

一、選擇題：每題 2 分。 20%

- 1.()常促使動物產生週期反應(biological rhythms)的荷爾蒙(Hormone)是
(1.胰島腺 2.松果腺 3. 腎皮質腺 4.攝護腺)
- 2.()肌肉組織與神經軸突末梢作用之位置為(1.肌腱 2.表皮組織 3.骨骼纖維
4.肌纖維(single muscle fiber))
- 3.()一般寄生蟲中有名的 nematode 是屬於三胚層之生物，其體腔是屬於
(1.無體腔動物 2. 擬體腔動物 3. 二體腔動物 4. 真體腔動物)
- 4.()如果神經細胞上有 2 個突觸前神經細胞同時刺激單一突觸後細胞，產生作用的是(1.No summation 2.one summation 3.Temporal summation
4.Spatial summation)
- 5.()在人類精細胞行成過程中，使染色體自 2N 成為 1N 之減數分裂時，屬於
(1.spermatogonium stage 2.spermatogonium----primary spermatocyte
3. primary spermatocyte ----Secondary spermatocyte
4. Secondary spermatocyte---- spermatides)
- 6.()glucose, amino acid 等營養物質在腎臟之腎管中釋出，再以 active transporte
輸送至周圍微血管再吸收之位置為 (1.亨氏環圈 2.集尿管
3.近端彎曲細管 4. 遠端彎曲細管)。
- 7.()許多的水生生物，如軟體動物之九孔和魚類之含氮排泄物為(1.amino acid
2.ammonia 3. urea 4. uric acid)
- 8.()Ancestral prokaryotes 會利用細胞末凹入，逐漸將一些 anerobic heterotrophic
prokaryotes 置入細胞內，共同成為 Eukaryotes 之過程，稱為(1.endosymbiosis
2.exocytosis 3.additional growth 4.competition).

9.() 脊椎動物心臟演化過程中，兩棲類之心房與心室共隔成為(1.一 2. 二 3.三 4.四)個空間。

10.() 人體需要許多礦物質，其中 bone and tooth formation, blood clotting, nerve and muscle function 等需要大量之(1.Sulfure 2.Sodium 3. Copper 4.Calcium)，供生理作用。

二、填空題(每空格 1 分) 15%

1. 哺乳動物之排泄系統通常可包含 (1) 作用、再吸收作用、(2) 作用、(3) 作用四種功能。

2. 魚類之鰓進行呼吸作用，是利用水流與血流相反方向之方法交換氧氣與二氧化碳，稱之為 (4) 交換法。

3. 人類心臟之泵出量(output)依據兩項因素，即心跳之 (5) 與 (6) 。

4. 蛋白質(protein)食入後，胃中分泌的 Enzymes 是 (7) ，產生作用將之分解成 (8) 。在十二指腸則有來自 (9) 所分泌之各種 peptidase，將小腸中的各種 peptide 分解成 (10) ，以供吸收。

5. 青蛙的胚胎在器官行成期(organogenesis)時，可發現神經管由 (11) 胚層形成；消化腔內膜與食物接觸面由外胚層形成；其餘消化器外膜由 (12) 胚層形成。

6. 肌肉產生收縮，依據 (13) Model 理論，並非薄纖維或厚纖維改變長度，而是由 ATP 供應能量給 (14) ，產生 head，並連結至 Actin 之 (15) 的作用位置，牽動 Actin 移動，使薄纖維或厚纖維產生重疊。

系組：生命科學系 三年級 日期節次：7 月 29 日 第 3 節

科目：普通生物學 (103-32)

三、問答題 15%

1. 請說明在兩神經細胞間通過突觸，傳遞化學刺激，產生動作電位(action potential)

之過程。 8%

2. 請說明著名的寄生蟲--血絲蟲(*Schistoma mansoni*)之生活史(life cycle)。 7%

四、填空题，請寫英文，中文不計分（每一題 1 分；共 20 分）：

- ◆ The pre-mRNA molecules contains noncoding regions, intron, and coding regions, exon. This RNA transcript is cut by _____ (1), the introns are cut out from the molecule and the exons joined together.
- ◆ The two vascular tissues in plant stem are _____ (2) and _____ (3).
- ◆ The union of two sperms with different nuclei of the embryo sac is called _____ (4). The process is unique to angiosperm. The one sperm fertilizes the egg, forming the zygote, and the other sperm combines with the polar nuclei and develops into endosperm.
- ◆ A change in genotype and phenotype due to the assimilation of external DNA by a cell is called _____ (5).
- ◆ The components of organic molecules that are most commonly involved in chemical reactions are known as _____ (6). These components help give each molecules its unique properties.
- ◆ Two glucose joined by a glycosidic linkage is a _____ (7).
- ◆ A _____ (8) is similar to a fat, but has only two fatty acids attached to glycerol rather than three. The third hydroxyl group of glycerol is joined to a phosphate.

- ◆ Polymers of amino acids are called _____ (9).
- ◆ The _____ (10) consists of a network of membranous tubules and sacs called cisternae, which carries out a variety of tasks in the cell includes synthesis of proteins and their transport, metabolism and movement of lipids, etc.
- ◆ The light energy absorbs by chlorophyll drives transfer of electrons and hydrogen from water to NADP^+ . The light reaction generate ATP using chemiosmosis to power the addition of a phosphate group to a ADP, a process called _____ (11).
- ◆ _____ (12) is an energy-coupling mechanism that uses energy in the form of a H^+ gradient across a membrane to drive cellular work.
- ◆ Eukaryotic cell division consists of mitosis, the division of the nucleus, and _____ (13), the division of the cytoplasm.
- ◆ _____ (14) chromosomes are the two chromosomes composing a pair. They have the same length, centromere position and staining pattern. Both chromosomes of each pair carry genes controlling the same inherited characters.
- ◆ During cell division, each duplicated chromosome has two _____ (15) connected at the centromere, which separate during cell division.
- ◆ Amoebas and many other protists eat by engulfing smaller organisms or other food particles, a process called _____ (16).
- ◆ An _____ (17) gradient is caused by the concentration electrical gradient of ions across a membrane.
- ◆ The binding of a molecule to an enzyme that affects the function of the enzyme at a regulatory site. _____ (18) is the term used to describe any case in which an enzyme's function at one site is affected by the binding of a regulatory molecule to a separate site.

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- ◆ The first step of respiration is _____ (19). It means the splitting of sugar. Glucose is split into two three-carbon compounds.
- ◆ Many polar molecules and ions impeded by the lipid bilayer of the membrane diffuse passively with the help of transport proteins that span the membrane. This phenomenon is called _____ (20). This process considered passive transport because the solute being transported is moving down its concentration gradient.

五、解釋名詞(每題 2 分；共 10 分)：

1. C3 plant, C4 plant and CAM plant
2. sodium-potassium pump
3. promoter and terminator
4. Mendel's law of segregation and law of independent assortment
5. Substrate-level phosphorylation

六、問答題(每題 4 分；共 20 分)：

1. Plants and some algae exhibit a sexual life cycle different from animals. What is the detail alternation of generation of mosses? (e.g., *Polytrichum* or *Sphagnum*)
2. Where is the active site of photosynthesis? What is the process of light reaction and Calvin cycle?

3. The formation of protein is a complex process including transcription, translation. What is the three stages of transcription and their mechanisms? What is the RNA splicing processes? How the synthesis of a polypeptide in translation?
4. Respiration is a cumulative function of three major metabolic stages. Where are their occurring sites? What are the processes, energy output and the products?
5. Detail describes the bacterial DNA replication.

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