

# Shanghai Ocean University

## College of Fisheries and Life Science

### PLANT BIOLOGY

#### Fill-in-the-blank Questions

1. The plant cell is different from the animal cell structurally; the former has \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_.
2. Plant cell consists of Structure A and Structure B. Structure A is \_\_\_\_\_ and plays a role in maintaining cell shape. It can be further divided into Parts A<sub>1</sub>, A<sub>2</sub> and A<sub>3</sub>. Part A<sub>1</sub> is \_\_\_\_\_ and common to adjacent cells; Part A<sub>2</sub> is \_\_\_\_\_ which is generated in the cell growth process and located inside A<sub>1</sub>. Part A<sub>3</sub> is \_\_\_\_\_ and formed after cell elongation stops. In the forming process of Part A<sub>3</sub>, un-thickened part becomes \_\_\_\_\_. Structure B is \_\_\_\_\_, the place for various metabolic activities inside cell. It can be further divided into Parts B<sub>1</sub> and B<sub>2</sub>. Part B<sub>1</sub> is \_\_\_\_\_ containing many cell organelles and usually in the state of motion. Part B<sub>1</sub> is \_\_\_\_\_ and has selective appearance permeability which can control the interchange of intracellular and extracellular substance. Except for cell organelles and particles, Part B<sub>1</sub> contains \_\_\_\_\_ which is also a ground substance in colloidal. Part B<sub>2</sub> is \_\_\_\_\_ and plays an important role in transferring genetic characters and controlling cell metabolism.
3. In the secretory tissues of plant, common external secretory structures include \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_.
4. On same branch, the water potential of upper leaves is \_\_\_\_\_ than of lower leaves.
5. Under photosynthesis, \_\_\_\_\_ NADPH molecules and \_\_\_\_\_ ATP molecules are required for 1 glyceraldehyde-3-phosphate molecule.

#### Single Choice Questions

1. In 1839, who firstly proposed the "Cell Theory" \_\_\_\_\_.  
A) The German M. Schleiden    B) The German T. Schwann    C) The Dutch Antonie van Leeuwenhoek    D) The Englishman R. Hooke

2. In comparison with root's primary structure, which one of following descriptions doesn't belong to the features of root's secondary structure? \_\_\_\_\_

- A) Various plant roots have secondary growth and secondary structure
- B) Secondary xylem and secondary phloem are arranged opposite from inside to outside
- C) Secondary xylem is dominant, while the proportion of secondary phloem is smaller
- D) Xylem ray and phloem ray are collectively called as vascular ray, which are new tissues

3. Which one of following items is the main cell composition of angiospermous xylem? \_\_\_\_\_

- A) Sieve tube and companion cell
- B) Cork and cork cortex
- C) Vessel and xylem parenchyma
- D) Pericycle and endodermis

4. At the time of fruit ripening, pulp becomes soft without "crispness" because \_\_\_\_\_ of pulp cells is dissolved, thus resulting in cell separation.

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

5. Which one of following structures can promote epigealous seedling as a result of the accelerated elongation? ( )

- A) Plumule
- B) Radicle
- C) Epicotyl
- D) Hypocotyl

6. Under strong transpiration and on one same leaf, the part is more distant from vein; its water potential is \_\_\_\_\_.

- A) Higher
- B) Lower
- C) Basically unchanged
- D) Unrelated to distance

7. If the epidermal cell solution with high concentration of  $K^+$  of broad bean is transferred to solution with low concentration of  $K^+$ , what will happen to stoma? \_\_\_\_\_

- A) Open
- B) Closed
- C) Un-changed
- D) Move randomly

8. 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, the tail of phospholipid is toward oil globule

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

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

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

9. In a fine morning, pick up a leaf A, dry it at the temperature of 100°C and weigh it; in the evening of the same day, pick up a leaf B (its insertion position, shape, size and weight are basically identical to leaf A) from same plant, process leaf B with same methods, weigh it and compare it with leaf A. What is the comparison result? \_\_\_\_\_

A) A is heavier than B    B) A and B have equal weight    C) B is heavier than A    D) Incomparable

10. One photosynthetic unit includes \_\_\_\_\_.

A) Antenna pigment system and reaction center pigment

B) ATP enzyme compound and electron transport complex

C) Electron transport complex and NADPH

D) TP enzyme compound and P700

### Short Answer Questions

1. What are pith ray and vascular ray? What are their differences?

2. It is assumed that for one mature plant cell, its  $\psi_s$  is equal to  $-8 \times 10^5$  Pa. If the mature plant cell is placed into solution with the  $\psi_s$  concentration of  $-5 \times 10^5$  Pa, please respectively calculate the cell  $\psi_p$  value under the following circumstances:

① Cell water loss; ② Cell water absorption; ③ Cell will not absorb or lose water

3. Briefly describe the features of meristematic cells.