

一. 單選題 (每題 3%)

1. Which of the following ions is pumped into the cell by the Na⁺-ATPase? (A) Na⁺ (B) K⁺ (C) organic anion (D) none of the above
2. Which of the following events on the membrane underlies the depolarization of an action potential? (A) Na⁺ influx (B) Na⁺ efflux (C) K⁺ influx (D) K⁺ efflux.
3. Which of the following is an electric synapse? (A) gap junction (B) axo-somatic synapse (C) axo-dendritic synapse (D) neuro-muscular junction
4. Which of the following structure in the skeletal muscle cell binds with Ca⁺⁺ to initiate myosin-actin association? (A) myosin light chain (B) myosin heavy chain (C) troponin C (D) 1, 25-dihydroxycholecalciferol
5. Which of the following is the neurotransmitter mediating synaptic transmission in the neuromuscular junction? (A) acetylcholine (B) glutamate (C) gamma-amino butyric acid (D) glycine
6. Which of the following adrenergic receptor mediates the chronotropic effect of the heart? (A) alpha 1 (B) alpha 2 (C) beta 1 (D) beta 2
7. Which of the following area mediates the sensory function of language? (A) Broca's area (B) Wernick's area (C) Willson's area (D) Barrinton's area
8. Which of the following is the most common brain wave coming from the frontal lobe during rapid eye movement sleep? (A) α wave (B) β wave (C) θ wave (D) δ wave
9. Which of the following is a thrombolytic agent? (A) urokinase (B) heparin (C) warfarin (D) ammonium oxalate
10. Which of the following catalyzes angiotensinogen to angiotensin I? (A) angiotensin converting enzyme (B) renin (C) aldosterone (D) lorsatan
11. Which of the following segments is characterized by a high elasticity? (A) aorta (B) arteriole (C) capillary (D) venule
12. Which of the following decreases the glomerular filtration rate? (A) afferent arteriole vasoconstriction (B) vasa recta vasoconstriction (C) efferent arteriole vasoconstriction (D) peritubular capillary vasoconstriction
13. Which of the following is the diuretic that could result in hyperkalemia (abnormally elevated blood [K⁺]) as a side effect? (A) furosemide (B) hydrochlorothiazide (C) spironolactone (D) amiloride
14. Which of the following is the main form that carbon dioxide is transported in the blood? (A) dissolved CO₂ (B) hemoglobin-bounded CO₂ (C) bicarbonate (D) liquid CO₂
15. Which of the following will be increased in corresponding to an increased alveolar dead space? (A) physiological dead space (B) anatomical dead space (C) both physiological and anatomical dead spaces (D) neither physiological nor anatomical dead space
16. Which of the following is a condition of restrictive pulmonary disease? [FEV₁: forced expiratory volume at the 1st second; VC: vital capacity] (A) FEV₁/VC > 0.7, VC > 0.8 of normal (B) FEV₁/VC < 0.7, VC normal (C) FEV₁/VC > 0.7, VC normal (D) FEV₁/VC > 0.7, VC < 0.8 of normal

17. Which of the following is the neural reflex triggering the mass movement in the colon? (A) gastro-colic reflex (B) Bambridge reflex (C) Bazold-Jarisch reflex (D) pontine-geniculate-occipital spike
18. Which of the following is a propulsive wave? (A) peristalsis (B) segmentation (C) haustration (D) none of the above
19. Which of the following is released from the neurohypophysis (posterior lobe of the pituitary gland) into the blood stream? (A) growth hormone releasing hormone (B) thyrotropin releasing hormone (C) corticotropin (D) anti-diuretic hormone
20. Which of the following releases insulin-like grow factor 1? (A) paraventricular nucleus of hypothalamus (B) adenohypophysis of the pituitary gland (C) the liver (D) the osteocyte

二. 問答題 (每題 10%)

1. Give a diagram illustrating the pressure-volume relationship of the left ventricle during a cardiac cycle, and specify each stage in the cycle, please. (10%)
2. Give the Starling equation, which defines the fluid exchange in the capillary; and explain which and how factors affect the outcome of fluid exchange, please. (10%)
3. Compare and contrast "ventilation-limited" from "perfusion-limited" conditions in patients complaining of dyspnea (difficult in respiration), please. (10%)
4. Please explain the rationale and method for measuring glomerular filtration rate using inulin. (10%)