

臺北醫學大學 102 學年度碩士班暨碩士在職專班入學考試

分子生物學試題

本試題第 1 頁；共 3 頁

(如有缺頁或毀損，應立即請監試人員補發)

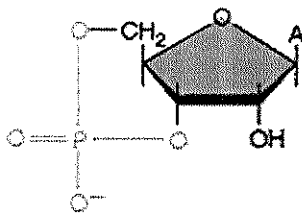
注意
事項

- 一、本試題共二大題，共計 100 分。
- 二、請將最適當的答案依題號作答於考試答案卷上。
- 三、試題答錯者不倒扣；題次號碼錯誤或不按順序或鉛筆作答，不予計分。

一、選擇題 (每題2%，共40%)

1. Which of the following is **not** one of the minimal features needed to make a cell?
The ability to capture and utilize energy to build complex structures
A cell wall
A plasma membrane
A genome, composed of DNA
The ability to express information in the genetic code
2. Which organelles are bounded by a double membrane?
Mitochondria, Golgi apparatus, endoplasmic reticulum
Mitochondria, nucleus, lysosomes
Nucleus, chloroplasts, mitochondria
Nucleus, endoplasmic reticulum, lysosomes
Chloroplasts, Golgi apparatus, nucleus
3. Which of the following is **not** a product of transcription?
RNA
rRNA
mRNA
DNA
tRNA
4. Which of the following would not be considered a mutation?
permanent replacement of guanine with thymine in a DNA strand
deletion of a gene segment
insertion of an intron in the middle of an exon
permanent replacement of cytosine with adenine
crossing over of two gene regions during meiosis
5. Which of the following would be the substance of choice to destroy the DNA in a solution?
ribonuclease
chymotrypsin
none of the choices are correct
trypsin
deoxyribonuclease
6. The bonds that connect adenine to thymine in a DNA double helix are
ionic bond
hydrogen bond
none of the choices are correct
hydrophobic bond
covalent bond
7. Which of the following is **not** found in RNA?
nitrogen
carbon
hydrogen
oxygen
sulfur
8. Which of the following features is common to DNA, RNA, and proteins?
They contain amino acids
They contain uracil
They are found in vesicles
They contain nucleotides
They are polymers
9. Which of following codons would not be recognized by release factors during translation?
AUG
UAA
none of the choices are correct
UAG
UGA

10. The complementary sequence of one of the following is a palindrome. Which one?
GAATTC
ATCCTC
CCTTTC
CTGACT
GGCCAA
11. One approach to prevent religation of the ends of a restricted plasmid DNA is to
store the plasmid in DNase
store the plasmid in RNAase
treat the plasmid with alkaline phosphatase to remove phosphates from the 'sticky ends'
treat the plasmid with a protease to remove all proteins
treat the plasmid with *BamHI* to create gaps
12. Which of the following techniques is not used to quantify the level of gene expression?
southern blotting
S1 mapping
nuclear run-off
northern blotting
RNase protection
13. The identity of the following molecule is



- galactose
glucose
heparin
lactose
cAMP
14. Select the correct statement about enhancers
They are proteins that promote transcription of RNA
They stimulate the binding of repressor to DNA
They bind protein factors and stimulate transcription
They are nonpromoter protein elements
None of the choices is correct
15. Which of the following can be found in DNA-binding domains?
zinc fingers
bZIP motifs
all of the choices are correct
glutamine-rich regions
bHLH motif
16. Which of the following is **not** true concerning eukaryotic mRNA processing?
addition of a 3' poly-A tail
intron splicing
occurs in the cytoplasm
addition of a 5' cap
occurs in the nucleus
17. Which of the following processes allows scientists to 'knock-down' genes?
SAGE
RNAi analysis
DNA microchip
CAGE
CHIP-chip

18. A nucleosome

- Adds extra nucleotides to the 3' end of chromosomes in the nucleus
- Contains RNA that is not being translated
- Contains DNA that is not being transcribed
- Is the most basic structural unit of chromatin
- Binds to the centrosome during mitosis

19. A nucleic acid is:

- A polynucleotide
- Hydrophobic
- Linked to an amino acid via a peptide bond
- A form of energy storage in the cell
- Linked to other nucleic acids by covalent bonds between bases

20. What is the function of the telomere?

- To allow cells to divide
- To induce cells to "age"
- To allow complete replication of an entire chromosome
- To ensure segregation of sister chromatids during mitosis
- To bind to Autonomous Replicating Sequences on chromosomes

二、問答題 (共60%)

1. What are Single-Nucleotide polymorphisms? Why are most of them unimportant? How can some of them be useful?(6%)
2. Describe the conservative, semiconservative, and dispersive mechanisms of DNA replication. (6%)
3. List the eukaryotic DNA polymerases and their roles.(6%)
4. What would be the effect on reading frame and gene function if (6%)
 - (a) 2 bases were inserted into the middle of an mRNA?
 - (b) three bases were inserted into the middle of an mRNA?
5. What roles do Single-strand DNA binding proteins (SSBs) play in DNA replication? (5%)
6. What are the roles of eRF1 and eRF3?(6%)
7. Describe what is RNA editing. (5%)
8. Describe the prokaryotic regulation of *lac* operon. (6%)
9. What is "Open reading frame" ? (4%)
10. Please define "cellular signal-transduction". (5%)
11. Please define "apoptosis". (5%)