

※ 注意：請於試卷內之「非選擇題作答區」依序作答，並應註明作答之大題及小題題號。

I: 填空題。每一題中，請將 A 至 H 的答案 填入以下短文的①至⑧空格中。作答時，也可直接以英文字母

A 或 B....., H, 作答。(每題 12 分，共 60 分)

1. A: chromosomes      B: ribosomes      C: nucleus      D: prokaryotic      E: nucleoid  
 F: plasma membrane      G: eukaryotic      H: organelle

短文：

All cells share some basic features: They are all surrounded by a selective barrier, called ①. All cell contained ②, which carried genes in form of DNA. All cells have ③ that make proteins according to instruction from the gene. In a ④ cell most of the DNA is in an ⑤ called the ⑥, which is bounded by a double membrane. In a ⑦ cell the DNA is concentrated in a region that is not membrane closed, called ⑧.

2. A: oxygen      B: glycolysis      C: aerobic respiration      D: sugar      E: NAD<sup>+</sup>  
 F: NADH      G: Fermentation      H: pyruvate

短文：

One catabolic process, ①, is a partial degradation of ② or other organic fuel that occurs without the use of ③. It consists of ④ plus reactions that regenerate ⑤ by transferring electrons from ⑥ to ⑦ or its derivatives. Although used by most cell, the most prevalent and efficient catabolic pathway is ⑧.

3. A: inositol triphosphate (IP<sub>3</sub>)      B: hormones      C: phospholipids      D: calcium  
 E: endoplasmic reticullum      F: ligand      G: paracrine molecules      H: specific

短文：

Cells may communicate by direct contact or secreting ① for local signaling. For long-distance signaling, both plant and animal cells use ②. The binding of ③ and receptor is highly ④, and may lead to a rise of the cytosolic ⑤. The rise of the cytosolic ⑥ involves a secondary messenger called ⑦, which is produced by cleavage of a certain type of ⑧ in the plasma membrane and activates ion channel located on the membrane of the cell's ⑨.

4. A: muscle tissue      B: epithelium tissue      C: connective tissue      D: glia  
 E: organ and cavities      F: outside of the body      G: extracellular matrix      H: cells

短文：

Animal body consists of 4 basic types of tissue. Occurring as sheets of cells, ①, cover the ② and lines ③ within body. ④, consisting of spare population of ⑤ scattered through an ⑥, holds many tissue and organ together and in place. The tissue responsible for nearly all types of body movement is ⑦. Nerve tissue functions in the receipt, processing, and transmission of information. It contains nerve cells and cells called ⑧.

5. A: myelin sheath(s)      B: Schwann cells      C: oligodendrocytes      D: electrical insulation  
 E: saltatory conduction      F: giant axons      G: vertebrate      H: in vertebrate

短文：

Axon diameter is a major factor affecting the speed at which the action potentials are conducted. In ① conduction speed is increased by forming ② of large diameter. ③ axons have narrow diameters; nevertheless, the evolutionary adaptation that enables fast conduction in ④ axons is ⑤. ⑥ that surrounds ⑦ axons is called a ⑧; ⑨ are produced two types of cells- ⑩ in the central nervous

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system and ⑦ in peripheral nervous system. The mechanism for a action potential propagation along the axons with ⑥ is called ⑧.

II. 配合題。每一題中，請將選項區中 A 至 H 的答案填入問題 a 至 d 的空格中。作答時，也可直接以英文字母 A 或 B..., H，作答（每題 8 分，共 40 分）

1. Regarding plant's responses to light:

- a: A physiological response to photoperiod such as flowering, is called \_\_\_\_\_
- b: Tomatoes, rice, and dandelions, are unaffected by photoperiod and flower when they reach a certain stage of maturity, regardless of day length. They are called \_\_\_\_\_
- c: A graph that depicts the relative effectiveness of different wave length of radiation in driving a particular process is called \_\_\_\_\_
- d: The growth of a plant's shoot toward light or away from it is called \_\_\_\_\_

選項區：

- A: phototropism      B: photomorphogenesis      C: action spectrum      D: circadian rhythms  
E: long-day plant      F: day-natural plant  
G: photoperiodism      H: vernalization

2. Regarding gas exchange in animals:

- a: Ventilation in fishes involve \_\_\_\_\_
- b: Gas exchange in insects relies on \_\_\_\_\_
- c: An amphibian ventilates its lung by \_\_\_\_\_
- d: Contraction of diaphragm is important for \_\_\_\_\_

選項區：

- A: a trachea system      B: lung alveoli      C: countercurrent exchange      D: respiratory pigment  
E: positive pressure breathing      F: negative pressure breathing      G: air sac

3. Regarding population ecology:

- a: \_\_\_\_\_ is more likely happen in the area where a forest was destroyed by fire.
- b: \_\_\_\_\_ occurs only if per capita rate of increase of a population equal to its maximum rate.
- c: \_\_\_\_\_ occurs when a per capita birth and death rates are equal?\_
- d: In \_\_\_\_\_, the per capita of increase approaches zero as carrying capacity is reached.

選項區：

- A: Exponential growth      B: Zero population growth      C: Logistic population growth

4. Regarding the function of hormone,

- a: Hormone that that decrease blood glucose
- b: Hormone that increases metabolic rate
- c: Hormone that increase water uptake in kidney
- d: Hormone that have receptor proteins in target cell's nucleus

選項區：

- A: Thyroid hormone      B: Cortisol      C: Growth Hormone      D: Vasopressin (ADH)  
E: prolactin      F: Insulin      G: atrial natriuretic peptide (ANP)

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科目：生物學(A)

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5. Regarding transport of solutes across plasma membrane,
- a: Amino acid uptake by small intestine epithelium
  - b: Glucose uptake by liver cell in the presence of insulin
  - c: Sodium ions moved from the inside to the outside of cell
  - d: The movement of  $\text{CO}_2$

選項區：

- A: simple diffusion      B: facilitated diffusion      C: primary active transport  
D: Secondary active transport

