中國文化大學 97 學年度轉學招生考試

系組：生命科學系二　　年級　　日期節次：7 月 29 日第 3 節

科目：普通生物學　(103-32)

U-3-7

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. 腎皮質線　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 nematodode 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 prokarotes 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.addtional growth 4.compettion).

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.人類心臟之汞出量(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。

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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、填空題，請寫英文，中文不計分（每一題1分；共20分）：

- The components of organic molecules that are most commonly involved in chemical reactions are known as _____ _____(1). These components help give each molecules its unique properties.
- Two glucose joined by a glycosidic linkage is a _____(2).
- A _____(3) 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 _____(4).
- The _____ _____(5) 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.
- Amoebas and many other protists eat by engulfing smaller organisms or other food particles, a process called _____ (6).
- An _____ (7) 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. _____ _____(8) 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.

- The first step of respiration is _____(9). 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 _____ _____(10). This process considered passive transport because the solute being transported is moving down its concentration gradient.

- 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.

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- The pre-mRNA molecules contains noncoding regions, intron, and coding regions, exon. This RNA transcript is cut by _____(16), the introns are cut out from the molecule and the exons joined together.
- The two vascular tissues in plant stem are _____(17) and _____(18).
- The union of two sperms with different nuclei of the embryo sac is called _____ _____(19). 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 _____(20)

五、解釋名詞(每題2分；共10分)：

1. peripheral protein and integral protein
2. promoter and terminator
3. Substrate-level phosphorylation
4. Alleles and Locus
5. Mendel's law of segregation and law of independent assortment

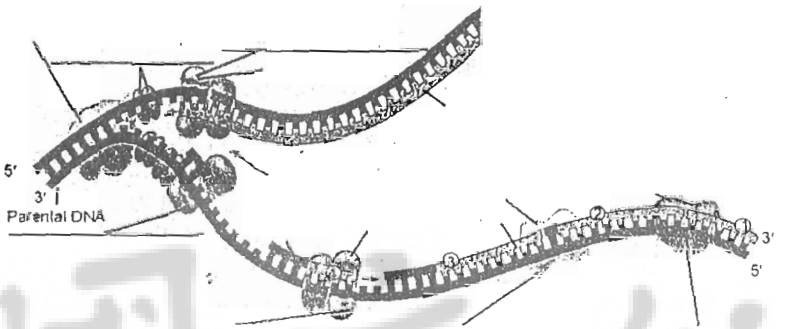
六、問答題(每題4分；共20分)：

1. Respiration is a cumulative function of three major metabolic stages. Where are their occurring sites? What are the processes, energy output and the products?

2. Where is the active site of photosynthesis? What is the process of light reaction and Calvin cycle?

3. Please describe the three main events distinguish the meiosis and mitosis.

4. This figure is a summary of bacterial DNA replication. Detail describes the process.



5. The formation of protein is a complex process including transcription and 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?