

元智大學 101 學年度研究所 碩士班 招生試題卷

系(所)別： 生物科技與工程
研究所碩士班

組別： 不分組

科目： 生物化學

用紙第 1 頁共 2 頁

●不可使用電子計算機

I. Please choose the most appropriate answer. (21%, each 3 %)

1. What is the major glycosidic linkage in the structure of cellulose?
(A): $\alpha(1 \rightarrow 2)$, (B): $\alpha(1 \rightarrow 4)$, (C): $\beta(1 \rightarrow 2)$, (D): $\beta(1 \rightarrow 4)$
2. Which of the following component does not present in the cell membrane?
(A): nucleic acid, (B): protein, (C): lipid, (D): carbohydrate
3. To prepare a 10% (w/v) glucose solution, one should
(A): add 10g of glucose into 100 ml of pure water,
(B): add 5g of glucose into 50 ml of pure water,
(C): add 100 ml of pure water into 10g of glucose,
(D): dissolve 5 g of glucose in 35 ml of pure water, and bring the final volume to 50 ml with pure water
4. The cytoplasmic membrane is the (A): primary support structure of the cell,
(B): highly selective permeability barrier of the cell, (C): source of nutrient Production, (D) structure which identifies a cell as eukaryotic or prokaryotic
5. Beta oxidation of a mole of a 16 carbon fatty acid under physiologic conditions Produces (A): one mole of acetic acid, (B): eight moles of acetyl CoA, (C): eight moles of acetic acid, (D): one mole of acetoacetic acid, (E): four mole of acetoacetic acid
6. Translation is the cellular process of making (A): new DNA, (B): RNA from DNA, (C): proteins from amino acids by way of RNA, (D):none of the above
7. In term of the number of atoms, which element is not considered as "macro-molecules" in living organisms? (A): C, (B): H, (C): O, (D): Zn, (E): S

II Short answer (79%)

1. Define and give the description of (1) noncovalent bond; (2) hydrogen bond; (3) peptide bond; (4) disulfide bond; (5) phosphodiester bond (10%)
2. Briefly define "genome" and "proteome" and describe the difference between them (10%)

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3. What are the three types of RNA? Please write down their full name in English and give brief description (9%)
4. What are reactive oxygen species (ROS)? What are effects of ROS on cell metabolism? (10%)
5. Why do aerobic cells carry out fermentation for the survival under anaerobic condition? (10%)
6. Please use collagen biosynthesis as an example to explain post-translational modification. (10%)
7. The side group of Lysine is $(\text{CH}_2)_4\text{NH}_2$. Please draw a zwitterion form of Lysine. (10%)
8. Briefly define "pH". What is the definition of $\text{pH}=5$? (10%)