選擇題：100%，共五十題，每小題 2%

1. 1.8 mg/ml of glucose (MW=180) is equivalent to (A) 1.8%; (B) 0.18%; (C) 0.018%; (D) 0.0018%.
2. Which compounds would be proteins? (A) Glycogen and cellulose; (B) Cholesterol and estrogen; (C) Keratin and protease; (D) Chlorophyll and hemoglobin.
3. Which combination is different from the other three? (A) Kinase vs phosphatase; (B) Synthetase vs lyase; (C) Ligase vs nuclease; (D) Polymerase vs isomerase.
4. Which combination in the following is not logical? (A) GTP, G protein; (B) GFP, fluorescence; (C) siRNA, sigma factor; (D) cAMP, PKA.
5. Generally, antibody is not applied to (A) Western blot; (B) ELISA; (C) EMSA; (D) Southern blot.
6. Which process is impossible in biology? (A) Protein→RNA; (B) RNA→Proein; (C) RNA→DNA; (D) DNA→DNA.
7. The following equation (G = glucose): G + G + G → G-G-G + $2H_2O$, is an example of (A) ionic bond formation; (B) glycosidic bond formation; (C) a ligation reaction; (D) a hydrolysis reaction.
8. Which of the following description is not correct regarding DNA and RNA? (A) They are belonged to nucleic acids; (B) DNA but not RNA can be used to store genetic information; (C) the quantity of RNA in a cell is higher than that of DNA; (D) DNA synthesis requires RNA, and RNA synthesis also requires DNA.
9. Which factor in the following statement can not determine protein

structure? (A) Amino acid sequence; (B) Chaperon; (C) Intron; (D) Temperature.

10. In normal physiological condition, DNA: (A) has low molecular weight; (B) has negative charge; (C) can be hydrolyzed in water; (D) forms hydrogen bond between water and DNA; therefore, DNA can move in an electric field.
11. Which description in the following statements about a gene is correct? (A) Genes can locate at both strands of a double helix; (B) A gene is currently defined as a segment of DNA able to produce protein; (C) A gene should contain exons and introns; (D) DNA acetylation is one of the most frequent ways to shut down gene expression.
12. Which biological substance in the followings is not a polymer? (A) Glycogen; (B) Cellulose; (C) Lipid; (D) Collagen fiber.
13. Which one in the followings is a DNA binding domain? (A) Helix-turn-helix; (B) CARD domain; (C) Kinase domain; (D) Pleckstrin homology domain.
14. What kind of analysis is used to detect the locus of a gene on a chromosome? (A) Northern blot; (B) Fluorescence in situ hybridization; (C) Immunofluorescence; (D) PCR.
15. Which of the following molecules serve as the main structural component of plasma membrane? (A) Glycoprotein; (B) Steroid; (C) Glycolipid; (D) Phospholipid.
16. Which of the following descriptions is wrong? (A) A set of three nucleotides able to produce an amino acid in DNA is called a code; (B) A set of three nucleotides able to produce an amino acid in mRNA is called a codon; (C) The nucleotide sequence in mRNA is

complementary to the sense strand of a gene; (D) The three nucleotide sequences in tRNA recognizing the three nucleotides in mRNA is called an anticodon.

17. Which of the following instruments can be used to measure DNA concentration? (A) Centrifuge; (B) pH meter; (C) Spectrophotometer; (D) Flowcytometer.
18. Which of the following substances can inhibit the synthesis of a given gene's product? (A) Antibodies; (B) tRNA; (C) microRNA; (D) snRNP.
19. Which instrument or technique can be used to determine protein structure? (A) X-ray crystallography; (B) Northern blot; (C) Inmmunohistochemistry; (D) HPLC.
20. Disulfide bond (A) is formed between 2 cystein residues; (B) can be broken down by reducing agent; (C) is critical to the protein conformation; (D) all above are correct.
21. Which of the following subcellular structure has the biggest volume in cells? (A) Cytosol; (B) Nucleus; (C) ER; (D) Golgi.
22. Which of the following organelles does not have outer and inner membrane? (A) Nucleus; (B) Golgi; (C) Mitochondria; (D) Chloroplast.
23. Which statement of phospholipids is wrong? (A) Pospholipids are amphipathic molecules; (B) Phosphatidylcholine is the most common phospholipid in cell membrane; (C) Phospholipid bilayers can only form sealed compartments with the help of the inserted proteins; (D) Phospholipids are distributed asymmetrically in the plasma membrane.

24. Which of the following substance cannot pass through membrane directly? (A) O_2; (B) H^+; (C) bezene; (D) CO_2.
25. Which statement of photosynthesis in the followings is not correct? (A) Photosynthesis produces electron and H^+ from the lysis of water molecules; (B) The H^+ gradient is used to generate ATP and the energy from electron transport is used to form NADPH; (C) NADPH and ATP are used to synthesize glucose and the carbon source is from CO_2; (D) O_2 is produced accompanied the fixation of CO_2.
26. The citric acid cycle (A) is occurred in cytosol; (B) produces GTP but not ATP; (C) generates NADH and NADPH; (D) oxidizes pyruvate to obtain energy.
27. Which description of beta oxidation is not correct? (A) It is occurred in mitochondria; (B) It is used to oxidize fatty acids; (C) It removes two carbons at a time to become acetyl-CoA; (D) It can produce 2 ATPs in one cycle.
28. Pyruvate can be catalyzed in the absence of oxygen. Which statement in the followings is not correct? (A) Pyruvate is oxidized to become lactate or ethanol; (B) The recovery of energy from pyruvate is less efficient compared to TCA cycle and electron transport chain; (C) In the very early environment on the earth, living organisms may use this way to produce energy; (D) The way to catalyze pyruvate in the absence of oxygen is only found in higher organisms.
29. Which of the following statements about digestion of food is correct? (A) Most of the biopolymeric food should be broken down to simple subunits outside cells; (B) The simple subunits can be delivered into cells through simple diffusion; (C) Proteins, carbohydrates and fats

can be transformed into pyruvate; (D) Only carbohydrates and proteins can undergo glycolysis.

30. Which description about enzyme is not correct? (A) Enzyme can speed up a reaction; (B) Enzymes catalyze reaction by lowering the activation energy; (C) Enzymes convert substrates to products while remaining unchanged themselves; (D) Enzyme can only catalyze energetically favorable reactions but not unfavorable ones.

31. Phospholipase C (A) is an enzyme catalyzing the degradation of phospholipids; (B) generates IP3 which activating the opening of calcium channel on ER; (C) generates diacylglycerol which is coupled with released calcium to activate PKC; (D) all of the above are correct.

32. The receptor-bound G protein (A) binds GTP when it is bound by receptor, and then alpha and beta/gamma complex falls apart; (B) Both of alpha and beta/gamma can relay signals downward; (C) The inactivated alpha subunit can bind beta/gamma again to form an inactive G protein; (D) All of above are correct.

33. Which description about G proteins is not correct? (A) All G-proteins possess a similar structure. They contains seven transmembrane domain along their protein length; (B) G protein can attach to a membrane receptor and therefore relay signal to the downstream pathways in cells; (C) Protein is not necessarily activated when they are phosphorylated; however, G protein is only activated when it is bound by a GTP molecule; (D) G protein actually is a GTPase. It can catalyze the hydrolysis of GTP to become GDP.

34. Not every extracellular signal molecules has a membrane bound

receptor. Some ligands can get into cells and find their receptors in cells and which do not include ligands with (A) small molecular weight; (B) hydrophobicity; (C) protein basis; (D) lipid like.

35. The reason for why there are so many components in a signal transduction pathway is (A) the more the components are, the higher the signal transduction efficiency is; (B) more components can relay the signal to farer place including nucleus; (C) more components can amplify the extracellular signal more remarkably; (D) all of above are correct.

36. Animal cells can signal to one another in various ways. The distance between the cells producing the signaling ligand and the cells receive and respond to the ligand vary. Which one in the following signaling patterns represents the shortest distance between the ligand generating cells and ligand responding cells? (A) Endocrine; (B) Paracrine; (C) Neuronal signaling; (D) Yeast mating factor related signaling mechanism.

37. Which creature in the followings is not usually used as a typical model organism in life science? (A) Bacteria; (B) Fruit fly; (C) Frog; (D) Elephant.

38. DNase is able to (A) digest DNA; (B) build DNA; (C) move DNA; (D) rearrange DNA.

39. Which description about sugars is not correct? (A) They usually have the formula $(CH_2O)_n$; (B) Monosaccharides have aldose and ketose form; (C) Sugars are usually straight, but not cyclic, in aqueous solution; (D) Starch and glycogen, but not cellulose, can be digested by human, although they are all sugars.

40. Human beings have (A) 10; (B) 20; (C) 30; (D) 40 kinds of amino acids.
41. Protein has (A) 1; (B) 2; (C) 3; (D) 4 levels of structures.
42. Which one of the followings is carbohydrate? (A) Fructose; (B) Cholesterol; (C) Prione; (D) Plasmid.
43. Which bond in the followings can be found in protein? (A) Peptide bond; (B) Phosphodiester bond; (C) Glycosidic bond; (D) All of above.
44. Vitamine is usually used as (A) a structural component; (B) an enzyme; (C) a coenzyme; (D) transcription factor in cells.
45. Isoelectric point is a (A) pH value; (B) membrane potential; (C) a place along a electric filed; (D) amino acid.
46. Most of the enzymes are (A) DNA; (B) RNA; (C) Protein; (D) All of above.
47. Which biomolecule in the followings can store highest abundant energy? (A) DNA; (B) RNA; (C) Protein; (D) Lipid.
48. The cohesion of water is caused by (A) hydrogen bond; (B) covalent bond; (C) hydrophobic forces; (D) ionic bonds.
49. Which of the following structures is most complicated? (A) Alpha helix; (B) Beta sheet; (C) Amino acid sequence; (D) Domain.
50. Which of the following amino acids contain no charge? (A) Alanine; (B) Glutamic acid; (C) Aspartic acid; (D) Lysine.