

國立臺灣大學九十六學年度轉學生入學考試試題

科目：普通生物學(B)

題號：41

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※ 注意：請於試卷上「選擇題作答區」依序作答。

一. 單選題。(每題 2 分，共 40 分)

1. The movement of glucose into a cell (when glucose is more concentrated outside the cell) is an example of  
A) diffusion    B) filtration    C) osmosis    D) active transport    E) facilitated diffusion
2. The peptide hormone, insulin, is secreted from a pancreatic cell. Which of the following most accurately represents the pathway of secretion?  
A) synthesis in the Golgi complex - secretory vesicle - cell surface  
B) synthesis on the rough ER - lysosome - plasma membrane  
C) synthesis on the rough ER - Golgi complex - secretory vesicle - cell surface  
D) synthesis on free ribosomes - smooth ER - secretory vesicle - cell surface  
E) synthesis on the rough ER - modification in the smooth ER - secretory vesicle
3. When you are exercising and you begin to "burn" fat, which of the following is happening?  
A) Fats are being broken down and converted to acetyl-CoA that enters the Krebs cycle.  
B) Fats are converted to glucose, then enters glycolysis.  
C) Fats are being broken down and converted to acetyl-CoA that enters the electron transport chain.  
D) Fats are converted to glucose that enters the Krebs cycle.  
E) Any of the above could be happening.
4. The length of the different phases of the cell cycle can be measured by labeling cells continuously with radioactive thymine and waiting to see how long it takes for radioactivity to appear in metaphase chromosomes. In a non-synchronized cell culture, what phase of the cell cycle would be the most likely represented by the time between the addition of radioactive thymine and the time at which radioactivity first appears in metaphase chromosomes?  
A) M phase    B) G1    C) Interphase    D) S phase    E) G2
5. The system of classification that is based on physical similarities among organisms and does not try to reflect evolutionary relationships is  
A) evolutionary school    B) phenetic school    C) phylogenetic school    D) cladistic school
6. Essential fatty acids are  
A) those fatty acids that we are unable to synthesize and must be included in our diet.  
B) those fatty acids that are found in essential body structures  
C) the fatty acids that we can synthesize from simpler molecules  
D) required to synthesize most vitamins  
E) only required by several bird species

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7. The organization of blood and water flow in a fish's gills increases the fish's ability to extract oxygen from the water because
- A) water flows in two directions over the gills, once during inhalation and again past the gills during exhalation
  - B) the thick blood vessels in the gills bring very large amounts of blood
  - C) the deoxygenated blood entering a gill lamella encounters oxygenated water first
  - D) the deoxygenated blood entering a gill lamella encounters deoxygenated water first
  - E) None of the choices are correct.
8. The immune system is capable of mounting specific responses to particular microorganisms because
- A) stem cells determine which type of B and T cells to make
  - B) lymphocytes are able to change their antigen specificity as required to fight infection
  - C) the body contains an enormous diversity of lymphocytes, each with a specific kind of antigen receptor
  - D) stem cells make different antigen receptors depending on the invading microorganism
  - E) stem cells are able to change
9. What is the function of the urea reabsorption that takes place in the renal collecting ducts?
- A) It restores the correct concentration of blood urea.
  - B) It increases the osmotic concentration of the interstitial fluid in the renal medulla so that more water can be extracted from the urine.
  - C) It reduces the salinity of the renal medulla and thus helps regulate how much water is reabsorbed from the urine.
  - D) It induced NaCl to move into the capillaries and thus helps maintain blood salinity.
  - E) The urea enters the ascending limb of the loop of Henle and from there is excreted in the urine.
10. What does gastrulation accomplish?
- A) It changes a solid embryo into a hollow morula.
  - B) It creates the neural tube by invagination of the ectoderm.
  - C) It creates the notochord by invagination of the ectoderm.
  - D) It changes the solid blastula into a hollow embryo that has three tissue layers.
  - E) It changes the hollow blastula into a hollow embryo that has three tissue layers.
11. The driving force that pushes the root tip of a plant through the soil is due primarily to
- A) continuous cell division in the root cap at the tip of the root
  - B) continuous cell division just behind the root cap in the center of the apical meristem
  - C) elongation of cells behind the root apical meristem
  - D) A and B only
  - E) A, B, and C

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12. Sugar synthesized in mature leaves moves from leaves into the \_\_\_\_\_ of \_\_\_\_\_ by \_\_\_\_\_.

- A) tracheid; phloem; active transport
- B) tracheid; xylem; diffusion
- C) sieve-tube member; phloem; active transport
- D) sieve-tube member; xylem; active transport
- E) sieve-tube; phloem; diffusion

13. In plant roots, the Casparian strip is correctly described by which of the following?

- A) It is located in the walls between endodermal cells and cortex cells.
- B) It provides energy for the active transport of minerals into the stele from the cortex.
- C) It ensures that all minerals are absorbed from the soil in equal amounts.
- D) It ensures that all water and dissolved substances must pass through a cell before entering the stele.
- E) It provides increased surface area for the absorption of mineral nutrients.

14. Phloem transport is described as being from source to sink. Which of the following would most accurately complete this statement about phloem transport as applied to most plants in the late spring? Phloem transports \_\_\_\_\_ from the \_\_\_\_\_ source to the \_\_\_\_\_ sink.

- A) amino acids; root; mycorrhizae
- B) sugars; leaf; apical meristem
- C) nucleic acids; flower; root
- D) proteins; root; leaf
- E) sugars; stem; root

15. Plant hormones can be characterized by all of the following except that they

- A) may act by altering gene expression.
- B) have a multiplicity of effects.
- C) function independently of other hormones.
- D) control plant growth and development.
- E) affect division, elongation, and differentiation of cells.

16. In attempting to keep a seed staying dormancy, what kind of hormone you may apply to it; Nevertheless, if you want the seed germinate, what you will use to treat the seed with.

- A) IAA; Gibberellins(GA)
- B) GAs; Absciscic acid
- C) Absciscic acid; Cytokinins
- D) Absciscic acid; IAA
- E) Absciscic acid; GAs.

17. Plant biotechnologists uses protoplast mainly to

- A) culture plant cells in vitro
- B) asexually propagate desirable plant varieties
- C) introduce bacterial genes into a plant genome

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- D) study the early events following fertilization
- E) produce new hybrid species

18. Plants growing in a partially dark environment will toward light in a response called phototropism. Choose the incorrect statement regarding phototropism.

- A) It is caused by a chemical signal
- B) one chemical involved is auxin
- C) Auxin causes a growth increase on one side of the stem
- D) auxin causes a decrease in growth on the side of the stem exposed to light
- E) removing the apical meristem prevents phototropism

19. All of the following are responses of plants to cold stress except

- A) the production of a specific solute "plant antifreezer" that reduces water loss
- B) excluding ice crystal from interior wall
- C) conversion of the fluid mosaic cell membrane to a solid mosaic one
- D) an alternation of membrane lipids so that the membranes remain flexible
- E) increasing the proportion of unsaturated fatty acids in the membranes

20. Under which conditions would asexual plants have the greatest advantage over sexual plants?

- A) an environment that varies on a regular, predictable basis
- B) an environment with irregular fluctuations of conditions
- C) a relatively constant environment with infrequent disturbances
- D) a fire-maintained ecosystem
- E) an environment with many seed predators.

※ 注意：請於試卷上「非選擇題作答區」依序作答，並應註明作答之題號。

二. 解釋名詞 (每題 5 分, 共 40 分)

1. Apoptosis
2. Homeostasis
3. Antagonistic effect
4. Cytokinesis
5. Maternal inheritance
6. Biological nitrogen fixation
7. Photorespiration
8. CAM plants

三. 問答題 (20 分)

1. 周邊感覺神經將訊息遵循一定方向傳遞至中樞神經系統，請說明神經訊息傳導的方向性如何構成及維持? (10 分)
2. 為何植物需要光化學反應的產物 (ATP and NADPH) 才能固定二氧化碳? (5 分)  
(the energy is consumed in what essential reactions)
3. 以演化觀點說明有性生殖對物種生存的好處。 (5 分)

試題必須隨卷繳回