

※ 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。

1. Please define the following terms (3 points each)

- (a) Neurotrophins
- (b) Neurofilaments
- (c) Blood-brain barrier
- (d) Excitatory postsynaptic potential
- (e) Golgi stain

2. Please answer below questions.

- (a) Please describe specific brain regions that have adult neurogenesis. (4 points )
- (b) How do you examine adult neurogenesis in animals? (3 points)
- (c) What is the importance of adult neurogenesis? (3 points)

3. Please explain below terms.

- (a) Neurogenesis (2 points)
- (b) Neural progenitors (2 points)
- (c) Synaptic plasticity (2 points)
- (d) Critical periods during brain development (2 points)
- (e) Neuromuscular junction (2 points)

4. Please explain how synapses are formed and eliminated during neurodevelopment and its significance (7 points).

5. Please design an experiment to address whether experience is critical for neurodevelopment. Please include the rationales for your experiment (8 points).

6. The dopamine system is involved in the reward circuit, and is also implicated in several neuropsychiatric disorders, including schizophrenia and Parkinson's disease. Please detail these three patho/physiological roles of dopamine. (12 points)

7. How much do you know NMDA receptors and GABA receptors? (13 points)

8. Please describe how you are going to understand the relationship between the brain and behavior with molecular, cellular and systematic research approaches. (9 points)

9. Please describe what you know about the pros and cons of laboratory and clinical researches in understanding biological mechanisms of behavior. (8 points)

10. Please describe what you know about possible mechanisms that may explain the decline of learning and memory during aging. Based on your understanding, what possible approaches are you going to adapt to prevent or alleviate the aging effect? (8 points)