

## 一、知覺心理學問答題 (6 題，共 50 分)

1. (15 分) Functional segregation is an important property of the visual system both in sub-cortical and cortical levels.

- a) Please describe the neural pathways for function segregation from the retina to the temporal-parietal regions.
- b) Please provide one electrophysiological and one psychophysical evidence for subcortical functional segregation.
- c) Please provide one electrophysiological evidence for functional segregation in each of the early visual cortical areas (V1 & V2).
- d) Please provide one electrophysiological or evidence for functional segregation in the parietal and temporal cortices.
- e) Please provide one psychophysical evidence for functional segregation in the cortical level.

2. (8 分) Briefly describe the major principle of Békésy's place theory of hearing. Please provide one evidence that support Békésy's theory and one evidence contradict it.

3. (5 分) Suppose that you want to identify the location of a sound source. With visual cue only, after 10 measurements, the participants reported that the perceived object location was at 30 degree to the right, with standard deviation 1 degree. With auditory cue only, the participants reported that the location was at 34 degree to the right with standard deviation 3 degree. What would the perceived location of the object if both the visual and auditory cues are available to the participants.

4. (6 分) Recent advance in Artificial Intelligent technology has a dramatically influence on neuroscience research in general and perception research in particular. Please provide an example, with a reasonable detail, on how to apply machine learning techniques to solve problems in perception research. Your answer should a). Identify the problem; b) describe how the technique was applied; and c) show how the problem was solved. You can use the examples provided in the textbooks, but you are not limited to those. You are welcomed to provide latest examples not yet in the textbooks.

5. (8 分) Please describe the functions of the following neural mechanisms:

- a) Cones
- b) Fusiform gyrus
- c) Meissner corpuscle
- d) Mirror neuron

6. (8 分) Both Gestalt theory (e.g., Wertherheimer) and Likelihood theory (e.g., Helmholtz) have strong influence on perception research. Please, a) in the context of perceptual grouping, compare these two approaches; b) provide one evidence that supports Gestalt theory and one contradicts it; and c) provide one evidence that supports Likelihood theory and one contradicts it.

二、生理心理學名詞解釋題 (10 題，每題 3 分，共 30 分)

1. Partial agonist
2. Autocrine communication
3. Tonic and phasic receptors in the somatosensory system
4. Narcolepsy
5. vestibulo-ocular reflex
6. muscular dystrophy
7. Klüver and Bucy syndrome
8. Hebbian synapse
9. typical and atypical antipsychotics
10. Prosopagnosia

三、生理心理學問答題 (2 題，每題 10 分，共 20 分)

1. 請說明下列探索大腦方法的原理和內容，及其主要的應用範疇。
  - a) 功能性磁振造影 (*functional magnetic resonance imaging*)
  - b) 單細胞紀錄法 (*single-unit recording*)
  - c) 腦電波 (*electroencephalograms*)
  - d) 光基因刺激 (*optogenetic stimulation*)
2. 請說明下列兩個跟注意力相關的神經網絡，其涵蓋的主要大腦結構及其功能。
  - a) the dorsal frontoparietal network
  - b) the right temporoparietal network

試題隨卷繳回