

一. 單選題(每題 2.5 分; 共 100 分)

1. ___ received the Nobel prize in 1954 for his discovery of the protein secondary structures (α helix and β sheet). (A) Walter Gilbert (B) Erwin Chargaff (C) Linus Paulin (D) Fred Sanger (E) Karst Hoogsteen
2. α helix of a polypeptide has a pitch (height per turn) of ___ nm. (A) 0.10 (B) 0.15 (C) 0.34 (D) 0.54 (E) 1
3. Which of the following descriptions about Hb (hemoglobin) is incorrect? (A) One Hb can bind 4 O_2 molecules (B) HbA has an $\alpha_2\beta_2$ structure (C) HbF has an $\alpha_2\gamma_2$ structure (D) HbF has a higher affinity for BPG than does HbA (E) CO_2 reduces the binding affinity of Hb for O_2 .
4. Which of the following descriptions about the Michaelis-Menten rate equation is incorrect? (A) K_M measures the substrate concentration at which the reaction rate is $V_{max}/2$ (B) k_{cat} is the turnover number that measures the rate of the catalytic process (C) The ratio of k_{cat}/V_{max} is a convenient measure of enzyme efficiency (D) The unit for K_M is μM (E) The unit for k_{cat} is s^{-1} .
5. ___ is commonly used to stain proteins after SDS-PAGE. (A) DAPI (B) EtBr (C) Coomassie Brilliant Blue (D) CNBr (E) BUdR.
6. A protein consists of 1,000 amino acid residues. What is its approximate molecular weight? (A) 33 (B) 65 (C) 330 (D) 110 (E) 1,100 kD.
7. Absorbance at ___ nm is frequently used to determine the concentration of a protein. (A) 200 (B) 260 (C) 280 (D) 400 (E) 540.
8. Which of the following compounds has the highest molecular weight? (A) adenine (B) adenosine (C) adenylyate (D) thymine (E) thymidine.
9. Which of the following descriptions regarding disaccharide is incorrect? (A) Sucrose is α -D-glucopyranosyl (1 \rightarrow 2) β -D-fructopyranoside (B) Sucrose is a non-reducing sugar (C) Maltose has an α (1 \rightarrow 4) linkage (D) Cellobiose is β -D-glucopyranosyl (1 \rightarrow 4) β -D-glucopyranose (E) Lactose is a reducing sugar.
10. Which of the following restriction endonucleases is an isoschizomer of XbaI (TCTAGA)? (A) EcoRI (GAATTC) (B) SpeI (ACTAGT) (C) BamHI (GGATCC) (D) SalI (GTCGAC) (E) EagI (CGGCCG).
11. Which scientist made a significant contribution to the understanding of the structure of collagen? (A) K. B. Mullis (B) J. D. Watson and H. C. Crick (C) A. D. Hershey and M. Chase (D) S. B. Prusiner (E) G. N. Ramachandran.
12. Triton X-100 is a nonionic surfactant that denatures proteins by disrupting ____? (A) hydrogen bonds (B) disulfide bridges (C) hydrophobic interactions (D) salt bridges (E) covalent bonds.
13. How many stereoisomers for a pentose? (A) 2 (B) 4 (C) 6 (D) 8 (E) 16.
14. A(n) ___ bond links ribose to adenine in AMP. (A) ether (B) ester (C) amide (D) aldehyde (E) phosphodiester
15. Which of the following lipids is not a major component of cellular membranes? (A) glycerophospholipids (B) sphingolipids (C) triglyceride (D) glycosphingolipids (E) glycoglycerolipid.
16. T ψ C loops are found in (A) mRNA (B) rRNA (C) tRNA (D) miRNA (E) snRNA.
17. Which of the following bond-pairs within a peptide backbone show free rotation around both bonds? (A) N-C α and N-C (B) C α -C and N-C α (C) C=O and N-C (D) C=O and N-C α (E) N-C and C α -C.
18. Which scientist made a significant contribution to the technology of PCR? (A) K. B. Mullis (B) J. D. Watson and H. C. Crick (C) A. D. Hershey and M. Chase (D) S. B. Prusiner (E) F. Sanger.

19. Which of the following amino acids contains only one codon? (A) Ala (B) Lys (C) Tyr (D) Met (E) Arg.
20. B form DNA has a pitch (height per turn) of ___ nm. (A) 0.10 (B) 0.15 (C) 0.34 (D) 0.54 (E) 3.4
21. The Northern blotting method is normally used for detection of (A) proteins (B) DNA (C) RNA (D) lipids (E) carbohydrates.
22. Which of the following tautomeric forms is the major form of ribose in solution? (A) α -pyranose (B) β -pyranose (C) α -furanose (D) β -furanose (E) all of the above.
23. The ribosome-binding sequence is ___ in *E. coli*? (A) AATT (B) AAGG (C) ATGC (D) TTCC (E) TTGG.
24. Carbon monoxide (CO) is poisonous, because it tightly binds ___ of the body. (A) CoQ (B) cyt b (C) cyt c (D) cyt a (E) hemoglobin
25. Which pair of enzymes listed below generates NADPH? (A) glucose-6-phosphate dehydrogenase and 6-phosphogluconate dehydrogenase (B) malic enzyme and glucose-6-phosphate dehydrogenase (C) citrate lyase and malic enzyme (D) 6-phosphogluconate dehydrogenase and fructose-bisphosphatase-1 (E) fructose-bisphosphatase-1 and hexose kinase.
26. Which pair of enzymes listed below is unique to the glyoxylate cycle? (A) pyruvate dehydrogenase and fructose-bisphosphatase-1 (B) pyruvate carboxylase and 3-phosphoglycerate kinase (C) PEPCK and pyruvate carboxylase (D) citrate lyase and malate synthase (E) pyruvate carboxylase and phosphofructokinase-1.
27. The major sugars in coke are (A) glucose (B) fructose (C) galactose (D) glucose and fructose (E) galactose and fructose.
28. Which of the following reactions is not located in mitochondria? (A) tricarboxylic acid cycle (B) electron transport (C) gluconeogenesis (D) β -oxidation (E) oxidative phosphorylation.
29. In a Lineweaver-Burk double reciprocal plot, the intercept of the y-axis equals ___. (A) K_M (B) $-1/K_M$ (C) V_{max} (D) $1/V_{max}$ (E) k_{cat}/K_M .
30. Phosphofructokinase-1 (A) is activated by ADP and citrate (B) is inhibited by ADP and citrate (C) is activated by citrate and fructose-2,6-bisphosphate (D) is activated by AMP and fructose-2,6-bisphosphate (E) is inhibited by ATP and fructose-2,6-bisphosphate
31. All α -amino acids except ___ contain an asymmetric α -carbon. (A) Gly (B) Ala (C) Ile (D) His (E) Met.
32. Amino acids can be covalently linked together by formation of a(n) ___ bond. (A) ether (B) ester (C) peptide (D) glycosidic (E) phosphodiester.
33. How many moles of $FADH_2$ molecules are produced in the TCA cycle per molecule of glucose metabolized? (A) 5 (B) 4 (C) 3 (D) 2 (E) 1.
34. The lipid portion of a typical cell membrane bilayer is about 3 nm thick. Predict the number of amino acid residues in an α helix that will just span this distance. (A) 20 (B) 15 (C) 10 (D) 5 (E) 4.
35. Pyruvate dehydrogenase complex catalyzes the release of carbons ___ from glucose. (A) 1 and 2 (B) 3 and 4 (C) 5 and 6 (D) 1 and 6 (E) none of the above.
36. Which of the following scientists made a significant contribution to the discovery of prion? (A) K. B. Mullis (B) J. D. Watson and H. C. Crick (C) A. D. Hershey and M. Chase (D) S. Altman and T. Cech (E) S. B. Prusiner.

類組：化學類 科目：生物化學(1006)

共 3 頁 第 3 頁

37. In a supercoiled DNA, a stretch of ~20 base pairs changes from the B form to the Z form. $\Delta W = \underline{\quad}$. (A) +1.7 (B) +2.7 (C) +3.7 (D) -1.7 (E) -3.7
38. and are referred to as the 21st and 22nd amino acids. (A) Cys and Sec (B) Ser and Thr (C) Sec and Pyl (D) Trp and Tyr (E) Pro and Pro-OH.
39. How many chiral carbons exist in α -D-glucopyranose? (A) 1 (B) 2 (C) 3 (D) 4 (E) 5
40. Only the tautomeric form of ribose exists in the nucleic acid structure? (A) α -pyranose (B) β -pyranose (C) α -furanose (D) β -furanose (E) all of the above.