

一、 選擇題 (每題 2 分) ※ 本大題請於試卷內之「選擇題作答區」依序作答。

1. Co-pigmentation in flowers involves the formation of complexes of colored and colorless _____ with metal ions.
 - a. tannins
 - b. essential oils
 - c. cardiac glycosides
 - d. terpenoids
 - e. flavonoids
2. Which of the following statements about eukaryotes and prokaryotes is FALSE?
 - a. Eukaryotic cells are usually larger than prokaryotic cells.
 - b. Eukaryotic cells possess a cytoskeleton, but prokaryotic cells do not.
 - c. Eukaryotic cells have a nucleoid, but prokaryotic cells do not.
 - d. The DNA of eukaryotic cells is bound to histones, but prokaryotic DNA is not.
 - e. The cell walls of eukaryotic cells and prokaryotic cells differ in composition.
3. The most likely function of cortical endoplasmic reticulum is:
 - a. regulating calcium ion levels in the cytoplasm.
 - b. synthesizing proteins on polysomes.
 - c. stabilizing the cytoskeleton.
 - d. forming new nuclear envelopes following nuclear division.
 - e. synthesizing lipids.
4. If the concentration of K^+ is higher outside a plant cell than inside, K^+ will enter the cell by:
 - a. facilitated diffusion through channel proteins.
 - b. simple diffusion through channel proteins.
 - c. facilitated diffusion via carrier proteins.
 - d. active transport through channel proteins.
 - e. active transport via carrier proteins.
5. Which of the following does NOT occur during the Krebs cycle?
 - a. decarboxylation
 - b. substrate-level phosphorylation
 - c. oxidation
 - d. oxidative phosphorylation
 - e. regeneration of oxaloacetate
6. Which of the following events is NOT associated with Photosystem I?
 - a. absorption of light by antenna molecules
 - b. excitation of an electron from P_{700}
 - c. transfer of electrons from cytochromes to iron-sulf proteins
 - d. reduction of $NADP^+$
 - e. reduction of A_0
7. Which of the following statements about CAM plants is FALSE?
 - a. Not all CAM plants are succulent.
 - b. All CAM plants are flowering plants.
 - c. They use both C_3 and C_4 pathways.
 - d. They are dependent on nighttime accumulation of CO_2 for photosynthesis.
 - e. Their water-use efficiency is higher than that of C_3 and C_4 plants.

見背面

8. Which of the following statements about the phragmoplast is FALSE?
 - a. It forms between the two daughter nuclei.
 - b. It is composed of microtubules.
 - c. Its formation precedes the growth of the cell plate.
 - d. It begins to form at the walls of the dividing cell and grows inward.
 - e. In cells with large vacuoles, it is formed within the phragmosome.
9. Which of the following describes zygotic meiosis?
 - a. It occurs in most plants.
 - b. The zygote is the only diploid cell in the life cycle.
 - c. It results directly in gametes.
 - d. It is characteristic of organisms having an alternation of generations.
 - e. It is characteristic of organisms with isomorphic generations.
10. In _____, a single gene has many different effects on the phenotype.
 - a. pleiotropy
 - b. continuous variation
 - c. epistasis
 - d. polygenic inheritance
 - e. incomplete dominance
11. Intersperse repeated DNA units:
 - a. are arranged in tandem.
 - b. tend to be smaller than 10 base-pairs long.
 - c. constitute less than 10 percent of the DNA of most multicellular organisms.
 - d. are identical to one another.
 - e. are believed to have originated from transposons.
12. Which of the following is NOT part of Darwin's formulation of the process of evolution?
 - a. natural selection leading to changes in populations
 - b. variations as the raw material of the evolutionary process.
 - c. formation of new species over very long periods of time
 - d. the central role of artificial selection
 - e. interaction between variations and the environment
13. The sporogenous cells of angiosperms develop directly into:
 - a. microsporocytes.
 - b. microspores.
 - c. pollen grains.
 - d. tube cells.
 - e. generative cells.
14. Where does the shoot apical meristem arise in eudicot and magnoliid embryos?
 - a. at the tip of a sheathlike extension
 - b. at the tip of a cotyledon
 - c. on one side of the single cotyledon
 - d. on one side of the two cotyledons
 - e. between the two cotyledons

15. Which of the following statements about the polarity of an embryo is FALSE?
- It fixes the structural axis of the body.
 - It is established only after the zygote has divided.
 - It is essential to the development of all higher organisms.
 - It refers to the condition in which one end is different from the other end.
 - It is a key component of biological pattern formation.
16. Substances moving through the root cortex:
- follow a symplastic pathway only.
 - follow an apoplastic pathway only.
 - follow both symplastic and apoplastic pathways.
 - are unable to travel via cell walls.
 - are unable to pass through plasmodesmata.
17. The highest concentrations of gibberellin are found in:
- immature seeds.
 - germinating seeds.
 - stems.
 - leaves.
 - fruits.
18. Which of the following statements about ethylene is FALSE?
- The final step in its synthesis in plants is catalyzed by enzymes on the tonoplast.
 - Its synthesis in plants begins with the amino acid tryptophan.
 - It exerts an influence on many aspects of plant growth and development.
 - It is the active component of illuminating gas that affects plant growth
 - It has the formula $H_2C=CH_2$.
19. Short-day plants flower:
- in the summer.
 - in early spring or fall.
 - when exposed to 8 hours of daylight.
 - when the light period is longer than a critical length.
 - without respect to daylength.
20. The direct role of flavonoids in nodule formation is to:
- stimulate formation of infection threads.
 - stimulate cell wall degradation.
 - stimulate root-hair curling.
 - activate the bacterial *nodD* gene.
 - activate the plant *Nod* genes.

見背面

※ 注意：請於試卷內之「非選擇題作答區」依序作答，並應註明作答之大題及小題題號。

二、 解釋名詞 (每題 2 分)

1. Photomorphogenesis
2. Thigmomorphogenesis
3. Substrate-level phosphorylation
4. Kranz anatomy
5. Hypogeal germination

三、 申論題 (每題 10 分)

1. 比較光合作用過程中非循環式與循環式電子傳遞鏈的不同；它們各別的產物是什麼？解釋為何「卡爾文循環」需要循環式電子傳遞鏈才能完成？
2. 利用「proton-coupled cotransport」、「sucrose-proton cotransport」、「primary active transport」、以及「secondary active transport」的觀念，解釋植物細胞如何將中性物質即使細胞外濃度低於細胞內時，仍然能夠運送進入細胞內。
3. 植物生長素具有「極性運送」(polar transport)的特性，解釋之。並且敘述植物生長素「極性運送」的分子機制。
4. 敘述植物體中存在「開花激素」(florigen)的證據。並且解釋在植物體中該「開花激素」如何運送？
5. 何謂「靜止中心」(quiescent center)？解釋「靜止中心」為何某些情況是 inactive，但某些情況又是 active？

試題隨卷繳回