

大葉大學 96 學年度 研究所碩士班甄試 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
生物資源學系		生物化學	12月23日	第一節 8:30~10:00	共兩頁

註：考生可否攜帶計算機或其他資料作答，請在備註欄註明（如未註明，一律不准攜帶）

(一) 選擇題：(57%) 每題三分

- 1) We now know that the one gene-one enzyme hypothesis is not entirely accurate because
 - A) many genes code for proteins that are not enzymes.
 - B) a single gene codes for a single polypeptide chain, and many enzymes are made up of more than one polypeptide chain.
 - C) many genes code for RNA molecules that have no enzymatic activity.
 - D) A and B only
 - E) A, B, and C
- 2) Which of the following represents a similarity between RNA and DNA?
 - A) Both are double-stranded.
 - B) the presence of uracil
 - C) the presence of an OH group on the 2' carbon of the sugar
 - D) nucleotides consisting of a phosphate, sugar, and nitrogenous base
 - E) Both are found exclusively in the nucleus.
- 3) What enzyme catalyzes the attachment of an amino acid to tRNA?
 - A) aminoacyl-tRNA synthetase
 - B) rubisco
 - C) dextrinase
 - D) argininosuccinate lyase
 - E) nuclease
- 4) Plasmids are important in biotechnology because they are
 - A) a vehicle for the insertion of foreign genes into bacteria.
 - B) recognition sites on recombinant DNA strands.
 - C) surfaces for protein synthesis in eukaryotic recombinants.
 - D) surfaces for respiratory processes in bacteria.
 - E) proviruses incorporated into the host DNA.
- 5) A eukaryotic protein can be made in bacteria by inserting the gene encoding the protein into a(n)
 - A) protein plasmid.
 - B) expression vector.
 - C) yeast artificial chromosome (YAC).
 - D) PCR vector.
 - E) restriction plasmid.
- 6) What type of bonding is responsible for maintaining the shape of the tRNA molecule?
 - A) covalent bonding between sulfur atoms
 - B) ionic bonding between phosphates
 - C) hydrogen bonding between base pairs
 - D) van der Waals interactions between hydrogen atoms
 - E) peptide bonding between amino acids
- 7) What is the function of reverse transcriptase in retroviruses?
 - A) It hydrolyzes the host cell's DNA.
 - B) It uses viral RNA as a template for DNA synthesis
 - C) It converts host cell RNA into viral DNA.
 - D) It translates viral RNA into proteins.
 - E) It uses viral RNA as a template for making complementary RNA strands
- 8) In biotechnology, genes are commonly introduced into bacterial cells by incubating the cells together with DNA and high concentrations of calcium ions. This is an example of
 - A) transformation.
 - B) translocation.
 - C) transduction.
 - D) conjugation.
 - E) transposition.
- 9) In a nucleosome, what is the DNA wrapped around?
 - A) polymerase molecules
 - B) ribosomes
 - C) mRNA
 - D) histones
 - E) nucleolus protein
- 10) Muscle cells and nerve cells in one species of animal owe their differences in structure to
 - A) having different genes.
 - B) having different chromosomes.
 - C) using different genetic codes.
 - D) differential gene expression.
 - E) having unique ribosomes
- 11) Which of the following statements correctly identifies a type II restriction endonuclease?
 - A) They work on both DNA and RNA.
 - B) They recognize a palindromic sequence and cut just before the palindromic sequence.
 - C) The result of this endonuclease is blunt ends.
 - D) They degrade DNA by subsequently removing bases from each end
 - E) They cut DNA only at sites in specific nucleotide sequences with a two-fold axis of symmetry.
- 12) In eukaryotic cells, DNA is found principally in the nucleus, but it also occurs in _____ and in _____.
 - A) ribosomes; mitochondria
 - B) mitochondria; chloroplasts
 - C) chloroplasts; peroxisomes
 - D) peroxisomes; vacuoles
 - E) vacuoles; mitochondria
- 13) DNA double helix structure is stabilized by all of the following EXCEPT:
 - A) sugar-phosphate backbones run in opposite directions.
 - B) the two glycosidic bonds holding the bases are exactly across the helix.
 - C) both internal and external hydrogen bonds are present.
 - D) bases stack together through hydrophobic interactions and van der Waals forces.
 - E) appropriate base pairing builds a polymer whose external dimensions are uniform.
- 14) Eukaryotic mRNAs are synthesized in the nucleus, are called _____, and contain noncoding regions called _____ because they intervene between coding regions called _____.
 - A) poly A RNAs; noncodons; codons
 - B) poly A RNAs; intervening sequences; codons
 - C) heterogeneous nuclear RNAs; intervening sequences; codons
 - D) heterogeneous nuclear RNAs; intervening sequences (introns); exons
 - E) none of the above.
- 15) _____ are attached to hnRNAs and mRNAs after transcription has been completed and is essential for efficient translation and stability of the mRNAs.
 - A) exons
 - B) introns
 - C) poly(A) tails
 - D) poly(U) tails
 - E) All are true

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16) _____ are important in the processing of eukaryotic gene transcripts into mature messenger RNAs for export from the nucleus into cytoplasm.

- A) snRNAs as snRNPs
- B) tRNAs
- C) rRNAs
- D) siRNAs
- E) stRNAs

17) Sequencing nucleic acids is now easier than sequencing polypeptides and that has occurred because of the development of:

- A) restriction endonucleases and polyacrylamide gel electrophoresis sensitive enough to resolve nucleic acids differing from one another in length by just one nucleotide.
- B) base specific chemical cleavage and autoradiography.
- C) cytosine methylation and base specific chemical cleavage.
- D) double helix denaturation and restriction endonucleases
- E) none are true.

18) All of the following are characteristics of chain termination protocol EXCEPT:

- A) A known sequence serves as a template in a polymerization reaction
- B) Four parallel reactions are run, each containing the substrates for DNA polymerase.
- C) The chain is terminated where the dideoxynucleotide is incorporated
- D) One dNTP is a radioactively labeled tracer to detect the products in the polymerization process.
- E) The dideoxynucleotide lacks 3'-OH and therefore can not serve as acceptors in nucleotide addition.

19) In eukaryotic cells, a class of _____ and _____-rich proteins called _____ interact ionically with the anionic phosphate groups in the DNA backbone to form _____.

- A) lysine; leucine; prions; ribosomes
- B) arginine; lysine; histones; nucleosomes
- C) arginine; alanine; histones; nucleosomes
- D) arginine; lysine; prions; ribosomes
- E) none are true

(二) 問答題：

1. Which one of the above tripeptides: (18%)

A	B	C	D	E
Asp-Trp-Tyr	Tyr-Lys-Met	Leu-Val-Phe	Asp-His-Glu	Gly-Pro-Arg

- (1) is most negatively charged at pH 7?
- (2) contains the largest number of nonpolar R groups?
- (3) contains sulfur?
- (4) will have the greatest light absorbance at 280 nm?
- (5) Which of the following monosaccharides is not an aldose?
(A) erythrose (B) fructose (C) glucose (D) ribose (E) galactose
- (6) When the linear form of glucose cyclizes, the product is a(n):
(A) anhydride (B) glycoside (C) hemiacetal (D) lactone (E) lactam

2. The melanocyte-stimulating peptide hormone α -melanotropin has the following sequence:

Ser Tyr Ser Met Glu His Phe Arg Trp Gly Lys Pro Val

Approximately what charge would you expect at pH values of 11, 5, and 1? (15%)

3. 生物技術在生物資源上的應用(10%)