

大 葉 大 學 九 十 一 學 年 度 碩 士 班 甄 試 試 題 紙					
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農業生物科技 生物產業科技	乙	生物化學	12月10日	8:30~10:00	P2-1

註：備註欄若未註明可攜帶計算機或其他資料作答時，考生一律不准攜帶。

I. 單選題, 每題 2 分, 共 40 分

- Which one is not included in ketone bodies? (A) acetate (B) acetone (C) acetoacetate (D) β -hydroxybutyrate.
- Gout is resulted from an excess of which compound in body fluids? (A) urea (B) urine (C) uric acid (D) purine (E) pyrimidine.
- Which compound is not involved in urea cycle? (A) ornithine (B) arginine (C) aspartate (D) fumarate (E) glutamate.
- Which of the following proteins is an enzyme? (A) insulin (B) trypsin (C) hemoglobin (D) myoglobin.
- Saponification is an alkaline hydrolysis of lipids. The bond to be hydrolyzed is (A) an amide bond. (B) a glycosidic bond (C) an anhydride bond (D) an ester bond (E) an ether linkage.
- The β -oxidation of saturated fatty acids is not characterized by (A) the elimination of 2-C units at each step. (B) β -oxidation occurs in the mitochondrial matrix. (C) β -oxidation is initiated at the methyl end of the fatty acid. (D) β -oxidation is the primary route to degradation.
- Pyruvate in humans cannot be converted to (A) lactate (B) acetyl-CoA (C) ethanol (D) oxaloacetate.
- If the coding units in the genetic code were composed of five nucleotides instead of three, how many different codons would be possible? (A) 64 (B) 128 (C) 256 (D) 512 (E) 1024
- Which of the following molecules is not a product in the pentose phosphate pathway? (A) NADPH (B) ribose-5-phosphate (C) 3-phosphoglycerate (D) xylulose-5-phosphate.
- The reactions in the glycolysis pathway occur in which organelle? (A) cytoplasm (B) mitochondria (C) cytoplasm and mitochondria (D) chloroplasts
- How many protons can dissociate from ATP? (A) 1 (B) 2 (C) 3 (D) 4 (E) 5
- Photosynthetic organisms use which of the following molecules as a reductant? (A) water molecules (B) carbon dioxide (C) carbohydrates (D) molecular oxygen gas.
- The net charge of the predominant form of Asp at pH 7.0 is (A) -2 (B) -1 (C) 0 (D) +1 (E) +2.
- How many dicarboxylic acids are found in the TCA cycle? (A) 1 (B) 2 (C) 3 (D) 4 (E) 5
- The Shine-Dalgarno sequence found in prokaryotic systems resides on the (A) tRNA (B) DNA (C) rRNA (D) snRNA (E) mRNA.
- The final electron acceptor in the electron transport chain is (A) molecular oxygen (B) water molecule (C) ubiquinone (D) cytochrome c (E) FMN.
- Which of the following peptides would absorb light centered at 280 nm? (A) ala-lys-his (B) gln-lys-met (C) ser-gly-asn (D) ala-ala-trp (E) val-pro-leu
- Which of the following amino acids is the least water soluble at pH 7.0? (A) cysteine (B) histidine (C) tryptophan (D) aspartic acid (E) glutamic acid.
- During the purification of an enzyme, the purity of the enzyme recovered in the various fractions is determined from (A) the specific activity in that fraction (B) the total activity in that fraction (C) the activity in that fraction (D) the protein concentration in that fraction.

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20. A mutation in the *lacZ* gene would result in (A) no transcription from the *lac* operon. (B) constitutive expression of the *lac* repressor. (C) constitutive expression of the three *lac* structural genes. (D) normal regulation of the *lac* operon but an alteration in β -galactosidase activity.

II. 複選題, 每題 2 分, 共 20 分

- Which statements about tRNA are true? (A) All tRNAs share a common secondary structure. (B) The anticodon is at the 5' end of the molecule. (C) Each tRNA can be charged with only one species of amino acid. (D) Transfer RNAs contain nucleotides other than A, G, C, U.
- Which of the following one-letter abbreviation for each of the amino acid are correct? (A) Lysine: K; Histidine: H (B) Arginine: R; Tyrosine: T (C) Asparagine: N; Glutamine: Q (D) Glycine: G; Phenylalanine: P (E) Glutamic acid: E; Tryptophan: W
- Which of the following sugars are reducing sugars? (A) sucrose (B) glucose (C) cellulose (D) maltose (E) galactose
- Which of the following are organelles? (A) nucleus (B) chloroplast (C) mitochondrion (D) lysosome (E) ribosome.
- Which of the following components of DNA are responsible for the absorbance band at 250-270 nm. (A) riboses (B) deoxyriboses (C) purines (D) pyrimidines (E) phosphates
- Mutations may result from (A) chemical mutagens. (B) errors in transcription. (C) physical insults on the cells, such as UV light. (D) errors in replication. (E) errors in translation.
- Which of the following sugars are disaccharides? (A) sucrose (B) glucose (C) cellulose (D) maltose (E) galactose
- Which of the following lipids have the sphingosine backbone? (A) sphingomyelin (B) ganglioside (C) phosphatidylserine (D) ceramide (E) cerebroside.
- Which of the following correctly describe the expected products obtained when the polypeptide asp-phe-gly-arg-met-asn-lys is treated as indicated below? (A) Treatment with cyanogen bromide yields two fragments. (B) Treatment with 6N HCl at 100°C gives seven products. (C) Treatment with chymotrypsin gives two fragments. (D) Treatment with trypsin gives two fragments.
- Which of the following molecules are amphipathic? (A) pyruvate (B) phosphatidylcholine (C) sphingomyelin (D) succinate (E) phosphatidylethanolamine.

III. 問答題, 共 40 分

- Please describe the function of the following enzymes: (a) reverse transcriptase (b) restriction enzyme (c) DNA ligase (d) DNA polymerase (e) topoisomerase. (15%)
- Why is a primer strand needed in DNA replication? (5%)
- What is the essential difference between the "lock and key" hypothesis of enzyme substrate interaction and the "induced fit" hypothesis? (6%)
- Foods containing aspartame have a warning to phenylketonurics. Why? (4%)
- What three common features are shared by all cloning vectors? (6%)
- Please draw the chemical structure of the dipeptide Gly-Phe. (Note: under the neutral pH.) (4%)