

1. (a)請敘述胚胎發育時 neural tube 及 neural crest 的形成過程。(5 points)
(b)neural tube 及 neural crest 將各自發育為何？ (2 points)
(c)腦發育過程中的三個 primary brain vesicles 為何？ (3 points)
2. (a)請敘述 photoreceptors 將光能轉換成膜電位的生化機轉。(4 points)
(b)請敘述三種視覺訊號 (包括形狀、顏色及動態) 由 retina ganglion cells 投射至 visual cortex 的路徑？ (6 points)
3. (a)請描述參與大腦運動控制的 motor loop (8 points), 而 Parkinson's disease 病患中其 motor loop 的哪個部位可能受到損傷？ (2 points)
(b)請敘述動作控制時 excitation-contraction coupling 的過程。(5 points)
4. 請以 neuromuscular synapse 為例說明 synapse 形成及移除的過程。(7 points)
5. 請敘述一種以實驗動物為模式用來測試“學習”與“記憶”的實驗方法。(8 points)
6. Action potential firing can be at a high frequency. How high do you expect the frequency can be? Why? (10%)
7. How do you prove a chemical extracted from brain lysate is a neurotransmitter? (10%)
8. Benzodiazepine can be used to treat insomnia (失眠) and anxiety. How does it work? (10%)
9. Explain the following terms, 4% each
 - A. The enteric division of the ANS
 - B. Leptin
 - C. Sexual dimorphisms
 - D. Broca's limbic lobe
 - E. Pulvinar nucleus