選擇題（100%, 每小題 2.5%）

1. DNA carries negative charge in normal physiological condition because it contains: (1) phosphate group; (2) nitrogen base; (3) ribose; (4) All of the above.
2. Which description is incorrect about the function of SDS (sodium dodecyl sulfate) when performing SDS-PAGE? (1) It denatures proteins; (2) It may break disulfide bond, so that protein conformation cannot interfere their migration; (3) It makes protein separated according to their different molecular weight; (4) The binding of SDS to proteins makes them carry negative charge, leading to the migration of these proteins in electric field.
3. Which biological substance in the followings is not a polymer? (1) Glycogen; (2) Cholesterol; (3) Nucleic acids; (4) Collagen fiber.
4. Which combination is different from the other three? (1) Kinase vs phosphatase; (2) Synthetase vs lyase; (3) Oxidase vs reductase; (4) DNase vs Protease.
5. 18% of glucose is equivalent to (1) 10 M; (2) 1 M; (3) 0.1 M; (4) 0.01 M.
6. 1 ng is equivalent to (1) 10^{-3} gram; (2) 10^{-6} gram; (3) 10^{-9} gram; (4) 10^{-12} gram.
7. In terms of the order of the molecular size, which one is correct? (1) Asparagin> Glutamine; (2) A glucose >a nucleotide; (3) A nucleotide> an amino acid; (4) A nucleoside> a nucleotide.
8. Which of the following amino acids carry positive charge? (1) Histidine; (2) Glycin; (3) Aspartic acid; (4) Tyrosine.

9. Which of the followings amino acids is encoded by the UAA? (1) Methionine; (2) Serine; (3) Glutamic acid; (4) None.

10. Which statement about metabolism in the following items is incorrect? (1) Most of food molecules are reduced to break its C-H bond to release the stored energy; (2) Photosynthesis and cell respiration are complementary processes; (3) Living cells do not follow the second law of thermodynamics; (4) Catabolic and anabolic pathways together constitute the cell's metabolism.

11. Which of the following description about enzymes is wrong? (1) An enzyme changes the equilibrium point for reactions; (2) Enzymes convert substrates to products while remaining unchanged themselves; (3) Enzymes catalyze reaction by lowering the activation energy; (4) Enzymes can be involved in the catabolic and anabolic pathways.

12. What kind of cellular apparatus is not involved in regulating the division of two newly duplicated daughter cells? (1) Peroxisome; (2) Centrosome; (3) Contractile ring; (4) Spindle.

13. In the end of glycolysis, pyruvate is transformed to acetyl-CoA, which is then subjected to further oxidation to obtain more energy from the stored chemical bond. Where is the right place that pyruvate is catalyzed to become acetyl-CoA? (1) cytosol; (2) mitochondria intermembrane space; (3) mitochondria inner membrane; (4) mitochondria matrix.

14. (1) Succinate dehydrogenase; (2) NADH reductase; (3) Cytochrome oxidase; (4) Cytochrome b-c complex is the final enzyme complex in the electron transfer chain, consumes nearly all oxygen we breathe.

15. Which of the following molecules is not produced directly by TCA

cycle is incorrect? (1) ATP; (2) NADH; (3) GTP; (4) CO2.

16. Which description about the glucose polymers is wrong? (1) Glycogen is produced and stored in liver; (2) Starch is the branch form of glucose polymer; (3) Cellulose serves as a structural role in grass with alternate arrangement of upright and inverted glucose; (4) Glycogen and starch, but not cellulose, can be digested by animal because the former two glucose polymers contain only upright glucose which can be recognized by related enzymes.

17. Which of the following molecules serve as the main structural component of plasma membrane? (1) glycoprotein; (2) steroid; (3) glycolipid; (4) phospholipid.

18. Which description in the followings about genes is wrong? (1) The eukaryotic genes are usually discontinuous; (2) The DNA region occupied by genes is very low in mammalian genomic DNA; (3) A gene is defined as a DNA fragment able to produce at least a mRNA and a protein; (4) The genes can be located at each one of the two DNA strands.

19. Which of the following descriptions is wrong? (1) The nucleotide sequence in mRNA is complementary to the gene strand; (2) A set of three nucleotides able to produce an amino acid in mRNA is called a codon; (3) A set of three nucleotides able to produce an amino acid in DNA is called a code; (4) The three nucleotide sequences in tRNA recognizing the three nucleotides in mRNA is called an anticodon.

20. Which one is correct about the length of a gene (A), an mRNA (B) and a protein (C)? (1) A>B>C; (2) A<B<C; (3) A=B>C; (4) A=B=C.

21. Which is wrong about the description of human genetic materials? (1)

The genetic materials are located in chromosomes which are composed of proteins and DNA; (2) The loose DNA structure in interphase cells is called chromatin; (3) During mitosis, the genomic DNA is condensed into a short structure called chromosomes; (4) There are about 3.2×10^{20} nucleotides for human genomic DNA.

22. Lipids are (1) composed of one glycerol and one fatty acid; (2) not good to our health; (3) classified into simple, complex (such as cholesterol) and derived lipids (such as phospholipid); (4) degraded into acetyl Co-A by beta-oxidation.

23. Carbohydrates (1) possess the formula $C(H_2O)_n$; (2) can have carbon number from 1 to 6; (3) can be in straight chain or circular form; (4) all above are right.

24. Which amino acid is encoded by start codon? (1) Methionine; (2) Histidine; (3) Glycine; (4) None.

25. mRNA is namely produced by (1) RNA polymerase I; (2) RNA polymerase II; (3) RNA polymerase III; (4) All above can produce mRNA.

26. Which bond in the following exists in all proteins? (1) peptide bond; (2) glycosidic bond; (3) phosphodiester bond; (4) disulfide bond.

27. Which instrument or technique can be used to determine protein structure? (1) HPLC; (2) Northern blot; (3) Inmmunohistochemistry; (4) X-ray crystallography.

28. Which of the following substanees can be used to reduce the expression level of a given gene? (1) siRNA; (2) tRNA; (3) antibodies; (4) Antibiotics.

29. Which process is impossible in biology? (1) Protein→RNA; (2)

RNA→Proein; (3) RNA→DNA; (4) DNA→RNA.

30. Which factor in the following statement can not determine protein structure? (1) Hydrogen bond; (2) Glycosidic bond; (3) Disulfide bond; (4) Hydrophobic force.

31. Disulfide bond (1) is formed between 2 cystein residues; (2) can be broken down by reducing agent; (3) is critical to the protein conformation; (4) all above are right.

32. Plasma membrane allows the passage of (1) small and charged molecules; (2) small ions; (3) small and uncharged polar molecules; (4) large and hydrophobic molecules.

33. Which of the following organisms is not used as an experimental model? (1) Worm; (2) yeast; (3) bacteria; (4) none of them.

34. Which description about a cell cycle of mammalian cells is correct? (1) A cell cycle is progressed from G1, G2, S to M in order; (2) DNA is replicated in S phase; (3) G2 is the shortest phase; (4) The biggest cell size is observed in M phase.

35. Which enzyme is responsible for DNA synthesis for human cells? (1) DNA-dependent DNA polymerase; (2) DNA-dependent RNA polymerase; (3) RNA-dependent DNA polymerase; (4) All of above.

36. The 'primary structure' of a protein refers to (1) interactions among the side chains or R-groups of the amino acids; (2) the number and sequence of amino acids; (3) coiling due to hydrogen bonding between amino acids; (4) the alpha-helix, or beta-sheets.

37. The two strands of a DNA molecule are held together by: (1) Glycosidic bonds; (2) Ester bonds; (3) Peptide bonds; (4) Hydrogen bonds.

38.Fatty acids that are unsaturated have: (1) an amino group; (2) a carboxyl group; (3) an excess of protons; (4) a double bond.

39.Which of the following technique is used to detect the expression of mRNA? (1) Northern blot; (2) Western blot; (3) Immunoprecipitation; (4) Immunofluorescence.

40.Upon chemical analysis, a particular protein was found to contain 108 amino acids. How many codons are present in its corresponding mRNA? (1) 108; (2) 36; (3) 216 (4) 324.