

※ 注意：請於試卷上「選擇題作答區」依序作答。

A. 選擇題 (60%; 每題兩分)

1. 就生物五界 (kingdoms) 而言, "algae" 是屬於下列何者?
 (A) Monera (C) Plantae
 (B) Protista (D) Monera, Protista, and Plantae
2. 下列哪種相關真菌常被應用於發酵、製酒、與糕餅烘培?
 (A) *Amanita phalloides* (C) *Penicillium*
 (B) *Morchella esculenta* (D) *Saccharomyces cerevisiae*
3. 下列有關 Photoautotrophs 的敘述, 何者正確?
 (A) include only the green plants.
 (B) make sugar by using organic raw materials.
 (C) produce organic molecules from inorganic molecules.
 (D) eat other organisms that use light energy to make food molecules.
4. 下列有關 meiosis 的敘述, 何者錯誤?
 (A) It consists of two successive nuclear divisions.
 (B) It produces a total of two daughter nuclei.
 (C) It produces cells with half as many chromosomes as the parent cell.
 (D) It produces cells with one homolog of each homologous pair.
5. 在下列何種情況下, 來自 S_1S_2 植物的花粉可對 S_2S_3 的花成功的完成授粉?
 (A) If you used pollen from a carpelate flower, to fertilize a staminate flower, it would be successful.
 (B) If the plants used sporophytic self-incompatibility, half of the pollen would be successful.
 (C) If the plants used gametophytic self-incompatibility, half of the pollen would be successful.
 (D) Pollen from an S_1S_2 plant can never pollinate an S_2S_3 flower.
6. 下列敘述何者與 Photosystem I 有關而與 Photosystem II 無關?
 (A) can function only in association with the other photosystem.
 (B) donates electrons to an electron transport chain.
 (C) splits water to release oxygen.
 (D) contains P700 at the reaction center.
7. 當植物發生突變而無法合成 lignin, 則下列哪一種組織或細胞的形成將受到最為明顯的影響?
 (A) fiber (C) epidermis
 (B) vascular cambium (D) sieve tube member
8. 下列有關維管束植物之演化趨勢的敘述, 何者是正確的?
 (A) production of seeds in all lineages
 (B) progressive reduction of the sporophyte
 (C) sporophyte becoming nutritionally dependent on the gametophyte
 (D) increased protection of the gametophyte by the sporophyte
9. 就下列各營養元素, 何者通常是植物體的微量必須元素?
 (A) Calcium. (C) Iron
 (B) Magnesium. (D) Sulfur.
10. 下列何者與植物根部吸收 phosphate 相關?
 (A) a PO_4 channel in the endoderm of the root.
 (B) soil bacteria to make the phosphate bioaccessible.
 (C) symbiotic fungal hyphae to increase the effective surface area of the root.
 (D) root nodules fixing phosphate from the air.
11. 若植物於太空艙中近無重力的狀況下生長, 則下列哪種現象會受到限制?
 (A) phototropism because it is dark in space.

接背面

國立臺灣大學九十六學年度轉學生入學考試試題

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- (B) photomorphogenesis because only near-red light filters into space.
(C) gravitropism because there is little gravity in space.
(D) aerotropism because there is no oxygen in space.

12. 若 α -amylase 的相關功能基因發生突變則下列種子萌芽的哪個過程會受到明顯的影響？
(A) The seed could not imbibe water. (C) The seed coat would not rupture.
(B) The embryo would starve. (D) The seed would germinate prematurely.
13. 下列有關 pollen tubes 的敘述，何者是正確的？
(A) providing water and nutrients to ovules. (C) the sites where sperm cell and egg fuse.
(B) transporting sperm cells to ovules. (D) growing in response to sucrose.
14. 就細胞壁的延展性而言，通常____可使細胞擴張，而____則使細胞延展性降低？
(A) auxin and GA; ABA and ethylene (C) ABA and ethylene; auxin and GA
(B) auxin and ethylene; GA and ABA (D) ABA and GA; auxin and ethylene
15. 下列相關敘述何者是針對 greenhouse effect ？
(A) reduced by the addition of carbon dioxide to the atmosphere, since carbon dioxide removes excess heat from the Earth's surface and reflects it back into space.
(B) reduced by the burning of fossil fuels, which removes oxygen from the atmosphere.
(C) reduced by photosynthesis, which removes carbon dioxide from the atmosphere.
(D) made worse by photosynthesis, which adds carbon dioxide to the atmosphere.
16. 下列何者不會出現在 DNA 的構造中？ (A) deoxyribose (B) pyrimidine (C) hexose (D) phosphate
17. 下列有關訊息分子(signal molecules)的特性，何者正確？
I. are water soluble
II. pass through the plasma membrane by active transport
III. bind to specific receptor in a membrane
IV. induce an enzymatic cascade reactions in the cytoplasm
(A) I and III. (C) I, II, and IV.
(B) III, and IV. (D) I, III, and IV.
18. 人類消化道的順序為
(A) pharynx – esophagus – pyloric sphincter – stomach - cariac orifice – duodenum – jejunum – ileum – cecum - colon – rectum.
(B) pharynx – esophagus – cariac orifice – stomach - pyloric sphincter – duodenum – jejunum – ileum – colon - cecum - rectum.
(C) pharynx – esophagus – cariac orifice – stomach - pyloric sphincter – duodenum – jejunum – ileum – cecum - colon – rectum..
(D) pharynx – esophagus – cariac orifice – stomach - pyloric sphincter – duodenum – ileum – jejunum – cecum - colon – rectum
19. 下列毛病都是中風的高危險群，除了
(A) hemophilia. (C) arteriosclerosis.
(B) hypertension. (D) thrombosis
20. 在負壓式呼吸方式中，吸氣是因為
(A) contraction the diaphragm. (C) relaxing the muscles of the ribs.
(B) the lungs to expand the alveoli. (D) forcing air from the throat down into the lungs.
21. 下列哪些與製造單株抗體(monoclonal antibody)有關？
I. antigens. II. T_H cells III. Phagocytic cells IV. myeloma cells. V. plasma cells.
(A) I, II, III, IV, and V. (C) I, III, IV, and V.
(B) I, II, III, and V. (D) I, IV, and V.

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22. 下列哪些細胞會執行吞噬反應(phagocytosis) ?
 (A) macrophag, and neutrophil.
 (B) macrophag, neutrophil, and eosinophil.
 (C) macrophag, neutrophil, eosinophil, and basophil.
 (D) macrophag, neutrophil, eosinophil, basophil, natural killer cell, and Tc cell.
23. 下列何項分子在內分泌系統及免疫系統中都扮演重要功能 ?
 (A) serotonin. (C) epinephrine.
 (B) glucocorticoid. (D) adenocorticotropin.
24. 有位消費者在餐廳吃完晚餐後，覺得口渴。這可能是因為
 I. eating salty meal.
 II. drinking too much alcohol.
 III. an increase of ADH releasing.
 IV. a decrease in the osmolarity of the blood.
 (A) I and II. (C) I and IV.
 (B) I, II and III. (D) II, III and IV
25. 當起始一個動作電位(action potential)時，下列何項需先發生 ?
 (A) Na⁺ channels are opened. (C) K⁺ channels are opened.
 (B) Na⁺ and K⁺ channels are activated. (D) Na⁺ and K⁺ channels are closed.
26. 有關動情週期(estrous cycle)及月經週期(menstrual cycle)的比較，何者正確 ?
 (A) Hormone control occurs in menstrual cycles, not in estrous cycles.
 (B) There are stronger effects of season and climate on menstrual cycle.
 (C) There are more significant behavioral changes during menstrual cycles than during estrous cycles.
 (D) In menstrual cycles, endometrial breeding occurs, while the endometrium is reabsorbed by uterus in estrous cycle.
27. 避孕丸(birth control pills)的生理機制為何 ?
 (A) They cause spontaneous abortion.
 (B) They prevent implantation by irritating the endometrium.
 (C) A negative feedback system stops the release of GnRH, FSH and LH.
 (D) A negative feedback to affect progesterone releasing, thus pregnancy can't be maintained.
28. 早期動物胚胎發育的的順序為何 ?
 I. cortical reaction.
 II. first cell division.
 III. acrosomal reaction.
 IV. fusion of egg and sperm
 V. onset of new DNA synthesis.
 (A) III→V→I→III→II. (C) IV→I→III→II→V.
 (B) III→I→IV→V→II. (D) IV→III→I→V→II.
29. 有關腎元再吸收的敘述，何者錯誤 ?
 (A) H⁺ is not reabsorbed in nephron.
 (B) NaCl is actively reabsorbed in loop of Henle.
 (C) Most nutrients are reabsorbed in proximal tubule.
 (D) Water is passively absorbed in proximal tubule, loop of Henle, and distal tubule.
30. 何項是人類正確的視覺訊號傳送途徑 ?
 (A) bipolar cells→ganglion cells→lateral geniculate nuclei→optic chiasm→primary visual cortex.
 (B) bipolar cells→ganglion cells→optic chiasm→lateral geniculate nuclei→primary visual cortex.
 (C) ganglion cells→bipolar cells→lateral geniculate nuclei→optic chiasm→primary visual cortex.
 (D) ganglion cells→bipolar cells→optic chiasm→lateral geniculate nuclei→primary visual cortex.

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B. 解釋名詞：(10%)

1. apomixes
2. fossil
3. phytochrome
4. seed dormancy

C. 申論題：(30%)

1. 試重點比較典型的細菌、動物細胞、與植物細胞之細胞分裂過程中，其細胞質分裂的差異。(5%)
2. 植物學家以 *Arabidopsis* 植物為例，利用突變株研究調控花器發育相關的基因，試說明 A, B 及 C classes 的 homeotic genes 如何進行 sepals, petals, stamens, 及 carpals 的發育，而當分別發生突變時，將各會造成何種性狀的花？(可以繪圖加以說明) (5%)
3. 從一有功能的真核生物蛋白質氨基酸序列所反推回的 DNA 序列與其最起始在染色體上的 DNA 序列，往往會有極大差異。試討論此差異是如何造成？(10%)
4. 試簡述臭氧層破洞及全球暖化的成因，及對地球生態的傷害(10%)

試題必須隨卷繳回