
- B. False

46. Osmosis is the movement of water across a membrane from an area of high solute concentration to low solute concentration.

- A. True
- B. False

47. As a banana fruit ripens and starch is converted into simple sugars, its water potential will decrease.

- A. True
- B. False

Starch is relatively insoluble in water (not a great solute).
But breaking starch into its many highly soluble glucose effectively increases solute concentration (decreases ψ_s).

48. Based on your answer to question 47 above, would ripe banana tissue be expected to gain more or less water than unripe tissue when soaked in pure water for 10 minutes?

- A. Less
- B. More

49. Water is transported from the roots to the shoot mainly via...

- A. Phloem
- B. Xylem
- C. Polar transport
- D. Parenchyma tissue
- E. Pericycle tissue.

50. The diameter of a stem _____ during the light hours.

- A. Stays the same
- B. Decreases
- C. Increases

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