

BIOS 100 - Fall, 2005
Exam II, 14 October, 2005
Michael Muller, Instructor

Name:
TA:

This exam consists of 55 questions over 6 pages. Please check to see that all the pages are present before you begin. Use a #2 pencil and bubble in all answers. Your score will be posted on the UIC Blackboard site as soon as they are in. The answer to question 26 is C. No kidding. Why don't you guys believe me? I am getting a little offended - I work hard to make these instructions and no one reads them. Good Luck!

Matching of a sorts - use the diagrams below of $2n=6$ cells to answer questions 1-5.

I

II

III

IV

V

VI

- Which of the cells pictured above are in Metaphase I?
A. I B. II C. III **D. IV** E. V
- Which of the cells pictured above is crossing over taking place?
A. II B. III C. IV D. V **E. VI**
- Which of the above pictured cells are in any stage of Meiosis I?
A. III B. IV C. III, IV **D. III, IV, VI** E. None of the above
- Which of the cells pictured above are in anaphase of mitosis?
A. II B. III C. IV D. V **E. None of the above**
- How many of the above cells are in a stage of meiosis?
A. 2 B. 3 C. 4 **D. 5** E. 6
- During which stage of the cell cycle are cyclin levels the greatest?
A. G0 B. G1 C. S **D. M** E. S & M
- Cancer cells do not exhibit contact inhibition
A. True B. False

8. Which of the following statements (A-D) about cancer and genes is FALSE? If statements A-D are true, then choose E.
- A. Healthy cells contain functional proto-oncogenes and tumor suppressor genes
 - B. Proto-oncogenes speed up cell division
 - C. Tumor suppressor genes slow down cell division
 - D. If either of these types of genes becomes damaged, it can become a cancer-causing gene
 - E. All of the above statements about cancer and genes are TRUE**
9. When do homologous chromosomes separate during meiosis?
- A. Metaphase I
 - B. Anaphase I**
 - C. Metaphase II
 - D. Anaphase II
 - E. None of the above
10. During which stage of the cell cycle is helicase most active?
- A. G₀
 - B. G₁
 - C. G₂
 - D. S**
 - E. None of the above
11. When do sister chromatids separate during meiosis?
- A. Metaphase I
 - B. Anaphase I
 - C. Metaphase II
 - D. Anaphase II**
 - E. None of the above
12. Which of the following statements (A-D) about chromosomes is FALSE. If answers A-D are true, then choose E.
- A. Chromosomes are composed primarily of DNA and protein
 - B. Sister chromatids are joined at the centromere
 - C. A human male has two homologous X chromosomes (X chromosome = chromosome 23)**
 - D. During mitosis and meiosis, the spindle fibers attach to the kinetochore region of the centromere
 - E. All of the above statements are TRUE
13. When do homologous chromosomes separate during mitosis?
- A. Prophase
 - B. Metaphase
 - C. Anaphase
 - D. Telophase
 - E. None of the above**
14. Which of the following statements (A-D) about MPF is FALSE? If statements A-D are true, then choose E.
- A. MPF is an aggregation of a cyclin and a CDK
 - B. MPF levels are greatest during the M phase of Mitosis
 - C. MPF complexes are formed at the G₂ checkpoint
 - D. MPF initiates a process which destroys CDK's, thus ending Mitosis**
 - E. All of the above statements are TRUE
15. Which of the following is NOT a function of the roots?
- A. Reproduction**
 - B. Storage
 - C. Support
 - D. Water acquisition
 - E. All of the above are functions of the roots
16. I am looking at a plant. It has a ring of discrete vascular bundles, leaves with pinnate venation, and five petaled flowers. What kind of plant is it?
- A. Herbaceous Monocot
 - B. Herbaceous Dicot**
 - C. Woody Monocot
 - D. Woody Dicot

Use the diagrams below to answer questions 17-20

I

II

III

IV

17. Which of the above illustrations above are of roots?
A. I B. II C. III D. I & II E. I, II, III
18. Which of the above illustrations are of dicots?
A. III B. IV C. I, III D. III, IV E. I, III, IV
19. Which of the above illustrations shows secondary growth?
A. II B. III C. II, III D. III, IV E. II, III, IV
20. Which of the above illustrations represents herbaceous stems?
A. II B. III C. II, III D. III, IV E. II, III, IV
21. All of the characteristics below are found in monocots except:
A. Flower parts in 3's B. Seeds C. Fibrous root system
D. **Secondary xylem** E. Scattered vascular bundles
22. Which of the tissues below are examples of dermal tissue?
A. **Epidermis** B. Endodermis C. Pallisade Mesophyll
D. Cortex E. A & B
23. Which of the following tissues is NOT meristematic?
A. Root apical meristem B. Shoot apical meristem
C. Vascular Cambium D. Pericycle
E. **All of the above are meristematic**

Use the key below to answer questions 23-26

- I. Collenchyma
- II. Parenchyma
- III. Sclerenchyma
- IV Sieve-tube element
- V. Tracheids and vessels

24. Which of the above cell types have a function in supporting the plant?
A. I B. III C. I, III **D. I, III, V** E. I, II, III, V
25. Which of the following conduct water and/or photosynthate?
A. II B. IV C. V **D. IV, V** E. II, IV
26. Which of the following cell types is a “fiber”
A. I B. II **C. III** D. IV E. V
27. Which of the above cell types are living at functional maturity
A. II B. I, II **C. I, II, IV** D. I, II, V E. I, II, IV, V
28. Which of the below are associated with secondary growth?
A. Root apical meristem B. Shoot apical meristem
C. Vascular cambium D. Pericycle
E. Axial meristem
29. Which of the following statements (A-D) about plants is FALSE. If statements A-D are true, then choose E.
A. Plants have determinant growth
B. Meiosis and gametogenesis are separate in plants
C. Plants have variable number of organs
D. Plants are photosynthetic organisms that cannot move
E. All of the above statements about plants are TRUE
30. Which of the following statements (A-D) about angiosperms is FALSE. If statements A-D are true, then choose E
A. Angiosperms completely lack gametophytes
B. Flowers are a characteristic unique to angiosperms
C. Angiosperms have coevolved with animals to facilitate pollination
D. In angiosperm double fertilization, one sperm fertilizes the egg producing the zygote while the other fertilizes the two polar nuclei, producing the endosperm
E. All of the above statements about angiosperms are TRUE
31. Which of the below areas is the farthest away from the tip of the root?
A. Root cap B. Apical meristem C. Quiescent Center
D. Zone of cell division **E. Zone of Maturation**
32. Which of the following is NOT a benefit to seed-based reproduction?
A. The food in the seed helps to nurture the plant while it becomes established
B. The seed coat provides protection for the embryo
C. It is energetically cheaper for the sporophyte to produce seeds than to produce spores
D. The embryo is dormant and can germinate when environmental conditions are conducive for growth
E. All of the above are benefits to seed-based reproduction.

Use the key below to answer questions 32 - 36. Choose the best answer.

- I. Bryophytes (mosses) III. Coniferophyta (Pines)
II. Pteridophyta (ferns) IV. Anthophyta (angiosperms, flowering plants)

33. This/these plants produce sperm cells that must swim on a thin film of water to fertilize an egg:
A. I only B. II only **C. I, II** D. I, II, III E. III, IV only
34. This/these plants have their reproductive structures in cones:
A. I only B. I, II **C. III only** D. IV only E. III, IV
35. This/these plants commonly utilize animals for pollination:
A. I only B. I, II C. III only **D. IV only** E. III, IV
36. This/these plants produce pollen
A. I only B. I, II C. III only D. IV only **E. III, IV**
37. This/these plants lack vascular tissue:
A. I only B. III, IV C. II, III, IV D. IV only E. I, II, III, IV
38. Which of the following plant organs is used to attract animals to the plant?
A. Sepals B. Petals C. Nectary **D. B & C** E. A, B, & C
39. A seed is a ripened:
A. Anther **B. Ovule** C. Ovary D. Egg Sac E. Stigma
40. The receptive site for pollen is the:
A. Stigma B. Style C. Ovary D. Ovule E. Egg Sac
41. Endosperm is:
A. Haploid B. Diploid **C. Triploid** D. Tetraploid E. None of the above
42. Which of the following characteristics is not unique to angiosperms?
A. Flowers B. Fruits **C. Seeds** D. Double Fertilization
E. All of the above are unique to angiosperms
43. In an angiosperm, what is the female gametophyte?
A. Anther B. Ovule C. Ovary **D. Egg Sac** E. Stigma
44. Which of the following colored flowers would you expect to be pollinated by birds?
A. Red B. Yellow C. Violet D. Blue E. White
45. What is the function of the style?
A. To prevent inbreeding of the flower
B. The receptive site of pollen
C. To force the pollen tubes and sperm cells to "race" to fertilize the egg
D. To produce the fruit
E. None of the above
46. Which of the following is a part of the symplast in plants?
A. Root cortex B. Cell Wall spaces C. Xylem
D. Sclerenchyma E. None of the above

47. In which of the following cells does water have to enter the symplast?
 A. Root hair (epidermis) B. Root Cortex **C. Endodermis**
 D. Pericycle E. Vessel element (xylem)
48. At night, where is the Ψ_s the lowest?
A. In the root cortex B. In the xylem of the root C. In the xylem of the stem
 D. In the leaves E. None of the above
49. In a turgid plant cell, where is the Ψ_s the lowest?
 A. In the nucleus B. In the cytoplasm **C. In the central vacuole**
 D. In the cell wall E. In the ribosome
50. Why doesn't water fall down the xylem in a tall tree when the stomates are closed?
 A. Water molecules have low surface tension, which prevents the backflow of water
B. The water molecules adhere to the cell walls of the xylem
 C. The Casparian Strip prevents water from flowing back down the xylem
 D. Water molecules have nowhere else to go, so they remain in the xylem
 E. Water does flow back down the xylem when the stomates are closed.
51. During translocation, which way does water flow in the phloem?
A. From the source to the sink B. From the sink to the source
 C. From the roots to the leaves D. From the leaves to the roots
 E. None of the above
52. _____ are fungi associated with roots.
 A. Root hairs B. Root smuts **C. Mycorrhizae** D. Galls
53. When stomates are open:
A. The concentration of K^+ is greater in the guard cells than in the surround epidermal cells
 B. The concentration of K^+ is greater in the epidermal cells than in the guard cells
 C. You cannot predict the concentration difference between the guard cells and the surround epidermal cells
54. When water evaporates from the leaves, it creates a suction in the xylem. When suction is present:
A. Ψ_p is negative B. Ψ_p is positive C. Ψ_p is zero
55. At the beginning of class one day, someone gave a little speech about:
 A. The text book and features of the website
B. Kaplan testing service
 C. Safe Sex
 D. The "Take a Professor to Lunch" program (hint hint)

Upon reading this a second time, I realized that answer A was also technically correct, since some loser did do this at the beginning of the class, and many people thought that the "hint hint" was a hint that this was the right answer, so I gave everyone the points.