

銘傳大學 98 學年度研究所碩士班招生考試

生物科技學系碩士班

第二節

分子生物學試題

(第 / 頁共 4 頁) (限用答案本作答)

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一. Single choices: choose the most appropriate one to each statement. (40 分)

1. A eukaryotic cell can not produce thymidine kinase because it lacks TK genes. Now a scientist adds a TK⁺ DNA into the cell to let the cell can product TK. What dose the scientist do?

- a. transformation
- b. transcription
- c. transposon
- d. transfection

2. Which kind of mutation does not alter the amino acid coded?

- a. Silent mutation
- b. Gain of function mutation
- c. Loss of function mutation
- d. Null mutation
- e. Leaky mutation

3. EcoRI is a common restriction enzyme to recognize the specific DNA sequence. What characteristic of the specific DNA sequence that EcoRI can reaction?

- a. tandom repeat
- b. GC rich
- c. Palindromes
- d. AT rich
- e. All are not true

4. SLI is a kind of transcriptional factor at eukaryotic except:

- a. including TBP and three TAF
- b. binding to upstream control element
- c. Can binding to DNA when UBF existence
- d. To attract RNA polymerase that starting the initiation of transcription process

5. GFP gene is frequently used as a reporter of expression. What statement is not true?

- a. To expose blue light, GFP can fluoresces green light
- b. GFP has a typical beta barrel structure
- c. Therefore inserting a gene to the GFP gene region, GFP can fluoresces green light.
- d. All are true

6. A zinc finger is a large superfamily of protein domains that can bind to DNA, what characteristic is not true?

- a. consists of two antiparallel β strands, and an α helix
- b. Zif268 is a transcriptional factor interact with DNA contains zinc finger
- c. It was originally recognized in factor TF_{III}A
- d. All are true

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7. Regarding the procession of microRNA, which one statement is not true?
 - a. transcribed by RNA polymerase II
 - b. extended single strand RNA on both 3' poly(A) and 5' cap ends of hairpin molecule
 - c. Animal miRNAs are usually complementary to a site in the 3' UTR of mRNA
 - d. Plant miRNAs are usually complementary to a site in the 5' UTR of mRNAs
 8. SnRNA plays an important role at:
 - a. 5' capping
 - b. 3' tailing
 - c. Splicing
 - d. Transport
 - e. Gene express
 9. Mutation at a single nucleotide can be measured easily via
 - a. gel filtration
 - b. affinity chromatography
 - c. restriction fragment length polymorphism
 - d. all are not true
 10. Topoisomerase I enzymes relax supercoiling in circular double-stranded DNA
 - a. in single steps by nicking one strand of the duplex.
 - b. in single steps by causing a transient double-strand break.
 - c. in steps of two supercoil turns by nicking one strand of the duplex.
 - d. in steps of two supercoil turns by causing a transient double-strand break.
 11. In *Drosophila melanogaster*, P element transposition is activated
 - a. when an M male is crossed with a P female.
 - b. when an M male is crossed with an M female.
 - c. when a P male is crossed with an M female.
 - d. when a P male is crossed with a P female.
 12. The synthesis of specific opines is induced in a plant cell after infection by *Agrobacterium tumefaciens*. Opines are a derivative of which amino acid?
 - a. arginine
 - b. histidine
 - c. glutamine
 - d. asparagines
 13. Establishing the identity of a DNA sample by detection of its unique genotypes at minisatellite loci is called
 - a. minisatellite mapping.
 - b. VNTR analysis.
 - c. DNA fingerprinting.
 - d. STR analysis.
 - e. replication slippage.
 14. cDNA is
 - a. chloroplast DNA.
 - b. DNA synthesized from a messenger RNA template.
 - c. chromosomal DNA.
 - d. DNA found in introns.
 - e. colinear DNA
 15. Error-prone DNA repair utilizes the products of which of the following genes?
 - a. umuD and umuC
 - b. uvrABCD
 - c. phr
 - d. mutHSLY

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16. If the sequence of the part of the sense strand of a gene is 5' - AGCCTAGCT - 3', what is the sequence of the RNA transcribed from this section of the gene?
- 5' - AGCCTAGCT - 3'
 - 5' - TAGGATCGA - 3'
 - 5' - AGCCUAGCU - 3'
 - 5' - UAGCAUCGA - 3'
 - 5' - AGCUAGGCU - 3'
17. In the human genome, tandem repeats are commonly found
- in intergenic regions.
 - in "desert" (gene free) regions of chromosomes.
 - in introns.
 - in centromeres and telomeres.
 - in coding regions.
18. The function of bacterial EF-Ts is to
- convert EF-Tu-GDP to an active form.
 - allow binding of aminoacyl-tRNAs to the A site of the ribosome.
 - convert GTP to GDP.
 - move the peptidyl-tRNA from the A site to the P site.
 - deacylate tRNAs.
19. Gene knock-in involves
- replacement of a wild-type gene with a mutant gene insert.
 - replacement of an inactive gene with an active copy of the gene.
 - activation of a mutated gene in a cell.
 - complete inactivation of a wild-type gene in a cell.
20. EF-Tu must energy to recycle. Which one kind of energy it can use?(d)
- ATP
 - TTP
 - CTP
 - GTP

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- 二. 說明方便選殖基因與 DNA 的質體或載體應具有什麼基本性質?在答案中亦請說明將一段外來的 DNA 選殖於此載體上,並且從細菌細胞中篩選並確認重組質體的方法。(10分)
- 三. 植物中的水稻及人類的全部序列已完全解讀成功。請就此二生物中選擇一個生物,描述得到此生物全部序列後,對人類的用途。(6分)
- 四. 請詳述 PCR 及 real time PCR 之原理,並舉一個例子說明其在分子生物領域方面之用途。(10分)
- 五. 解釋下列名詞:(8分)
- (a) totipotent cell
 - (b) oncogene
- 六. 請簡述 RNAi 的作用原理。(10分)
- 七. 為何可以用農桿菌來進行植物基因轉殖?(10分)
- 八. 何謂藍白篩選?(6分)

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