國立中央大學96學年度碩士班考試入學試題卷

所別:生物資訊與系統生物研究所碩士班 一般生 科目:生物化學

Part I: (Total 50%)

- I. 是非題 (2 points each, 20%)
 - 1. Proteins absorb UV light.
 - 2. DNA absorbs UV light.
 - 3. RNA absorbs UV light.
 - 4. Glycolysis only occurs only at aerobic condition.
 - 5. β-oxidation occurs only at aerobic condition.
 - 6. Respiration occurs only at aerobic conditon.
 - 7. photosynthesis is involved in oxidative phosphorylation.
 - 8. Fermentation is involved in oxidative phosphorylation.
 - 9. Km is the affinity of the substrate to its enzyme
 - 10. One gene has only one protein product

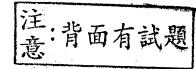
II.解釋名詞: (5 points each, 30%)

- 1. Enzyme cofactor
- 2. Anabolism vs. catabolism
- 3. Glycolysis
- 4. Phospholipid
- 5. Citric acid cycle
- β-oxidation 6.

Part II Single Choice (Total 50%, each 2.5%):

- 1. Ribosome is responsible for protein synthesis. Which part of ribosome has the major activity to link amino acid to peptide chain?
 - (A) 16S rRNA
 - (B) 5S rRNA
 - (C) Large ribosomal proteins
 - (D) Small ribosomal proteins
 - (E) 23S rRNA
- 2. Which of the following description is TRUE?
 - (A) Eukaryotic transcription occurs in cytosol
 - (B) Eukaryotic DNA replication occurs in the cytosol
 - (C) Prokaryotic transcription occurs in the nucleus
 - (D) Prokaryotic DNA replication occurs in the nucleus
 - (E) Prokaryotic translation occurs in the cytosol
 - Which of the following description is NOT TRUE?
 - (A) Eukaryotic transcripts contain poly A tail
 - (B) Eukaryotic genes contain introns
 - (C) Eukaryotic transcripts contain introns
 - (D) Prokaryotic transcripts do not contain introns
 - (E) Prokaryotic transcripts contain more than one gene sequence
- 4. A hydrophobic protein is most likely to have the highest proportion of which of the following amino acid residues buried within its core?
- (B) Isoleucine (C) Leucine
 - (D) Valine
- (E) Glycine
- (F)Alanine

- 5. Which of the following description is TRUE?
 - (A) EF-Tu carries tRNA to P site of ribosome
 - (B) EF-Tu carries tRNA to A site of ribosome
 - (C) EF-Tu recharge EF-Ts with GTP
 - (D) EF-Tu facilitates translocation
 - (E) EF-Ts facilitates translocation



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- 6. Which of the following ion is required for polymerase chain reaction?
 - (B) Na^+ (C) K^+ (D) Mg^{2+} (E) Li^+
- 7. Which of the following description is NOT TRUE?
 - (A) Eukaryotic mRNA is synthesized by RNA polymerase II
 - (B) TFIIH is required to unwind DNA
 - (C) TFIIH is required to phosphorylate C-terminal domain of RNA polymerase II
 - (D) TFIID is required for the binding of promoter
 - (E) TFIID is required to unwind DNA
- 8. An E. coli strain lacking RecA would be deficient in
 - (A) Transcription
- (B) Translation (C) DNA repair (D) Splicing (E) Degradation
- 9. The reason for that plant genome is normally larger than human genome is more likely due to
 - (A) DNA duplication
- (B) DNA deletion (C) DNA methylation
- (D) DNA repair
- (E) DNA translocation
- 10. Gene Z contains a lysine residue that is important for binding to DNA. Which mutations would be predicted to be the most harmful to the ability of gene Z to bind DNA?
 - (A) Arginine
- (B) Glycine
- (C) Valine
- (D) Glutamate
- (E) Histidine
- 11. Which of the following description about nucleotides excision repair is TRUE?
 - (A) Damaged nucleotides are removed by nick translation
 - (B) DNA ligase catalyzes the final reaction
 - (C) Deficiency of this enzyme in humans greatly increases the risk of skin cancer
 - (D) The first enzyme in this pathway cleaves two phosphodiester bonds
 - (E) All above

Questions 12, 13 refer to the following descriptions.

- (A) GC rich (B) AT rich (C) AC rich (D) TG rich (E) GG rich
- 12. Which is a common characteristic of replication origin sequences?
- 13. Which is a common characteristic of promoter sequences?

Questions 14-17 refer to the following enzymes.

- (A) DNA polymerase δ
- (B) DNA polymerase α
- (C) DNA ligase
- (D) DNA helicase
- (E) Topoisomerase
- 14. Which enzyme is required to link two Okazaki fragments?
- 15. Which enzyme is required to unwind double-stranded DNA?
- 16. Which enzyme has proofreading function?
- 17. Which enzyme is required to initiate replication

Questions 18-20 refer to the following sequences.

Genomic sequence of gene X is

- 5'GGCTGATGCCAATCGCCGAATTGTACTGAACC-3'.
 - (A) 5'-CCGACTACGGTTAGCGGCTTAACATGACTTGG-3'
 - (B) 5'-GGTTCAGTACAATTCGGCGATTGGCATCAGCC-3'
 - (C) 5'-CCGACUACGGUUAGCGGCUUAACAUGACUUGG-3'
 - (D) 5'-GGCUGAUGCCAAUCGCCGAAUUGUACUGAACC-3'
- (E) 5'- GGUUCAGUACAAUUCGGCGAUUGGCAUCAGCC-3' 18. Which sequence is DNA template for RNA transcription?
- 19. Which sequence is gene transcript?
- 20 Which seguence