銘傳大學 99 學年度春季轉學生招生考試

1 月 22 日第三節

普通生物學試題

（第 1 頁共 2 頁）（限用答案本作答）　☐可使用計算機 ☑不可使用計算機

一、選擇題一，每題 2 分，共 40 分。請在答案紙上標示清楚題號作答。若連續題號寫 4 個或 4 個以上相同答案，這些題目都不給分。

1、下列的胞器何者為單層膜？
A) 粒腺體　B) 細胞核　C) 內質網
D) 核糖體　E) 葉綠體

2、下列胞器何者是一般高等植物細胞內所沒有的？
A) 溶體　B) 粒腺體　C) 高爾基斯體
D) 內質網　E) 核糖體

3、下列敘述中何者並非平滑內質網的功能？
A) 解毒　B) 貯藏鈣離子　C) 合成脂質
D) 修飾蛋白質　E) 代謝碳水化合物

4、紅花植物基因型是 AA，與另一棵植物白花基因型是 aa，兩者雜交後產生的 F1 子代，再後代自交產生 F2 子代，請問 F2 子代之紅花與白花比率為何？
A) 全是紅花　B) 全是白花
C) 紅花：白花 = 1 : 1　D) 紅花：白花 = 3:1
E) 紅花：白花 = 1 : 3

5、紅花高莖植物基因型是 AATT，與另一棵植物白花高莖基因型是 aatt，兩者雜交後產生的 F1 子代，再後代自交產生 F2 子代，請問 F2 子代之紅花與白花比率為何？
A) 紅花高莖：白花高莖 = 3:1
B) 紅花高莖：白花高莖 = 1:3
C) 紅花高莖：紅花矮莖：白花高莖：白花矮莖 = 1:1:1:1
D) 紅花高莖：紅花矮莖：白花高莖：白花矮莖 = 4:2:2:1
E) 紅花高莖：紅花矮莖：白花高莖：白花矮莖 = 9:3:3:1

6、減數分裂同源染色體在哪一個時期分離？
A) 中期 I　B) 後期 I　C) 前期 II
D) 中期 II　E) 後期 II

7、下列敘述鈉鉀唧筒何者是錯誤的
A) 讓鈉離子往細胞內部移動
B) 讓鉀離子往細胞內部移動
C) 為在細胞膜上的離子運輸者
D) 運輸需要耗能
E) 維持動物細胞膜內外的電位差

8) A localized group of organisms that belong to the same species is called a
A) biosystem.　B) community.　C) population.
D) ecosystem.　E) family.

9) What coefficients must be placed in the following blanks so that all atoms are accounted for in the products?
$C_6H_{12}O_6 \rightarrow$ ___ C_2H_6O + ___ CO_2
A) 1; 2　B) 2; 2　C) 1; 3
D) 1; 1　E) 3; 1

10) What gives rise to the cohesiveness of water molecules?
A) hydrophobic interactions
B) nonpolar covalent bonds
C) ionic bonds　D) hydrogen bonds
E) both A and C

11) For this pair of items, choose the option that best describes their relationship.
(A) The number of purines in the DNA strand 5'-AAGAGGAGAAA-3'
(B) The number of pyrimidines in the DNA strand 5'-AAGAGGAGAAA-3'
A) Item (A) is greater than item (B).
B) Item (A) is less than item (B).
C) Item (A) is exactly or very approximately equal to item (B).
D) Item (A) may stand in more than one of the above relations to item (B).

12) Which of the following hydrocarbons has a double bond in its carbon skeleton?
A) C_3H_8　B) C_2H_6　C) CH_4
D) C_2H_4　E) C_2H_2

13) Which of the following polymers contain nitrogen?
A) starch　B) glycogen　C) cellulose
D) amylopectin　E) chitin

本試題係兩面印刷

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14) Which of the following would likely move through the lipid bilayer of a plasma membrane most rapidly?
A) CO_2 B) an amino acid C) glucose
D) K^+ E) starch

15) If an enzyme solution is saturated with substrate, the most effective way to obtain a faster yield of products is to
A) add more of the enzyme.
B) heat the solution to 90°C.
C) add more substrate.
D) add an allosteric inhibitor.
E) add a noncompetitive inhibitor.

16) Which of the following statements regarding enzymes is true?
A) Enzymes decrease the free energy change of a reaction.
B) Enzymes increase the rate of a reaction.
C) Enzymes change the direction of chemical reactions.
D) Enzymes are permanently altered by the reactions they catalyze.
E) Enzymes prevent changes in substrate concentrations.

17) Where does glycolysis takes place?
A) mitochondrial matrix
B) mitochondrial outer membrane
C) mitochondrial inner membrane
D) mitochondrial intermembrane space
E) cytosol

18) What are the products of the light reactions that are subsequently used by the Calvin cycle?
A) oxygen and carbon dioxide
B) carbon dioxide and RuBP
C) ATP and NADPH
D) electrons and photons
E) water and carbon

19) Membrane receptors that attach phosphates to specific animo acids in proteins are
A) not found in humans.
B) called receptor tyrosine-kinases.
C) a class of GTP G-protein signal receptors.
D) associated with several bacterial diseases in humans.
E) important in yeast mating factors that contain amino acids.

20) Consider this pathway: epinephrine → G protein-coupled receptor → G protein → adenylyl cyclase → cAMP. Identify the second messenger.
A) cAMP B) G protein C) GTP
D) adenylyl cyclase E) G protein-coupled receptor

二、問答題：共 60 分，每題分數標示在題目後面。請在答案紙上標示清楚題號作答，不用抄題目；題號標示不清或錯誤者，都以 0 分計算。

1、請說明在 *E. coli* 內的 laz operon 如何調控。(10%)
2、請說明 DNA 中心法則。(6%)
3、請說明 mRNA processing。(9%)
4、請說明 telomere。(5%)
5、在真核細胞中如何合成 complementary DNA (cDNA)。(5%)
6、請說明 restriction enzyme。(5%)
7、請說明 PCR(polymerase chain reaction)所需的反應物有哪些？它的合成反應的條件為何？(10%)
8、請詳細說明真核細胞 DNA replication。(10%)

試題完