

注意：第一大題選擇題，考生應作答於「答案卡」。

第一大題：選擇題 (40 題，每題 1.5 分，共計 60 分)

1. Using Weber's Law, if the discrimination threshold for a 100 gram weight standard is 2 grams, then the discrimination threshold when using a 200 gram standard would be ____ grams.
(A) 0.02 (B) 2
(C) 4 (D) 50
2. Rushton demonstrated that the physiological mechanism behind dark adaptation is
(A) visual pigment regeneration. (B) the enzyme cascade.
(C) modular organization. (D) photon remission.
3. A neuron with an excitatory center- inhibitory surround receptive field will respond most when we stimulate
(A) only the center. (B) only the surround.
(C) both the center and surround together. (D) part of the surround.
4. Unlike simple cells, complex cells respond best to
(A) stationary spots of light. (B) small spots of light.
(C) moving stimuli. (D) stationary lines of any orientation.
5. An electrode is placed in an orientation column that responds best to orientations of 135 degrees. The adjacent column of cells will probably best respond to orientations of
(A) 45 degrees. (B) 130 degrees.
(C) 90 degrees. (D) 225 degrees.
6. Activity in the PPA
(A) reveals a preference for indoor, but not outdoor, scenes.
(B) is higher for pictures of empty rooms than furnished rooms.
(C) reveals a preference for body parts over faces.
(D) is the same for pictures of furnished and empty rooms.
7. Gestalt psychologists used the example of illusory contours to support the claim that
(A) perceptions are formed by combining sensations.
(B) vision can be modeled on computer processing.
(C) the whole is different than the sum of its parts.
(D) experience determines perceptual interpretation.
8. When presented with superimposed images of a house and a face, Mack is asked to focus on the house. This attentional "focus" results in
(A) increased activity in the FFA. (B) increased activity in the MT.
(C) increased activity in the PPA. (D) similar activation changes in the FFA and PPA.

見背面

9. Which statement is true concerning the focus of expansion?
- (A) It always occurs at the point you are fixated on.
 - (B) It always occurs at the point you are moving toward.
 - (C) It continues in the same direction once established.
 - (D) It always contains the fastest flow of information.
10. Tom is watching Terri walk across the room. According to Gibson, Tom perceives Terri
- (A) to be moving because her image is moving across his retina.
 - (B) to be stationary because the background is stationary.
 - (C) to be moving because of a local disturbance in the optic array.
 - (D) to be moving because the background texture is moving across his retina.
11. Presenting transcranial magnetic stimulation to the area of the STS in humans
- (A) increased the person's ability to perceive biological motion.
 - (B) decreased the person's ability to perceive biological motion.
 - (C) did not affect the person's ability to perceive biological motion.
 - (D) resulted in gender difference in perceiving biological motion.
12. Which statement below best describes the current consensus on the theories of color vision?
- (A) The physiological support for the trichromatic theory is greater than the support for the opponent-process theory.
 - (B) The physiological evidence for the opponent-process theory has shown that the trichromatic theory is incorrect.
 - (C) The psychophysical evidence for the trichromatic theory has shown that the opponent-process theory is incorrect.
 - (D) The physiology of the cone receptors and the discovery of opponent cells in the retina and LGN show that both theories are correct.
13. Which of the following depth cues is effective both from 0-2 meters and above 30 meters?
- (A) atmospheric perspective
 - (B) occlusion
 - (C) accommodation
 - (D) convergence
14. The key to the Ames Room illusion is
- (A) the room is constructed of trapezoids, but looks rectangular to the observer.
 - (B) the room is constructed of rectangular walls, but looks trapezoidal to the viewer.
 - (C) people of a wide range of physical heights are put in the room.
 - (D) all depth cues except binocular disparity are eliminated.
15. Békésy's place theory of hearing proposes that the frequency of a sound is
- (A) based on how much the inner hair cells are bent.
 - (B) based on how much the outer hair cells are bent.
 - (C) based on whether the sound is processed through the round window or the oval window.
 - (D) the place along the organ of Corti at which the nerve firing is highest.

16. Interaural level differences are a cue to auditory localization because the
- (A) person's head creates an acoustic shadow that prevents high-frequency sounds from reaching the far ear.
 - (B) person's head creates an acoustic shadow that prevents low-frequency sounds from reaching the far ear.
 - (C) medium through which the sound travels can be air, liquid, or solid.
 - (D) acoustic shadow is more likely to occur in an enclosed space than outdoors.
17. A person with Wernicke's aphasia
- (A) has damage to an area of the occipital cortex.
 - (B) can comprehend words, but can't produce speech.
 - (C) can easily isolate phonemes, but have trouble with word segmentation.
 - (D) produces fluent speech, but in nonsensical "word salads."
18. Jimmy looks at a picture of a side of a submarine that has dents and bumps on it. When he turns the picture upside-down, what he originally perceived as bumps, now look like dents, and vice versa. This is due to
- (A) figure-ground reversal.
 - (B) the oblique effect.
 - (C) accidental properties of light.
 - (D) the "light-from-above" heuristic.
19. The area on the retina that influences the firing rate of the neuron is called the
- (A) receptive field.
 - (B) amacrine region.
 - (C) divergence area.
 - (D) inverted fovea.
20. Prosopagnosia is
- (A) the difficulty recognizing familiar faces.
 - (B) due to damage to the parietal lobe.
 - (C) due to damage to the MT cortex.
 - (D) the inability to detect movement.
21. Which of the following is supported by phrenology?
- (A) The brain functions as a whole.
 - (B) There is some localization of function in the brain.
 - (C) Visual processing occurs in several lobes of the brain.
 - (D) There is more than one brain area that is responsible for aggression.
22. Which region of the cortex is crucial for motor control?
- (A) Postcentral gyrus
 - (B) Parietal lobe
 - (C) Precentral gyrus
 - (D) Prefrontal cortex
23. Some neurons lack which of the following components?
- (A) Nucleus
 - (B) Dendrite
 - (C) Axon
 - (D) Myelin
24. Action potentials generally are not propagated along dendrites because they have
- (A) few voltage-gated ion channels.
 - (B) sodium channels.
 - (C) no myelin.
 - (D) mitochondria.

25. The term "kindling" refers to
 (A) the experimental induction of seizures using subthreshold stimuli.
 (B) an experimental procedure for blocking the spread of seizures.
 (C) the application of massive depolarizing stimuli to a brain region.
 (D) the net effect of integrating postsynaptic potentials at the axon hillock.
26. Most antipsychotic medications act by blocking _____ receptors.
 (A) serotonergic (B) dopaminergic
 (C) cholinergic (D) muscarinic
27. The dopamine-containing fibers of the mesolimbocortical system originate in the
 (A) substantia nigra. (B) locus coeruleus.
 (C) raphe nucleus. (D) ventral tegmental area.
28. Which of the following statements about oxytocin and vasopressin is false?
 (A) They are secreted in response to hypothalamic releasing hormones.
 (B) They are peptide hormones.
 (C) They are posterior pituitary hormones.
 (D) They are synthesized in cell bodies of the hypothalamus.
29. Which of the following observations provides evidence for the effect of steroids on gene transcription?
 (A) Taking birth control pills prevents pregnancy.
 (B) Stress hormones can increase heart rate.
 (C) Growth hormone causes growth in children.
 (D) Body builders that take testosterone have increased growth of muscle cells.
30. The receptive fields associated with Merkel's discs
 (A) have an inhibitory surround. (B) are large with vague borders.
 (C) are slow-adapting. (D) have an excitatory surround.
31. Which of the following is not part of the vestibular system?
 (A) Saccule (B) Semicircular canals
 (C) Eustachian tube (D) Utricle
32. Which of the following best describes the Wernicke-Geschwind model of aphasia?
 (A) Global (B) Connectionist
 (C) Gestalt (D) Atomistic
33. In fear conditioning, the central nucleus of the amygdala transmits information through the _____ to evoke hormonal responses.
 (A) bed nucleus of the stria terminalis (B) lateral hypothalamus
 (C) central (periaqueductal) gray (D) septal nuclei

34. Depriving a monkey of vision in one eye early in life results in
- (A) the absence of neural activity in brain cells on the same side.
 - (B) the absence of responses elicited by the deprived eye.
 - (C) profound ocular dominance.
 - (D) minimal long-lasting changes.
35. Entrainment of circadian rhythms refers to the process by which
- (A) the periodic oscillations of an animal's activity are dampened.
 - (B) the length of a typical day is extended.
 - (C) the rhythms of an animal's activities are synchronized and shifted.
 - (D) a free-running process is established.
36. Mental rehearsal of a complex motor task in humans is associated with
- (A) greater metabolic activity in the primary motor cortex.
 - (B) enhanced metabolic activity in the primary motor cortex, somatosensory cortex, and supplementary motor cortex.
 - (C) increased blood flow only in the supplementary cortex.
 - (D) increased blood flow only in the visual cortex.
37. One of the effects of long-term exposure to stress may be cell loss in the hippocampus, which could be produced by sustained exposure to
- (A) acetylcholine.
 - (B) glucocorticoids.
 - (C) serotonin.
 - (D) norepinephrine.
38. The increase of cortical thickness with enriched experience is probably mainly due to the increased
- (A) size of synaptic junctions.
 - (B) number of dendritic spines.
 - (C) branching of dendrites.
 - (D) fluid content of cortical tissue.
39. "Inhibition of return" refers to
- (A) the conscious inhibition of the feature search in a previously attended spatial location.
 - (B) impaired detection of stimuli at the former location of the task-irrelevant cue.
 - (C) the search for a sought-after item.
 - (D) the "popping out" into awareness of a task-irrelevant item.
40. An on-center/off-surround cell responds most strongly when
- (A) the entire center and surround are illuminated.
 - (B) a spot of light illuminates part of the center.
 - (C) the entire center is illuminated.
 - (D) a spot of light illuminates part of the surround.

第二大題：問答申論題 (8 題，每題 5 分，共計 40 分)

1. State, define, and give an example (in words and/or drawings) for each of any five Gestalt principles of perceptual organization (1pt each).
2. Does retinal physiology support the trichromatic theory, opponent-processing theory, or both? Support your answer. (5pts)
3. Why convergence of the rods results in increased sensitivity, but decreased acuity (2.5 pts) and why the lack of convergence in the foveal cones results in decreased sensitivity, but increased acuity (2.5pts)
4. Please name and describe the three levels of analysis for a visual system proposed by Marr (1982) (1 pt. each) and provide an example to illustrate these levels (2pts)
5. 跟失語症(aphasia)相關的兩個理論為：(1) Wernicke-Geschwind model of aphasia；(2) the motor theory of aphasia。請說明這兩個理論的內容，並比較其異同。
6. 杏仁核(amygdala)是大腦處理害怕制約(fear conditioning)的主要結構。請說明跟害怕制約相關的大腦神經網絡，包括外界訊息如何抵達杏仁核，以及杏仁核如何將此訊息透過不同結構影響不同層面的生理反應。
7. 生物體內有許多不同形態的神經傳導物質(neurotransmitter)。請任選其中的兩種，就下列的四個面向加以說明：(1)該物質在大腦何處產生？(2)產生後會傳遞到那些大腦結構？(3)該物質作用的受器(receptor)類型為何？(4) 該物質與那些生理功能及疾病相關？
8. 聽覺系統如何運用雙耳線索及單耳線索偵測聲音的位置？請描述相關的大腦結構，以及這些結構如何偵測聲音來源的位置及方向(左右、上下等)。

試題隨卷繳回