

一、選擇題 (60%)

1. True-breeding, round-seed of plants were crossed with true-breeding, wrinkled-seed plants. The F1 progeny all had round seeds.

If the F1 offspring are self-fertilized, what F2 phenotypes would be expected?

- A. round : wrinkled = 3 : 1
- B. round : wrinkled = 1 : 3
- C. round : wrinkled = 1 : 1
- D. All rounds
- E. All wrinkled

2. Which of the following components is **not** in DNA replication fork?

- A. DNA polymerases
- B. DNA helicases
- C. topoisomerases
- D. restriction endonucleases
- E. single-strand DNA-binding proteins

3. Which of the following modifications can be found on nucleic acids?

- A. Phosphorylation
- B. Glycosylation
- C. Hydroxylation
- D. Fatty acid modification
- E. Methylation

4. Which of the followings of the *lac* operon in *E.coli* is **false**?

- A. Control the expression of β -galactosidase, galactoside permease and galactoside transacetylase.
- B. The *lac* repressor is encoded by *lac I*.
- C. The *lac* repressor functions as a dimer.
- D. The inducer of *lac* operon is allolactose.
- E. The *lac* operon is activated only when glucose concentration is low.

5. Which of the followings is an enzyme that link together two DNAs covalently in the DNA cloning experiment?

- A. Restriction endonuclease
- B. DNA polymerase I
- C. Polynucleotide kinase
- D. DNA ligase
- E. Reverse transcriptase

6. Which of the followings is **true** for cDNA libraries?

- A. cDNA is a circular form of DNA that are generated by partial digests with restriction enzymes.
- B. cDNA libraries contain cDNAs made from mRNA by PCR.
- C. cDNA libraries contain sequences from expressed genes only.
- D. Genes represented in cDNA libraries contain introns.
- E. cDNA libraries usually contain large fragments and are likely to be constructed in YAC or BAC vectors.

7. Which of the followings is **not** true for the Sanger sequencing method?

- A. Requires a DNA as a template.

參考用

注意：背面有試題

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參考用

- B. The sequencing reaction requires a primer.
C. Using a DNA polymerase for sequencing.
D. Requires ddNTPs which are lacking a 2'OH for chain termination.
E. The sequencing reaction products are separated by electrophoresis.
8. One nucleosome contains:
- A. A histone octamer composed of the following proteins: SMC1, SMC2, SMC3, SMC4, H1, H2, H3, and H4.
B. A histone octamer composed of the following proteins: SMC1, SMC2, SMC3, SMC4, H2A, H2B, H3, and H4.
C. A histone octamer composed of two copies of each of the following proteins: H2A, H2B, H3, and H4.
D. A histone octamer composed of two copies of each of the following proteins: H1, H2, H3, and H4.
E. A histone octamer composed of two copies of each of the following proteins: SMC1, SMC2, SMC3, and SMC4.
9. Which activities are required for DNA polymerase I doing the nick translation?
- A. 5'-3' exonuclease and 3'-5' polymerase
B. 5'-3' exonuclease and 5'-3' polymerase
C. 3'-5' exonuclease and 5'-3' polymerase
D. 3'-5' exonuclease and 3'-5' polymerase
E. 3'-5' exonuclease and 5'-3' exonuclease
10. Which of the following transcription factors is in all three eukaryotic RNA polymerases?
- A. TFIIA
B. TBP
C. UBF
D. TFIIC
E. TFIIF
11. Please put the following steps of the general transcription factors to the initiation complex in the correct order?
- (1) TFIIA+TFIID
(2) TFIIE
(3) TFIIB
(4) TFIIF + pol II
(5) TFIIH
- A. 1,2,3,4,5
B. 1,3,5,4,2
C. 1,3,4,2,5
D. 1,5,3,4,2
E. 4,1,5,3,2
12. Which of the followings is **not** true for the spliceosome.
- A. The U1 snRNP binds to 5'-splice site of an mRNA precursor.
B. The U2 snRNA base-pairs with the conserved sequence at the splicing branchpoint.
C. The U6 snRNP associates with the 5'-end of the intron.
D. The U6 also associates with U2 during splicing.
E. The U4 snRNA associates with the last nucleotide in one exon and the first nucleotide of the next.
13. Which of the following RNA processings is **not** associated with the C-terminal domain of RNA Polymerase II?

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- A. Capping
B. tRNA charging
C. Splicing
D. Polyadenylation
14. Which of the following codons is stop codon?
A. UAA
B. UCA
C. ACA
D. AUC
E. AUG
15. The bacterial Shine-Dalgarno sequence:
A. can be found in tRNA.
B. is translation termination signal.
C. is the ribosomal binding site.
D. is a region of 30S ribosomal RNA.
E. is a translational elongation factor.
16. Which of the following initiation factors in eukaryotes promotes scanning to the initiation codon?
A. eIF1
B. eIF2
C. eIF3
D. eIF4
E. eIF5
17. Which of the following structural motifs is **not** commonly found in the DNA-binding domain of eukaryotic transcriptional factors?
A. Homeodomain
B. Leucine zipper
C. β -barrel
D. Helix-turn-helix
E. Zinc fingers
18. Which of the followings is **not** a protein post-translational modification?
A. Phosphorylation
B. Glycosylation
C. Acetylation
D. Methylation
E. polyadenylation
19. The mechanism of retrotransposons is:
A. Lysogeny
B. Replicative transposition
C. Bacterial transduction
D. Cut-and-paste transposition

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參考用

E. Transposition via an mRNA intermediate

20. The general name for an enzyme that transfers phosphate groups from ATP to the specific substrates is:

- A. kinase.
- B. phosphorylase.
- C. phosphatase.
- D. dehydrogenase.
- E. ribonuclease.

二、解釋名詞 (40%)

- 1. enhancer
- 2. open reading frame (ORF)
- 3. Okazaki fragments
- 4. microRNA (miRNA)
- 5. Holliday junction
- 6. Ti plasmid
- 7. TATA box
- 8. RNA helicase

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