

# MY SO PRACTICE TEST

DIVISION C - HIGH SCHOOL, GRADES 9-12

## PRACTICE TEST

### Instructions

- You have 20 minutes to complete this test.
- You may write your answers directly in the test.
- You may use any notes or resources you have created or collected.
- You may use a calculator and scratch paper if necessary.
- Good Luck!

### Test Questions

For questions 1-4, fill in the blanks to describe the megasporogenesis and ovule development process.

1. The megasporocyte, a (1) \_\_\_\_\_ cell, undergoes (2) \_\_\_\_\_.
  - a.(1) haploid, (2) meiosis
  - b.(1) haploid, (2) meiosis
  - c.(1) diploid, (2) meiosis
  - d.(1) diploid, (2) meiosis
  - e.(1) haploid, (2) mitosis
  - f.(1) haploid, (2) mitosis
  - g.(1) diploid, (2) mitosis
  - h.(1) diploid, (2) mitosis
2. This generates (1) \_\_\_\_\_ megaspores, which are (2) \_\_\_\_\_ cells.
  - a.(1) four, (2) diploid
  - b.(1) four, (2) diploid
  - c.(1) four, (2) haploid
  - d.(1) four, (2) haploid
  - e.(1) two, (2) diploid
  - f.(1) two, (2) diploid
  - g.(1) two, (2) haploid
  - h.(1) two, (2) haploid

3. The large megaspore produces the embryo sac, which divides (1) \_\_\_\_\_ times to form a mature stage with (2) \_\_\_\_\_ nuclei.
  - a. (1) two, (2) four
  - b. (1) two, (2) eight
  - c. (1) three, (2) six
  - d. (1) three, (2) eight
  
4. The mature embryo sac then consists of 7 cells, which are...
  - a. 1 egg cell, 1 central cell with 2 polar nuclei, 2 synergids, and 3 antipodals
  - b. 1 egg cell, 1 central cell with 2 polar nuclei, 3 synergids, and 2 antipodals
  - c. 1 egg cell, 2 central cells with 1 polar nuclei each, 2 synergids, and 3 antipodals
  - d. 1 egg cell, 2 central cells with 1 polar nuclei each, 3 synergids, and 2 antipodals
  
5. Describe the process of double fertilization in angiosperms.
  - a. One sperm cell fertilizes the egg cell, forming a haploid zygote, while the other sperm cell fuses with two polar nuclei, forming a diploid cell that develops into the endosperm.
  - b. One sperm cell fertilizes the egg cell, forming a diploid zygote, while the other sperm cell fuses with two polar nuclei, forming a triploid cell that develops into the endosperm.
  - c. One sperm cell fertilizes the egg cell, forming a diploid zygote, while the other sperm cell fuses with two polar nuclei, forming a diploid cell that develops into the endosperm.
  - d. One sperm cell fertilizes the egg cell, forming a diploid zygote, while the other sperm cell fuses with two polar nuclei, forming a haploid cell that develops into the endosperm.
  
6. What is the dominant phase in the life cycle for vascular plants, such as ferns?
  - a. Sporophyte
  - b. Gametophyte
  - c. Prothallium
  - d. Antheridium
  
7. What is the correct order for the sporic life cycle of land plants?
  - a. Fertilization → Meiosis → Meiosis → Mitosis → repeat
  - b. Fertilization → Mitosis → Meiosis → Mitosis → repeat
  - c. Fertilization → Meiosis → Mitosis → Meiosis → repeat
  - d. Fertilization → Mitosis → Mitosis → Meiosis → repeat
  
8. What is a distinctive trait of liverworts?
  - a. Neither having stoma pores nor having stomata pores
  - b. Having both stoma pores and stomata pores
  - c. Having stoma pores instead of stomata pores
  - d. Having stomata pores instead of stoma pores
  
9. What are the functions of xylem and phloem in plants?
  - a. The phloem carries water up from the roots to the leaves and the xylem carries nutrients from the leaves to the roots.
  - b. The phloem carries nutrients up from the roots to the leaves and the xylem carries nutrients from the leaves to the roots.
  - c. The xylem carries water up from the roots to the leaves and the phloem carries nutrients from the leaves to the roots
  - d. The xylem creates the nutrients to be carried by the phloem to the leaves and the roots

10. For questions 10-11, identify the biomes.

Annual precipitation of 200 to 300 cm and average annual temperature of 10 to 20 °C

- a. Temperate rainforest
- b. Temperate seasonal forest
- c. Woodland
- d. Tropical rainforest

11. Annual precipitation of 250 to 450 cm and average annual temperature of 20 to 30 °C

- a. Temperate rainforest
- b. Temperate seasonal forest
- c. Woodland
- d. Tropical rainforest

12. Where are the male spores produced in a monoecious plant?

- a. Stigma
- b. Sepal
- c. Anther
- d. Filament

13. Which of the following would be seen in a cross-section of stem with vascular bundles forming a ring but NOT a cross-section of a stem with scattered vascular bundles?

- I. Cortex
  - II. Ground Tissue
  - III. Pith
- a. I only
  - b. II and III
  - c. I and II
  - d. I and III

14. Why are positively charged ions (cations), such as potassium or calcium, not lost easily in soil by leaching?

- a. Soil particles are typically positively charged
- b. Cations are displaced by other cations
- c. Cations are not attracted to water particles
- d. Soil particles are typically negatively charged

15. A bird is most likely to pollinate a...

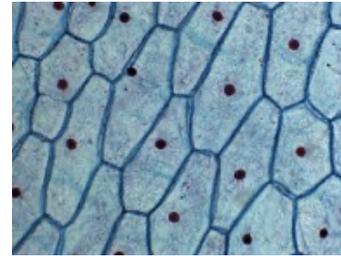
- a. Large, bright red flower with little odor
- b. Small green flower with a sweet odor
- c. Red flower with a fleshy odor
- d. White flower with a sweet odor

16. Which of the following plants flower only once in their lifetime?

- a. Yucca
- b. Fern
- c. Celery
- d. All of the above

17. What hormone may a plant use in response to a drought?
- Auxin
  - Absciscic acid
  - Ethylene
  - Brassinosteroids
18. Theodor Engelmann was a botanist who performed an experiment using a crystal prism to determine whether photosynthesis is dependent on the wavelength of light. He found that Spirogyra algae produced the most oxygen using the red and blue light. This led to the discovery that:
- Carotene is the key photosynthetic pigment because it reflects green light and accepts red and blue light
  - Carotene is the key photosynthetic pigment because it accepts green light and reflects red and blue light
  - Chlorophyll a is the key photosynthetic pigment because it reflects green light and accepts red and blue light
  - Chlorophyll a is the key photosynthetic pigment because it accepts green light and reflects red and blue light
19. Balance the following equation for photosynthesis:  
\_\_\_\_ CO<sub>2</sub> + \_\_\_\_ H<sub>2</sub>O + sunlight → \_\_\_\_ C<sub>6</sub>H<sub>12</sub>O<sub>6</sub> + \_\_\_\_ O<sub>2</sub>
- 1, 6, 6, 1
  - 6, 6, 1, 6
  - 6, 12, 2, 12
  - 3, 1, 2, 6
20. Red algae is used to make this:
- Agar
  - Gelatin
  - Keratin
  - Chewing Gum
21. Which of the following disturbances is NOT an example of secondary succession?
- A volcano erupts, exposing bare rock
  - A flood clears a valley of all vegetation
  - Human activity such as logging destroys the trees in an area but leaves nutrient-rich soil
  - A wildfire burns through the majority of an oak forest
22. The fact that sometimes plants have sporophyte generation and other times have gametophyte generation is called...
- Primary succession
  - Alternation of generations
  - Phylogeny
  - Ovulation
23. When you are biting into a plum, you are biting which part of the flower?
- Ovule
  - Stigma
  - Anther
  - Ovary

24. Assume that we are in an environment where there is no carbon dioxide. What part of photosynthesis would then fail to occur?
- Light-dependent reactions
  - Electron transport chain
  - Calvin cycle
  - ATP synthesis
25. Where does the oxygen from photosynthesis come from?
- Electron transport chain
  - Electrolysis of water
  - Calvin cycle
  - ATP synthesis
26. In this image, what are the purple dots? (Source: Valley Microscope)
- Mitochondria
  - Nuclei
  - Chloroplasts
  - Central Vacuoles
27. Which one of the following are non-vascular?
- Lycophytes
  - Ferns
  - Seed Plants
  - Hornworts
28. You find yourself in a mysterious land. Around you, you see primarily CAM and C4 plants. Where are you?
- Desert
  - Taiga
  - Tundra
  - Rainforest
29. The peach plant (*Prunus perisa*) is an example of a(n)...
- Angiosperm
  - Seed plant
  - Vascular plant
  - All of the above
30. Which of these is not a part of the pericarp?
- Endocarp
  - Mesocarp
  - Exocarp
  - Medicarp



# ANSWER KEY

- |     |          |     |          |     |          |
|-----|----------|-----|----------|-----|----------|
| 1.  | <b>C</b> | 15. | <b>A</b> | 29. | <b>D</b> |
| 2.  | <b>D</b> | 16. | <b>A</b> | 30. | <b>D</b> |
| 3.  | <b>D</b> | 17. | <b>B</b> |     |          |
| 4.  | <b>A</b> | 18. | <b>C</b> |     |          |
| 5.  | <b>B</b> | 19. | <b>B</b> |     |          |
| 6.  | <b>A</b> | 20. | <b>A</b> |     |          |
| 7.  | <b>B</b> | 21. | <b>A</b> |     |          |
| 8.  | <b>C</b> | 22. | <b>B</b> |     |          |
| 9.  | <b>C</b> | 23. | <b>D</b> |     |          |
| 10. | <b>A</b> | 24. | <b>C</b> |     |          |
| 11. | <b>D</b> | 25. | <b>B</b> |     |          |
| 12. | <b>C</b> | 26. | <b>B</b> |     |          |
| 13. | <b>D</b> | 27. | <b>D</b> |     |          |
| 14. | <b>D</b> | 28. | <b>A</b> |     |          |



*Practice Test Developed with Science Olympiad at Cornell*



Science Olympiad, Inc. (c) 2021