

科目： 分子生物學

系所組：營養科學

- I. Explain the following terms: (6 points for each sentence, 30 points)
1. Shine-Dalgarno sequence
 2. RNA splicing
 3. Wobble pairing
 4. Okazaki fragment
 5. Ubiquitination
- II. Question and Answer: (10 points for each question, 30 points)
1. Please detail described the mechanism of post-transcriptional modification of RNA. (10%)
 2. What is end-replication problem? How eukaryotic cells to solve this problem? (10%)
 3. What is Chromatin immunoprecipitation? Please describe the principle of the methods and how to use this technology. (10%)
- III. Choice questions: (4 points for each question, 40 points)
1. Which of the following is not involved in DNA replication?
 - A. Ligase.
 - B. Helicase.
 - C. SSB.
 - D. Topoisomerase.
 2. Which of the following is not involved in the eukaryotic DNA polymerase I function?
 - A. 5' to 3' DNA-Dependent DNA polymerase activity.
 - B. 3' to 5' exonuclease activity.
 - C. 5' to 3' exonuclease activity.
 - D. 3' to 5' DNA-Dependent DNA polymerase activity.
 3. Which of the following is not involved in G1 cell cycle regulation?
 - A. CDK1.
 - B. Cyclin D.
 - C. CDK4.
 - D. p21^{Waf1/Cip1}.
 4. Which of the following is not correct?
 - A. Okazaki fragments have short RNA sequence.
 - B. DNA polymerase II can remove the RNA from Okazaki fragment.
 - C. DNA ligase I can join the two fragments of DNA.
 - D. Okazaki fragments are synthesized from DNA polymerase III.
 5. Which of the following structure is not a DNA-binding domain
 - A. Helix-loop-helix.
 - B. Zinc finger.
 - C. Basic region-leucine zipper.
 - D. Copper finger.
 6. Which of the following description is incorrect?
 - A. Bacterial sigma factor can make direct contacts with promoter sequence and ensure transcription begins at the proper position in the DNA.
 - B. Histone modification and chromatin structure must be change before transcription initiation.
 - C. In transcription initiation, transcriptional factors form number of covalent interactions with DNA to ensure the compact interaction.
 - D. The process of transcription can be divided to initiation, elongation and termination.

科目： 分子生物學

系所組：營養科學

7. Which of the following description is correct?
- A. The SCF complex is an ubiquitin ligase that regulates the transition from G1 into S phase by degrading specific proteins that are phosphorylated by G1-S cyclin-Cdks.
 - B. Histone acetyltransferases (HATs) and histone deacetylases (HDACs) are two of the chromatin modification enzymes, and HDACs remove the acetyl groups when DNA replication or transcription initiation.
 - C. Both of RNA helicase and 5' to 3' exonuclease are included in degradosome.
 - D. Stem-loop and poly(U) structures are two specific transcriptional termination structure signals.
8. Which of the following description is correct?
- A. Restriction fragment length polymorphism (RFLP) is a tool to analyze different RNA sequences.
 - B. Polymerase chain reaction (PCR) is to detect RNA expression.
 - C. Electrophoresis mobility shift assay (EMSA) is to analyze the transcriptional factor binding to DNA sequence ability.
 - D. Fluorescence in situ hybridization (FISH) is used to detect the specific RNA sequences on chromosomes.
9. Which of the following description is incorrect?
- A. The key subunit of eukaryotic cells transcription factor IIB is included TBP (TATA binding protein) and TAFs (TBP-associated factors).
 - B. DNA polymerase II has 3'-5' and 5'-3' exonuclease activity and participates in DNA repair system.
 - C. Type IA and B topoisomerases break one of the two strands of DNA and do not require ATP.
 - D. The end replication problem can be solved by telomerase.
10. Which of the following description is correct?
- A. The DNA-binding domain helix-turn-helix using recognition helix (C-terminal helix) to fit in the minor groove of DNA and forms contacts with the base pairs that read the DNA sequence.
 - B. Eukaryotic pre-RNA must undergo 5'-capping by 7-methyl adenosine to protect pre-RNA degradation.
 - C. Eukaryotic cells can utilize RNA interference system to detect and degrade foreign RNAs produced by parasites.
 - D. The function of Uvr B in nucleotide excision repair is to nick the DNA backbone up- and down-stream of the lesion.

※ 注意：1.考生須在「彌封答案卷」上作答。

2.本試題紙空白部份可當稿紙使用。

3.考生於作答時可否使用計算機、法典、字典或其他資料或工具，以簡章之規定為準。