Shanghai Ocean University

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PLANT BIOLOGY

I. Fill-in-the-blank Questions

1. Cell is the basic unit constituting organisms, i.e. _____ and _____. It can be classified into two major basic types, i.e. _____ and _____.
2. _____ is the most apparent feature of collenchymatous cell and belongs to mechanical tissues as _____.
3. The basic structures of seed include _____, _____ and _____, of which only some plants have _____.
4. The quiescent center of plant root tip is located at _____, and root hairs are located at _____.
5. The primary structures of root are respectively _____, _____ and _____ from outside to inside of the cross-sectional view; its xylem and phloem are arranged in the form of _____; root can be called as _____ if there are 6 xylem bundles.
6. Dicotyledonous stem's secondary xylem consists of _____, _____, _____ and _____, of which _____ is extremely developed among woody plants and it is the main component of timber.
7. Leaf has three basic structures, i.e. _____, _____ and _____.
8. On a same branch, the water potential of upper leaves is _____ than that of lower leaves.
9. For leaf nutrition, nutrients can be delivered into mesophyll cells by _____ and _____.
10. Light reaction occurs on _____ membrane, while carbon reaction occurs inside the ground substance of _____.

II. True-False Questions

1. Sclerenchymatous cells (sclereid and fibrocytes) inside plant body are dead cells. ( )
2. Vascular bundle sheath cells of corn leaves have chloroplasts. ( )

3. In the primary structure of stems, lenticel is the channel for gas exchange with external air. ( )

4. The power of plant for passive water absorption is sourced from transpirrationnal pull, and unrelated to the water potential gradient of adjacent cells. ( )

5. If one cell fully saturated is placed into solution of which the concentration is less than the cell concentration by 10 times, its volume will become smaller. ( )

6. In the primary reaction of photosynthesis, only chlorophyll *b* is the "capturer" and "converter" of luminous energy. ( )

7. A Meristematic cell only has primary wall, and will not generate secondary wall. ( )

8. Elements massively accumulated inside plant body are certainly essential elements of plant. ( )

9. Leaf vein's phloem is close to upper epidermis, while xylem is close to lower epidermis. ( )

10. "Cotton fiber" doesn't belong to fiber. ( )

11. There are all axillary buds at the base of simple leaf's petiole and compound leaf's petiolule. ( )

12. Shortened internode segment is the primary reason for fascicled phyllotaxy. ( )

13. Sapwood belongs to secondary xylem, and heartwood belongs to primary xylem. ( )

14. Nitrogen is an ash element rather than a mineral element. ( )

15. Ribulose-1,5-bisphosphate is the receptor of CO_2 in Calvin cycle. ( )

16. Endosperm tissue will not occur in the forming process of non-endospermic seed. ( )

17. In 1839, the German Schleiden firstly proposed the "Cell Theory". ( )

18. Plasma membrane shows three-layer structure under electron microscope. ( )

19. Root's primary xylem is located inside the secondary xylem. ( )

20. Cork cambium can only come from pericycle. ( )

III. Single Choice Questions

1. At the time of fruit ripening, pulp becomes soft without "crispness" due to ( ) of pulp cells is dissolved, thus resulting in cell separation.

A) Cellulose B) Primary wall C) Secondary wall D) Intercellular layer

2. Plant's petals or leaves showing red, purple or blue due to ( ) of cells containing anthocyanidin.

A) Chloroplast B) Chromoplast C) Vacuole D) Leukoplast

3. Which one of following descriptions about ergastic substances is incorrect ( ).

A) After starch grains are being processed with ethyl alcohol, the annulation chequered with black and white will also disappear due to dehydration

B) Inorganic salt crystals inside plant cells are formed inside leukoplasts

C) Fats and oils are storage substance with highest energy and smallest volume

D) There are protein crystalloids inside parenchymal cells close to and surrounding potato tuber, so protein nutrition will be lost after peeling

4. Which one of following categories doesn't belong to external secretory structure? ( )

A) Glandular epidermis B) Nectary C) Hydathode D) Secretory cavity

5. Intercalary meristem is meristematic tissue among mature tissues, and belongs to ( ) based on its source and nature.

A) Primary meristem B) Secondary meristem C) Promeristem D Mature tissue

6. Which one of following structures belong to the primary structure of dicotyledonous stem? ( )

A) Pith B) Phelloderm C) Vascular ray D) Phellem layer

7. Which one of following elements has highest content in gramineous plants, especially in epidermic cells of stem leaves and can be resistant to plant diseases and pests and lodging? ( )

A) Cobalt B) Zinc C) Silicon D) Boron

8. Phloem is a compound tissue, which one of following items is not its composition?

A) Sieve element B) Vessel element C) Parenchymal cell D) Companion cell

9. Which one of following items doesn't belong to monocotyledon? ( )

A) Rice B) Maize C) Onion D) Broad bean

10. Which one of following items is storage nutrient of aleurone grains? ( )

A) Starch B) Protein C) Lipid D) Nucleic acid

11. Which one of following plant tissues has thin cell wall and its vacuoles can store nutrients? ( )

A) Protective tissue B) Transfusion tissue C) Parenchymatous tissue D) Meristematic tissue

12. Except for C, H and O elements, which one of following elements has highest content in plant body? ( )

A) N B) P C) K D) Ca

13. Under the dark conditions, the inner membrane of proplastid forms the separated tubes which connect the each other and form a grid, further developing into ( ).

A) Chloroplast B) Chromoplast C) Leukoplast D) Plastid

14. Which one of following descriptions is about daily changes in the water potential of plant leaves in a clear day? ( )

A) High in the morning – Low at noon – Gradually increase at nightfall – Reach highest at night

B) High in the morning – High at noon – Gradually decrease at nightfall – Reach lowest at night

C) Low in the morning – High at noon – Gradually increase at nightfall – Higher at night

D) Low in the morning – Low at noon – Gradually increase at nightfall – Reduce at night

15. Phospholipid is an important component of cell membrane; it is related to the lipid molecules' head hydrophilic and tail lyophobic nature. Some study team found that plant seed cells store oils in the pattern of small oil globules, and each oil globule is enveloped with phospholipid membrane. Which one of following structures is the most possible structure of such membrane? ( )

A) Constituted by single-layer phospholipid molecules, and the tail of phospholipid is toward oil globule

B) Constituted by single-layer phospholipid molecules, and the head of phospholipid is toward oil globule

C) Constituted by double-layer of phospholipid molecules, and its structure is basically same as cell membrane

D) Constituted by double-layer of phospholipid molecules, and the heads of double-layer of phospholipid molecules are opposite each other

16. Which one of following items is the primary shape of root vascular cambium? ( )

A) Strip B) Ring C) Wavy D) Round

17. Among angiosperm, which one of following dead cells has functions? ( )

A) Vessel element and sieve element B) Sieve element and fiber

C) Vessel element and fiber D) Fiber and companion cells

18. What does infrapetiolar bud belong to? ( )

A) Offset bulb B) Axillary bud C) Adventitious bud D) Terminal bud

19. If petiole is located at the middle of blade back or within leaf edge, such leaf can be called as ( ) leaf.

A) Reniform B) Rhomboid C) Peltate D) Fan-shaped

20. Photosynthesis involves two stages of light reaction and dark reaction. Which one of following descriptions is correct? ( )

A) Enzyme isn't required for light reaction, while is required for dark reaction

B) Light reaction consumes water, while dark reaction consumes ATP

C) Light reaction fixes CO_2, while dark reaction reduces CO_2

D) Light reaction stores energy, while dark reaction releases energy

21. Roots produced on the part except for principal root and its lateral roots are generally called as ( ).

A) Principal root B) Adventitious root C) Lateral root D) Tap root

22. What is the major basis for distinguishing stem and root in the aspect of external form?

A) Node and internode B) Adventitious bud C) Adventitious root D) None of the above

23. Which one of following item does the branch system of most gymnospermous plants such as pine, cypress and Taxodiaceae belong to? ( )

A) Sympodial branching B) Monopodial branching C) Dichotomous branching D) False dichotomous branching

24. The jointing and head sprouting of rice, wheat, etc. are due to the activity of ( ).

A) Apical meristem B) Intercalary meristem C) Lateral meristem D) Primordial meristem

25. In which zone of vertical root tip section can the features of cell mitosis at different stages be easily observed? ( )

A) Root cap B) Meristem zone C) Elongation zone D) Root-hair zone

26. Which one of following structures is used for water transportation of Gymnospermous plants?

A) Vessel and tracheid; B) Tracheid; C) Sieve tube; D) Sieve cells

27 Which one of following fungus and plant root can form symbion, i.e mycorrhiza?

A) Bacteria B) Fungus C) Actinomycetes D) None of the above

28. Which one of following structures can promote epigaeous seedling as a result of the accelerated elongation?

A) Hypocotyl B) Epicotyl C) Radicle D) Cotyledon

29) The vascular cambium of dicotyledonous stem consists of fascicular cambium and inter-fascicular cambium. Although their division activities and results are consistent, their sources are different. What is the origin of the former? ( )

A) Procambium B) Procuticle C) Fundamental meristem D) Dedifferentiation of parenchymatous cells

30) What is the primary ray of stem? ( )

A) Pith ray B) Vascular ray C) Xylem ray D) Phloem fiber

IV. Short Answer Questions

1. Types and functions of cell wall specialization

2. There are 2 kinds of unmarked slices, how to distinguish the primary structure of root and stem under the microscope?

3. What is casparian strip? Where it and what is the relation between casparian strip and water absorption of root system?

4. What are Structural features of biological membrane and types of proteins transported by biological membrane?