## 國立清華大學100學年度碩士班入學考試試題

系所班組別:生命科學院甲組、醫學生物科技學程 考試科目(代碼):生物學(0402、0702) 共\_3\_頁,第\_1\_頁 \*請在【答案卷】作答

[. 選擇題 [單選, 每題一分	〉, 題號 1-4, 總共	占 4%] Choose of	ne <u>best</u> answer
<ol> <li>In the Meselson and Stall light nitrogen after three A. 25%</li> <li>C. 75%</li> <li>None of the above.</li> </ol>	generations of repl B.		DNA is labeled with
<ol> <li>If Hershey and Chase for experiment would have A. proteins contain photo.</li> <li>C. phage DNA enters the E. None of the above.</li> </ol>	demonstrated that sphorus. B.	phages rather than DNA contains sul phage protein ent	lfur.
<ul> <li>3. Which of the following matched with its function A. DNA Pol ε—DNA realization B. DNA Pol δ—ligation C. DNA Pol γ—elongat D. DNA Pol β—DNA realization E. DNA Pol α—priming</li> <li>4. The probe used in chromatory</li> </ul>	epair of DNA strands ion of both strands epair g DNA synthesis		not correctly select the target
chromatin fragments.	C Drotoin	D. Antibody	E. gRNA
A. DNA B. RNA			
II. 選擇題 [單選, 每題兩	1分,題號 5-8,總共	长佔 8%] Choose	one <u>best</u> answer
5. Which of the following pre-mRNA?	is not needed for m	ammalian cell pol	yadenylation of
A. RNA polymerase I C. PAP E. PABII	B. RNA pol D. CPSF	ymerase II	
6. In human global genon are correct for the "inci		on repair (GG-NE)	R), which products
A. XPF and XPG	B. XPB and	l XPD	
C. XPA and XPC	D. XPA and	IXPB	

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共\_3\_頁,第\_2\_頁 \*請在【答案卷】作答

- 7. Select one of the choices below to indicate whether it is a characteristic of miRNA or siRNA.
  - A. miRNAs function to silence gene expression primarily by blocking transcription of targeted mRNAs.
  - B. siRNA induces degradation of the target mRNA.
  - C. miRNAs usually base-pair perfectly with target mRNA
  - D. siRNAs are formed by cleavage from a stem-loop RNA.
- 8. Which following statement is right during homologous recombination?
  - A. RecBCD has a DNA exonuclease activity
  - B. RecA and RecB are involved in branch migration of a Holliday junction
  - C. RuvC could bind to and resolve Holliday junctions
  - D. Spoll creates single strand breaks in DNA in baker yeast.

## III. 問答題

- 9. Please give chemical structures and describe "Adenosine deamination" for RNA editing. (4%)
- 10. Describe DNA replication on beta clamp cycles in lagging strand. (4%)
- 11. What are the dendritic cells? (2%)
- 12. What are the cytokines? (2%) Please describe the biological actions of cytokines on eukaryotic cells. (4%)
- 13. Please describe the penetration and uncoating processes in paramyxovirus and HIV, respectively. (8%)
- 14. How does the avian influenza virus interact with sialic acid receptor? (4%)
- 15. Please describe how the cell cycle is controlled by different cyclin-dependent kinase molecules. (8%)
- 16. Please describe how EGF receptor acts through Ras to promote cell proliferation. (6%)
- 17. Please describe the current model for the signal mechanism of cotranslational import. (6%)
- 18. Describe how a countercurrent heat exchanger may function to retain heat within an animal body. (5%)

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- 19. Explain how osmotic pressure and hydrostatic pressure regulate the exchange of fluid and solutes across the capillary walls. (5%)
- 20. Describe clonal selection and distinguish between effector cells and memory cells. (5%)
- 21. Explain how the antagonistic hormones insulin and glucagon regulate carbohydrate metabolism. (5%)
- 22. Explain the significance of Spemann's organizer in amphibian development. (5%)
- 23. Describe saltatory conduction in vertebrate axons. (5%)
- 24. Explain the sliding-filament model of muscle contraction. (5%)
- 25. Explain how density-dependent and density-independent factors may affect population growth. (5%)