試題請務必連同試卷交回。

單選題 （每題 2 分）

SIMPLE-CHOICE QUESTIONS

Identify the correct statement. Gain two points for each correct answer.

1. Peptidoglycan is the main component of which of the following structures?
   (A) Plant primary cell wall
   (B) Bacterial cell wall
   (C) Plant extracellular matrix
   (D) Mammalian extracellular matrix

2. The three basic functions of cell junctions are adhesion, sealing, and communication. The function of communication is carried out by:
   (A) hemidesmosomes
   (B) desmosomes
   (C) tight junctions (occluding junctions)
   (D) gap junctions

3. Select the type of animal tissue that covers organs or lines lumens of structures, provides barriers and makes compartments, as well as specialized for protection, absorption, or secretion.
   (A) epithelial tissue
   (B) connective tissue
   (C) muscular tissue
   (D) nervous tissue

4. Which of the following contains negatively charged galacturonic acid and the sugar rhamnose and is a highly branched polysaccharide that is found intertwined with the cellulose microfibrils.
   (A) hemicellulose
   (B) pectin
   (C) lignin
   (D) fibronectin

5. Which of the following cytoskeletal structures is composed of polymers of tubulin subunits?
   (A) microfilaments
   (B) microtubules
   (C) intermediate filaments
   (D) tonofilaments

6. The light-dependent generation of ATP in photosynthesis occurs in the:
   (A) stroma
   (B) inner membrane
   (C) thylakoid membrane
   (D) thylakoid lumen

7. Osmosis is a form of diffusion in which:
   (A) the solute moves freely from a region where it is in higher concentration to a region of lower concentration
   (B) the solute moves freely from a region where it is in lower concentration to a region of higher concentration
   (C) the solvent moves through a semipermeable membrane from a region where a solute is in higher concentration to a region of lower concentration
   (D) the solvent moves through a semipermeable membrane from a region where a solute is in lower concentration to a region of higher concentration

(背面仍有題目,請繼續作答)

8. The main function of the Golgi complex is:
   (A) carbohydrate metabolism
   (B) synthesis of steroids
   (C) the processing of proteins for export from the cell
   (D) destruction of worn out organelles

9. Synthesis of proteins for export or membrane inclusion is a major role of the:
   (A) rough endoplasmic reticulum
   (B) smooth endoplasmic reticulum
   (C) Golgi complex
   (D) free ribosomes

10. Primary control over protein synthesis occurs at:
   (A) the transcriptional level
   (B) the post-transcriptional level
   (C) the translational level
   (D) the post-translational level

11. The first step in the elongation stage of protein synthesis is:
   (A) translocation
   (B) the binding of the appropriate amino acyl-tRNA to the A-site.
   (C) peptide bond formation
   (D) formation of the initiation complex

12. During protein synthesis an anticodon on tRNA pairs with:
   (A) other tRNA nucleotide bases
   (B) DNA nucleotide bases
   (C) rRNA nucleotide bases
   (D) mRNA nucleotide bases

13. During the elongation stage of DNA replication, nucleotides are added to:
   (A) the 5' end of the DNA strand being synthesized.
   (B) the 3' end of the DNA strand being synthesized.
   (C) the 5' end of the RNA strand being synthesized.
   (D) the 3' end of the RNA strand being synthesized.

14. If the sequence in mRNA is 5' AUG 3', the DNA sequence on the strand from which it was copied was (written here 5' to 3'):
   (A) TTC
   (B) UAC
   (C) TAC
   (D) CAT

15. The gravitational force generated by a centrifuge depends on:
   (A) the radius of the particle
   (B) the density of the particle
   (C) the viscosity of the medium
   (D) the distance of the sample from the axis of the rotor and the speed of the centrifuge

16. The limit of resolution of the light microscope is:
   (A) 240 μm
   (B) 240 nm
   (C) 100 nm
   (D) 215 mm

17. In a typical cell, water comprises from:
(A) 10 - 30 %
(B) 20 - 45 %
(C) 45 - 60 %
(D) 75 - 90 %

18. From the following, select the statement that is true:
(A) All cells have a cell wall.
(B) Animal cells contain microtubules but plant cells do not contain microtubules.
(C) The Golgi apparatus is found only in animal cells.
(D) Chloroplasts are found in plant cells but not in prokaryotic or animal cells.

19. Prokaryotes include:
(A) plants and animals
(B) bacteria and fungi
(C) bacteria and blue-green algae
(D) protists and blue-green algae

20. After meiosis, from a cell with 46 chromosomes, we obtain:
(A) 2 cells with 46 chromatids
(B) 4 cells with 23 chromosomes
(C) 4 cells with 23 chromatids
(D) 2 cells with 23 chromosomes

複選選擇題 （每題 3 分，全對才給分）

MULTIPLE-CHOICE QUESTIONS

Identify the correct statements. Note that more than one statement are correct in each question. Gain three points for each correct question.

1. Which of the following are molecular components of the extracellular matrix of animal cells?
(A) collagen
(B) cellulose
(C) proteoglycan
(D) fibronectin

2. Select the true statements about flagella:
(A) Bacterial flagella are much smaller (12-20 nm.) in diameter than eukaryotic flagella (~500 nm.).
(B) Bacterial flagella are one of the few examples of rotary motion in the world of living organisms.
(C) Both eukaryotic and bacterial flagella are covered by the plasma membrane.
(D) Bacterial flagella are totally different from the flagella of eukaryotes in chemical composition, structure, and function.

3. Select the true statements about glycolysis.
(A) Glycolysis is the breakdown of one molecule of glucose into two molecules of pyruvate.
(B) Glycolysis occurs in the cytosol or cell sap.
(C) Glycolysis occurs within mitochondria.
(D) Glycolysis occurs in both aerobic and anaerobic organisms.

4. Which of the following antibiotics disable the prokaryotic 70S ribosome, but NOT the eukaryotic 80S ribosome?
(A) chloramphenicol
(B) streptomycin
(C) erythromycin
(D) tetracycline

(背面仍有題目,請繼續作答)

5. AUG is the codon for Met (methionine). AUG is also the START codon. Select the true statements.
   (A) This means that protein synthesis begins with the amino acid methionine.
   (B) This means that protein synthesis begins when AUG occurs near the 5' end of mRNA.
   (C) This means that protein synthesis begins when AUG occurs near the 3' end of mRNA.
   (D) This means that the first transfer RNA in the initiation complex will carry the anticodon UAC.

6. Initiation, elongation and termination are words used to describe stages in:
   (A) DNA synthesis
   (B) RNA synthesis
   (C) carbohydrate synthesis
   (D) Protein synthesis

7. Select the true statements about the steps involved in the processing of the primary RNA transcript:
   (A) A ribonucleoprotein particle is formed.
   (B) Introns are removed.
   (C) Exons are removed.
   (D) The 5' end of the RNA molecule is capped with 7-methyl guanosine

8. Select the true statements about meiosis.
   (A) It occurs in somatic and germ cells.
   (B) Daughter cells are different from the original cell.
   (C) Homologous pairing of chromosomes occurs in meiosis.
   (D) It involves a process called crossing-over.

9. Select the true statements from the following:
   (A) Facilitated diffusion is several orders of magnitude faster than simple diffusion.
   (B) Facilitated diffusion exhibits saturation kinetics.
   (C) Facilitated diffusion is not very selective.
   (D) Facilitated diffusion can be inhibited by agents known to denature proteins.

10. Functions of lysosomes are:
    (A) degradation of foreign material taken up by endocytosis.
    (B) destruction of worn or damaged organelles (autophagy).
    (C) breakdown of entire cell during cell death (autolysis).
    (D) provision of materials for extracellular digestion via exocytosis.

簡答題 （每題5分）
SHORT ESSAY

1. Write down five functions of plasma membrane.

2. How many layers of membrane does the nucleus have? Describe the function of pores in the nuclear membrane.

3. How many layers of membrane do the mitochondria have? What is the major function of the mitochondria?

4. List five kinds of extracellular matrix components.

5. Draw and explain the growth curve of cells transferred from tissue cultural plate to collagen coated plate.

6. Describe how a lysosomal enzyme is synthesized and transported to the lysosomes.