大同大學 九十三 學年度 轉學考試 試題

考試科目：生物　系別：生物工程學系　

註：本次考試不可以參考自己的書籍及筆記；　不可以使用字典；　不可以使用計算器。

I. 單選題 (2 points each)

1. Osmosis (a) is a active transport (b) is diffusion of dissolved substance across differentially permeable membrane (c) need a membrane protein to facilitate its reaction (d) need to spend ATP
2. Specific protein receptors are present for all of the following except (a) signal amplification (b) signal transduction (c) intracellular receptors binding to DNA (d) signaling to other cells (e) as cell junctions
3. Small molecules or ions can pass from one cell to another through (a) tight junctions (b) gap junctions (c) diffusion spheres (d) desmosomes (e) adherens junctions
4. One of the most important coenzymes that accepts electrons/hydrogens is (a) NAD+ (b) NADH (c) ATP (d) NADPH (e) ribozyme
5. A researcher wants to slow down a particular cellular activity by controlling an enzyme that catalyzes that activity. All of the following choices are available except (a) increasing the temperature of the cell's environment (b) decreasing the temperature of the cell's environment (c) reducing the pH of the cell's environment (d) increasing the pH of the cell's environment (e) adding substrate as it is depleted to the cell's environment
6. The energy released in the mitochondrial electron transport chain is used to transport protons into the (a) matrix (b) cytoplasm (c) ER (d) inter-membrane space of mitochontria (e) enzyme complex of the Krebs cycle
7. Pinching off the top buds will decrease the production of _____ by the apical bud and allow the plant to become bushy. (a) auxin (b) cytokinin (c) gibberellin (d) abscisic acid (e) ethylene
8. When a seed is first formed in the fall, it typically will not germinate because _____ must first be washed from the seed by a hasrd rain or broken down by cycles of freezing and thawing. (a) auxin (b) cytokinin (c) gibberellin (d) abscisic acid (e) ethylene
9. Which part of the chloroplast contains the Calvin-cycle enzymes? (a) stroma (b) thylakoids (c) grana (d) envelope (e) cristae
10. Primary growth in plants results from activity of (a) apical meristems (b) lateral meristems (c) vascular cambium (d) cork cambium (e) tracheids
11. Which sequence most accurately describes blood flow in the human circulatory system? (a) right atrium →right ventricle →pulmonary

artery (b) right atrium →left atrium → left ventricle →aorta (c) left atrium →left ventricle →pulmonary artery (d) left ventricle →left atrium →aorta (e) right atrium →right ventricle →aorta

12. Which of the following regulate the red blood cell numbers in human? (a) epinephrine (b) erythropoietin(c) oxygen (d) sympathetic nervous system (e) parasympathetic nervous system

13. Select the mismatched digestive enzyme and substrate. (a) trypsin – proteins (b) lactase – disaccharides (c) chymotrypsin -- DNA and RNA (d) amylase – starch (e) pepsin – proteins

14. What determines the ability of a mammal to concentrate the urea? (a) the numbers of nephrons (b) the length of the tubules (c) the length of the collecting duct (d) the size of the glomerulus (e) the length of the Loop of the Henle

15. A hemoglobin molecule has an iron atom at its center. A hemoglobin molecule can carry all of the following gases or gaseous products.
I. oxygen II. carbon dioxide III. carbon monoxide IV. nitric oxide
(a) I and II (b) I and III (c) I and IV (d) I, II and III (e) I, II , III and IV

II. 問答題

1. 請畫出 ATP 之結構. 其如何儲存能量? (5 points)
2. 請列舉蛋白質的四種組成結構並說明每一結構是由何種鍵結所形成? (8 points)
3. 水具有高比熱的性質. 請說明為何此對生物的生存是重要的. (5 points)
4. 何謂 C_3, C_4, CAM plants? 這些植物都有光呼吸嗎? 若有, 這類植物又有何對策? (10 points)
5. 請繪製單子葉及雙子葉植物根部及莖部的橫切面圖並比較之. (8 points)
6. 何謂 sinoatrial node? atrioventricular node? 其對人體心臟之運作有何功能? (6 points)
7. 為何動物大多以 fat 作為能量儲存之方式? (5 points)
8. 請說明 NaCl 及尿素對人體腎臟濃縮尿液之重要性. (6 points)
9. 請說明免疫系統中 B 細胞如何進行 clonal selection 產生抗體 (5 points)
10. 請比較 (a) cardic muscle vs. smooth muscle (c) positive feedback systems vs. negative feedback systems (c) vessel member vs. sieve tube member 之異同 (12 points)