《生理考科》

一、選擇題：（20% ）

1. ( ) Which structure is composed of protein filaments and is located in the center of the thick filaments.
   a) z line. b) titin. c) m line. d) actin.
2. ( ) Clotting is blocked by
   a) vitamin K agonists. b) calcium. c) heparin antagonists. d) coumarin agonists.
3. ( ) The major plasma protein is
   a) alpha globulin. b) beta globulin. c) fibrinogen. d) albumin.
4. ( ) An increase in muscle tension due to a gradual increase in stimulus intensity is termed
   a) tetanus. b) tetany. c) treppe. d) motor unit summation.
5. ( ) Growth would be inhibited by
   a) increasing prolactin secretion. b) increasing somatostatin secretion.
   c) increasing somatomedin secretion. d) increasing thyroid hormone secretion.
6. ( ) Blood vessel diameter is regulated by all of the following **except**
   a) platelet-derived growth factor. b) bradykinin. c) endothelin. d) nitric oxide.
7. ( ) The highest oxygen affinity is demonstrated by
   a) hemoglobin A. b) hemoglobin F. c) myoglobin. d) hemoglobin S.
8. ( ) Urine is transported to the urinary bladder by the
   a) ureter. b) urethra. c) nephron. d) renal pelvis.
9. ( ) If ~10 grams of bile salts enter the enterohepatic circulation per day, approximately how many grams will be excreted per day?
   a) 10. b) 8. c) 4. d) 0.5.
10. ( ) The primary intracellular cation is
   a) Ca^{2+}. b) K^{+}. c) Mg^{2+}. d) Na^{+}.

二、非選擇題：（30% ）

1. 何謂β-agonist，並說明人類食用含β-agonist相關肉品可能產生之副作用？15%

2. 請翻譯以下摘自數種期刊主題的英文意涵：15%

Title1 Short-term changes of mRNA expression of various inflammatory factors and milk proteins in mammary tissue during LPS-induced mastitis
Domestic Animal Endocrinology 26 (2004) 111–126

Title2 Effect of *Bifidobacterium bifidum* Fermented Milk on *Helicobacter pylori* and Serum Pepsinogen Levels in Humans
J. Dairy Sci. 90 (2007): 2630–2640

Title3 Estrogen replacement therapy decreases platelet-activating factor-acetylhydrolase activity in post-menopausal women
Maturitas 31 (1999) 249–253

背面尚有試題

《生化考科》

1. Since DNA synthesis is bidirectional from the origin, the number of new strands are being made simultaneously in *E. coli* is:
   (A) one
   (B) two
   (C) three
   (D) four
   (E) the answer cannot be determined from this information.

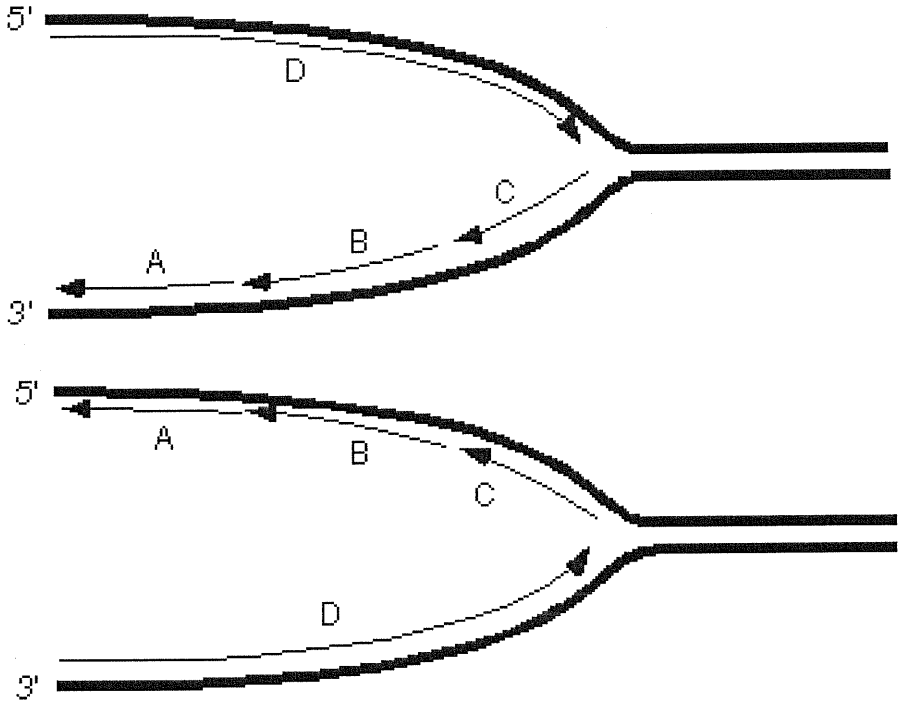
2. When the synthesis of new DNA is directed by an original template DNA molecule
   (A) the DNA produced has two newly formed strands (no change in the original DNA)
   (B) two DNA molecules are formed, each with one new strand and one strand from the original DNA
   (C) there is random arrangement of newly formed and original DNA on the two strands of the DNA produced
   (D) no information is available on this subject

3. The primer for *in vivo* DNA replication is:
   (A) The 3' hydroxyl of the preceding Okazaki fragment.
   (B) A short piece of RNA.
   (C) A nick made in the DNA template.
   (D) A primer is not always required for DNA replication.
   (E) All of these are true.

4. Which of the following is not a function of DNA polymerase I from *E. coli*?
   (A) adding nucleotides to the primer strand
   (B) 3' → 5' exonuclease activity
   (C) 5' → 3' exonuclease activity
   (D) proofreading

5. *E. coli* replication on the lagging strand
   (A) is carried out by DNA polymerase I
   (B) is initially synthesized as Okazaki fragments
   (C) is synthesized continuously
   (D) has this DNA strand synthesized in a 3'-5' direction

Exhibit 1A: Consider the following diagrams showing a replication fork moving from left to right. The thick lines represent the template/parental strands. The 5' and 3' represent the ends of those template/parental strands.



6. **Refer to exhibit 1A:** Which diagram correctly depicts the orientation of the lagging and leading strands on the parentals?
   (A) The top
   (B) The bottom
   (C) Neither is fully accurate.
   (D) Either would be accurate dependent on the organism being studied.

7. **Refer to exhibit 1A:** Which Okazaki fragment was synthesized earliest?
   (A) A
   (B) B
   (C) C
   (D) D

8. Which of the following activities does *E. coli* DNA polymerase III **lack**?
   (A) 5'—>3' polymerase
   (B) 5'—>3' exonuclease
   (C) 3'—>5' exonuclease
   (D) *E. coli* DNA polymerase III has ALL of the above activities.

9. Single strand binding proteins are important for this activity:
   (A) Prevent single-stranded DNA from rewinding.
   (B) Protect single-stranded DNA from enzymatic degradation.
   (C) Prevent double helical DNA from unwinding.
   (D) Prevent double helical DNA from becoming a triple helix.

(E) Prevent single-stranded DNA from rewinding and protect it from degradation.

10. Ultra-violet light principally causes which of the following damages to DNA?
    (A) mismatches between stands
    (B) breaks in the phosphodiester backbone of the DNA strand
    (C) thymine dimerization
    (D) methylation of specific bases

11. Replication of eukaryotic DNA
    (A) must occur faster than replication of prokaryotic DNA
    (B) must be controlled to coordinate with the cell cycle
    (C) takes place during mitosis
    (D) takes place twice during each cell cycle

12. Chain termination occurs, *in vivo*, when:
    (A) RNA Pol gets to the end of the DNA.
    (B) The factor called rho (ρ) binds to the DNA.
    (C) A hairpin loop forms in the template.
    (D) Either a hairpin loop forms or rho is involved.
    (E) All of these.

13. Which of the following correctly describes a difference between RNA & DNA polymerases?
    (A) RNA polymerases usually do not need a template, while DNA polymerases do.
    (B) DNA polymerases usually require a primer (i.e., they can only continue a strand, not start one), while most RNA polymerases do not.
    (C) RNA polymerases usually synthesize introns, while DNA polymerases synthesize cistrons.
    (D) RNA polymerases polymerize 5' —> 3', while DNA polymerases polymerize 3' —> 5'.

14. The promoter site is
    (A) the start site for transcription in DNA
    (B) the binding site for regulatory proteins that stimulate transcription
    (C) the general region of DNA downstream from the start site
    (D) the site on DNA at which RNA polymerase binds to initiate transcription

15. Which of the conditions would result in the **greatest** amount of transcription of the *lac* operon?

	[glucose]	[lactose]
(A)	high	high
(B)	low	low
(C)	high	low

(D) low high

16. The following are all key steps in activation of mRNA synthesis in eukaryotes, **except**:
    (A) Binding of TBP to the DNA.
    (B) Binding of other transcription factors.
    (C) Binding of RNA Pol I.
    (D) Phosphorylation of the RNA Pol.
    (E) All of these are necessary to initiate RNA synthesis in eukaryotes.

17. Which of the following is not a structural motif encountered in DNA-binding proteins?
    (A) helix-turn-helix
    (B) leucine zipper
    (C) zinc finger
    (D) β barrel

18. Ribozymes, the catalytic activity of RNA, were first discovered as part of the snRNA group.
    (A) True
    (B) False

19. Inosine or hypoxanthine can wobble with all the following bases, **except**:
    (A) A
    (B) C
    (C) T
    (D) U
    (E) Inosine can wobble with all of these bases.

20. Which amino acids have unique codons?
    (A) gly
    (B) met
    (C) tyr
    (D) stop

21. A tRNA was determined to have the following anticodon sequence:
    3'-GAI-5' (I represents the base hypoxanthine). Indicate which of the following codons can form base pairs with this anticodon
    (A) 5'-CUA-3'
    (B) 5'-CUC-3'
    (C) 5'-CUU-3'
    (D) all of the above

22. A Shine-Dalgarno Sequence is a

(A) sequence of nucleotides in the DNA that interacts with the σ-subunit of RNA polymerase to begin transcription.

(B) sequence of nucleotides in an mRNA that interacts with the small subunit of a ribosome to begin translation.

(C) sequence of nucleotides in the DNA that interacts with ρ-protein to terminate transcription.

(D) sequence of nucleotides in an mRNA that functions to terminate translation.

23. The ribosome is actually a ribozyme.

(A) True

(B) False

24. The final form of mRNA in eukaryotes has all these features, **except**:

(A) There will be a special nucleotide cap on the 5' end of the mRNA.

(B) There is usually a poly A tail on the 3' end of the mRNA.

(C) The mature, active mRNA contains introns.

(D) Only a single protein is made from any mature mRNA molecule.

25. All of these are true. The protein which marks proteins for degradation is called:

(A) Chaperonin

(B) Ubiquitin

(C) Proteasomin

(D) Apoptosin

(E) None of these names is correct.