國立臺灣大學105學年度轉學生招生考試試題

題號： 41
科目：普通植物學

※請將選擇題作答於試卷內之「選擇題作答區」。

一、單選題（每題 2 分 ×30 題 ＝60 分）

1. The major component of plant cell wall is
(A) cellulose.
(B) chitin.
(C) glycan.
(D) peptidoglycan

2. Plant __ can store a variety of toxic materials.
(A) mitochondria
(B) vacuoles
(C) chloroplasts
(D) nuclei

3. Plant __ control both gas exchange and water evaporation.
(A) plasmodesmata
(B) epidermis
(C) stomata
(D) xylems

4. During plant cell division, the __ is formed at the __ of the cytoplasm to form two daughter cells.
(A) cell plates, both ends
(B) cell plate, center
(C) cleavage furrows, both ends
(D) cleavage furrow, center

5. The Orchidaceae 蘭科植物
(A) usually are epiphytes.
(B) usually are CAM plants.
(C) are a diverse and widespread family of flowering plants.
(D) All the choices are true.

6. When an aphid 蚜蟲 feeds on a plant, its sylet 口針 is inserted into
(A) epidermis.
(B) mesophyll cells.
(C) xlyem vessels.
(D) sieve elements.

7. Microbial pathogens, which achieve systemic spread within a plant and cause rapid wilting 萎凋, are most likely infecting
(A) epidermis.
(B) mesophyll cells.
(C) xlyem vessels.
(D) sieve elements.

8. Plant photosynthesis
(A) uses the same light-harvesting pigments as bacteria.
(B) involves photosystems P650 and P700.
(C) occurs only the leaves.
(D) None of the choice is true.

9. Plant photorespiration occurs
(A) in cold, wet climates.
(B) due to mitochondrial dysfunction 功能障礙.
(C) when Rubisco prefers to react with O_2.
(D) to increase the efficiency of the Calvin cycle.

10. Which of the following is absent in CAM plants?
(A) Stomata.
(B) Kranz anatomy.
(C) Four-carbon photosynthesis intermediate products.
(D) Rubisco.

11. Plant meristems are present in
(1) the tip of shoot. (2) axillary buds.
(3) the cambium. (4) the tip of root.
(5) the initiation sites of root hairs
(A) 1, 2, 3, 4
(B) 1, 2, 3, 5
(C) 1, 2, 4, 5
(D) 1, 2, 3, 4, 5

12. __ are produced in roots to balance the effects of __ on apical dominance.
(A) Gibberellic acids, auxin
(B) Brassinosteroids, cytokinins
(C) Cytokinins, auxin
(D) Auxin, gibberellic acids

13. __ is the major hormone regulting plant senescence 老化.
(A) Gibberellic acids
(B) Auxin
(C) Abscisic acid
(D) Ethylene

14. In general, plant shoots display
(A) positive gravitropism
(B) negative phototropism
(C) positive thigmotropism
(D) All of the choices are true.

15. Road lamps may reduce grain yield of rice 稻穀產量 mainly because
(A) temperature is increased.
(B) photoperiod is disturbed 干擾.
(C) fertilization 授粉 is blocked.
(D) seed development is inhibited 抑制.

16. Plants use phytochromes sense the __ of environmental light.
(A) spectral quality
(B) intensity
(C) duration
(D) All of the choices are true.

見背面

17. Barbara McClintock discovered that variegated color pattern of maize kernels 玉米粒顏色變異性 is caused by
(A) insertions of transposable elements.
(B) different cultivation 栽種 systems.
(C) global temperature changes.
(D) ozone depletion 耗竭.

18. Which of the following do(es) not serve as a second messenger in plant signal transduction?
(A) reactive oxygen species
(B) Ca^{2+} ions
(C) cyclic GMP
(D) phytochromes

19. The genome size of genetically modified transgenic Bt-maize is __ the wild-type parental cultivar.
(A) a quarter of
(B) a half of
(C) the same as
(D) double of

20. The genome of modern wheat is 6N, which
(A) leads to sterility 不孕.
(B) is resulted from fusion of chromosomes.
(C) causes self-incompatibility.
(D) is a good example for polyploidy.

21. Crop resistance to insects can be controlled by more than four genetic loci located on different chromosomes. This is a form of
(A) incomplete dominance.
(B) polygenic inheritance.
(C) gene linkage.
(D) codominance.

22. The petals 花瓣 of a plant flowers is
(A) haploid.
(B) diploid.
(C) triploid.
(D) polyploid.

23. __ are the most primative vascular plants among the followings.
(A) Ferns
(B) Pines
(C) Ginkgo 銀杏
(D) Mosses 苔蘚

24. Artificial breeding usually leads to
(A) enhanced environmtal adaptation.
(B) increased crop longervity 壽命.
(C) increased, targeted crop diversity.
(D) None of the choices is true.

25. Rhizobacteria and mycorrhizal fungi both
(A) can infect soybean.
(B) form root nodules.
(C) have a wide host range.
(D) All of the choices are true.

26. Phytoremediation defines the use of plants to
(A) produce high-quality foods.
(B) generate recombinant 重組 products.
(C) create genetically identical offspring 子代.
(D) decomtaminate 淨化 the enviroments.

27. The immediate function of heat proteins is to __, leading to protection of plants under high temperature conditions.
(A) remove denatured proteins
(B) keep folding of proteins
(C) enhance water intake
(D) reduce water loss

28. Plants can communicate with each other via
(A) changing leaf movement patterns.
(B) making low frequency waves.
(C) releasing volatile 揮發性 chemicals.
(D) producing electronic signals.

29. In plant disease-defense response, __ is the receptor which specifically recognizes the pathogen.
(A) a resistance protein
(B) a virulent protein
(C) an avirulent protein
(D) an effector protein

30. Plant signaling transduction pathways involved in development and stress defense responses
(A) have synergistic 協同 effects.
(B) are regulated by different hormones.
(C) have complex interactions.
(D) are highly conserved among different species.

二、配合題（共 30 分）

（請作答於試卷內之「非選擇作答區」並標明題號依序作答）

1. Which of the following structures are physical barriers 物理屏障 to protect plants from physical damages? (4 分)

2. What are the organelles involved in plant energy conversion? (4 分)

3. What are the major mechansims making transpiration achieved? (4 分)

4. Which tissue of a plant senses photoperiod? And what kind of signal is then transduced for apical buds to grow as flowers? (4 分)

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5. What are the plant hormones which play major differential 差異性的 roles in the regulation of seed germination? (6 分)

6. Which signaling pathway plays a major role in the systemic acquired resistance of plants? (2 分)

7. Which of the followings play major roles involved in rgulation of plant drought 乾旱 response? (6 分)

(A) Abscisic acid
(B) Adhesion of water to the cell walls of the xylem vessels
(C) Auxin
(D) Brassinosteroids
(E) Chloroplasts
(F) Cohesion between water molecules
(G) Cytokinins
(H) Ethylene
(I) Florigen
(J) Gibberellic acids
(K) Guard cells
(L) Jasmonic acid
(M) Leaves
(N) Mitochondria
(O) Pressure flow mechanism
(P) Root meristem
(Q) Salicylic acid
(R) Shoot meristem
(S) Stems
(T) Stomatal closure
(U) Systemic movement
(V) Trichomes
(W) Wax layer

三、簡答題（10 分）

（請作答於試卷內之「非選擇作答區」並標明題號依序作答）

1. 閱讀以下短文後，簡述出其重點。

Plant viruses spread from the initially infected cells to the rest of the plant in several distinct stages. First, the virus moves intracellularly from the sites of replication to plasmodesmata (PD), the virus then transverses the PD to spread intercellularly. Long-distance movement of virus occurs through phloem sieve tubes. The processes of plant virus movement are controlled by specific viral movement proteins (MPs). No extensive sequence similarity has been found in MPs belonging to different plant virus taxonomic groups. Moreover, different MPs were shown to use different pathways and mechanisms for virus transport. Some viral transport systems require a single MP while others require additional virus-encoded proteins to transport viral genomes. (modified from *Methods Mol. Biol.* 2008, 451:33-54)