

大葉大學 102 學年度 研究所碩士班 招生考試試題紙

系 所 別	組 別	考 試 科 目 (中文名稱)	考 試 日 期	節 次	備 註
藥用植物與保健學系 碩士班	甲	生物化學	3 月 23 日	第一節 10:30~12:00	共 2 頁, 第 1 頁

說明 1: 可否攜帶特殊作答輔助工具: 否 是, 考生可使用\_\_\_\_\_ (如未註明, 一律不准攜帶)

一、單選題 (60%) 請依順序作答, 否則不予計分

1. ( ) The nucleic acid bases: (A) absorb ultraviolet light maximally at 280 nm. (B) are all about the same size. (C) are relatively hydrophilic. (D) are roughly planar. (E) can all stably base-pair with one another.
2. ( ) The amino acids serine, alanine, and cysteine can be catabolized to yield: (A) fumarate. (B) pyruvate. (C) succinate. (D)  $\alpha$ -ketoglutarate. (E) none of the above.
3. ( ) A precursor in the synthesis of the peptidoglycan of bacterial cell walls is UDP-: (A) galactose. (B) glucose. (C) glucuronic acid. (D) *N*-acetylglucosamine. (E) penicillin.
4. ( ) Which one of the following reactions, cycles, or pathways is *not* found in plant systems? (A) The Calvin cycle (B) The gluconeogenesis pathway (C) The glyoxalate cycle (D) The rubisco reaction (E) The urea cycle.
5. ( ) When blood glucose is abnormally high, the pancreas releases: (A) epinephrine. (B) glucagon. (C) glucose. (D) insulin. (E) trypsin.
6. ( ) The human genetic disease phenylketonuria (PKU) can result from: (A) deficiency of protein in the diet. (B) inability to catabolize ketone bodies. (C) inability to convert phenylalanine to tyrosine. (D) inability to synthesize phenylalanine. (E) production of enzymes containing no phenylalanine.
7. ( ) The synthesis of glycogen, starch, and sucrose all: (A) involve addition of a sugar residue at the reducing end of the growing polymer. (B) take place in liver and muscle of mammals. (C) use a sugar nucleotide as substrate. (D) use glucose 1-phosphate as the only substrate. (E) use glucose-6-phosphate as substrate.
8. ( ) The immediate precursors of DNA and RNA synthesis in the cell all contain: (A) 3' triphosphates. (B) 5' triphosphates. (C) adenine. (D) deoxyribose. (E) ribose.
9. ( ) The largest energy store in a well-nourished human is: (A) ATP in all tissues. (B) blood glucose. (C) liver glycogen. (D) muscle glycogen. (E) triacylglycerols in adipose tissue.
10. ( ) The operator region normally can be bound by: (A) attenuator. (B) inducer. (C) mRNA. (D) repressor. (E) suppressor tRNA.
11. ( ) Consider the *lac* operon of *E. coli*. When there is neither glucose nor lactose in the growth medium: (A) CRP (cAMP receptor protein of *E. coli*) protein binds to the *lac* operator. (B) CRP protein displaces the Lac repressor from the *lac* promoter. (C) occurs in the *lac* repressor region. (D) occurs only when glucose is present in the growth medium. (E) prevents repressor from binding to the *lac* operator.
12. ( ) When glycerol is converted to glucose via gluconeogenesis in germinating seeds, the first glycolytic intermediate formed is: (A) 1,3-bisphosphoglycerate. (B) dihydroxyacetone phosphate. (C) glycerol 1,3-bisphosphate. (D) glycerol 3-phosphate. (E) ribulose 1,5-bisphosphate.
13. ( ) A precursor in the synthesis of the peptidoglycan of bacterial cell walls is UDP-: (A) galactose. (B) glucose. (C) glucuronic acid. (D) *N*-acetylglucosamine. (E) penicillin.
14. ( ) Glycolysis is the name given to a metabolic pathway occurring in many different cell types. It consists of 11 enzymatic steps that convert glucose to lactic acid. Glycolysis is an example of: (A) aerobic metabolism. (B) anabolic metabolism. (C) a net reductive process. (D) fermentation. (E) oxidative phosphorylation.
15. ( ) Glycosylation of proteins inside the endoplasmic reticulum does *not* involve: (A) a His residue on the protein. (B) an Asn residue on the protein. (C) dolichol phosphate. (D) glucose. (E) *N*-acetylglucosamine.
16. ( ) Which of the following deoxyoligonucleotides will hybridize with a DNA containing the sequence (5')AGACTGGTC(3')? (A) (5')CTCATTGAG(3') (B) (5')GACCAGTCT(3') (C) (5')GAGTCAACT(3') (D) (5')TCTGACCAG(3') (E) (5')TCTGGATCT(3').

大葉大學 102 學年度 研究所碩士班 招生考試試題紙

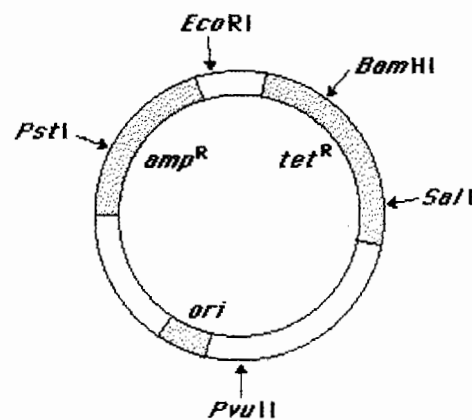
系 所 別	組 別	考 試 科 目 (中文名稱)	考 試 日期	節 次	備 註
藥用植物與保健學系 碩士班	甲	生物化學	3 月 23 日	第一節 10:30~12:00	共 2 頁,第 2 頁

說明 1：可否攜帶特殊作答輔助工具：否 是，考生可使用\_\_\_\_\_（如未註明，一律不准攜帶）

17. ( ) The fundamental cause of sickle-cell disease is a change in the structure of: (A) blood. (B) capillaries. (C) hemoglobin. (D) red cells. (E) the heart.
18. ( ) A monoclonal antibody differs from a polyclonal antibody in that monoclonal antibodies: (A) are labeled with chemicals that can be visualized. (B) are produced by cells from the same organism that produced the antigen. (C) are synthesized by a population of identical, or "cloned," cells. (D) are synthesized only in living organisms. (E) have only a single polypeptide chain that can recognize an antigen.
19. ( ) The carbon assimilation ("dark") reactions of photosynthetic plants: (A) are driven ultimately by the energy of sunlight. (B) are important to plants, but ultimately of little significance for bacteria and animals. (C) cannot occur in the light. (D) yield (reduced) NADH. (E) yield ATP, which is required for the light reactions.
20. ( ) During seed germination, the glyoxylate pathway is important to plants because it enables them to: (A) carry out the net synthesis of glucose from acetyl-CoA. (B) form acetyl-CoA from malate. (C) get rid of isocitrate formed from the aconitase reaction. (D) obtain glyoxylate for cholesterol biosynthesis. (E) obtain glyoxylate for pyrimidine synthesis.

二、問答題 (40%) 請依順序作答，否則不予計分

1. 解釋名詞: (1) Collagen; (2) Western Blot; (3) Glutathione ; (4) Oxidative Phosphorylation; (5) Angiogenesis. [15%]
2. 試舉例說明蛋白質摺疊錯誤與疾病的關係。 [5%]
3. Match each feature of the plasmid pBR322 (at left) with *one* appropriate description presented (at right) (see illustration of pBR322 below). Descriptions may be used more than once. [10%]



- \_\_\_ *amp<sup>R</sup>* sequence (a) permits selection of bacteria containing the plasmid
- \_\_\_ *ori* sequence (b) a sequence required for packaging recombinant plasmids into bacteriophage
- \_\_\_ *tet<sup>R</sup>* (c) origin of replication
- \_\_\_ *Bam*HI sequence (d) cleavage of the plasmid here does not affect antibiotic sequence resistance genes
- \_\_\_ *Pst*I sequence (e) insertion of foreign DNA here permits identification of

4. 試說明生物化學在生活上的應用實例[5%]與相關原理或機制[5%]。