

一、單選題(每題 2.5 分，共計 100 分) 答錯不倒扣。

1. During animal behavior development, sensitive period is:
  - A. It describes during a developing period animals are sensitive to itching.
  - B. It describes during a developing period animals are paranoid.
  - C. It describes during a developing period, long-term memory formations have impacts on animal behavior.
  - D. Sensitive period in animal behavior development means animals are trying to find mate.
  - E. None of these descriptions above.
2. Which of the following description of optimal foraging model is correct ?
  - A. A model of balancing risk and reward when animals forage.
  - B. Longer the foraging path, more preys animals can get. Therefore animals have the tendency to maximizing foraging paths.
  - C. It indicates the most efficient way of killing a prey once animals get it.
  - D. It describes how a predator consume their prey.
  - E. None of these descriptions above.
3. Monogamous relationship is
  - A. One male mates with one female.
  - B. One sex mates with several of other sex.
  - C. One male mates with many females.
  - D. One female mates with many males.
  - E. None of above.
4. Polyandry relationship is
  - A. One male mates with one female.
  - B. One sex mates with several of other sex.
  - C. One male mates with many females.
  - D. One female mates with many males.
  - E. None of above.
5. Polygyny relationship is
  - A. One male mates with one female.
  - B. One sex mates with several of other sex.
  - C. One male mates with many females.
  - D. One female mates with many males.
  - E. None of above.

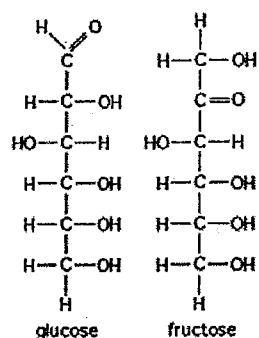
6. Polygamous relationship is
- A. One male mates with one female.
  - B. One sex mates with several of other sex.
  - C. One male mates with many females.
  - D. One female mates with many males.
  - E. None of above.
7. Population ecologists are primarily interested in
- A. Understanding how biotic and abiotic factors influence the density, distribution, size, and age structure of populations.
  - B. The overall vitality of a population of organisms.
  - C. How humans affect the size of wild populations of organisms.
  - D. Studying interactions among populations of organisms that inhabit the same area.
  - E. How populations evolve as natural selection acts on heritable variations among individuals and changes in gene frequency.
8. Dispersion patterns tend to be highly dependent on the spatial scale of the observer. For example, football players lined up on the scrimmage line are clumped at the scale of 100 yards but uniformly dispersed at the scale of a meter. An example of animals that are likely to be clumped at a large scale but uniformly distributed at a small scale is
- A. Buffalo grazing on a prairie.
  - B. Bluegills swimming in a northern lake.
  - C. Ant nests in an abandoned field.
  - D. Red-winged blackbirds in a cattail marsh.
  - E. All of the above.
9. Disturbance is an important component of succession because it
- A. Removes keystone species.
  - B. Changes the biome from one kind to another.
  - C. Introduces invasive species.
  - D. Is associated with humans.
  - E. Tends to promote earlier successional stages.

10. Unlike energy, matter cycles. This means that
- A. An ecosystem cannot lose chemicals from it.
  - B. Ecosystems can acquire chemicals that are used up from other ecosystems.
  - C. When models are built for ecosystems, all of the materials should be able to be accounted for.
  - D. Matter is being continually converted into heat and back into matter.
  - E. Chemicals contain energy, but energy doesn't contain chemicals.
11. Gross primary productivity is higher than net primary productivity. The difference between the two is
- A. The amount of energy producers burn when they metabolize.
  - B. Typically the ratio between the biomass of producers and the biomass of consumers.
  - C. An important measure of ecosystem productivity.
  - D. Energy that is lost into outer space due to metabolic inefficiencies.
  - E. Energy that is stored in plant tissues.
12. Why are big, predatory animals rare? Most big, predatory animals are tertiary consumers, which implies that
- A. typically, they are highly territorial.
  - B. It's hard for an ecosystem to support many of them because so much energy is lost at each level of energy exchange.
  - C. By overexploitation, humans have caused many predatory species to become endangered.
  - D. It takes a long time for big, predatory animals to evolve.
  - E. It's hard for a big animal to move through dense vegetation
13. A localized group of organisms that belong to the same species is called a \_\_\_\_\_.
- A. community
  - B. family
  - C. ecosystem
  - D. population
  - E. Biosphere
14. How many electrons are involved in a triple covalent bond?
- A. 3
  - B. 6
  - C. 9
  - D. 12
  - E. 15

15. What is the hydroxyl ion (OH<sup>-</sup>) concentration of a solution of pH 8?

- A. 8 M
- B.  $8 \times 10^{-6}$  M
- C.  $10^{-6}$  M
- D.  $10^{-8}$  M
- E.  $8 \times 10^{-8}$  M

16. Use the following figure to answer the question.



The figure shows the structures of glucose and fructose. These two molecules are \_\_\_\_\_.

- A. isotopes
  - B. cis-trans isomers
  - C. enantiomers
  - D. epimers
  - E. structural isomers
17. Which polysaccharide is an important component in the structure of many animals and fungi?
- A. chitin
  - B. cellulose
  - C. amylopectin
  - D. amylose
  - E. starch
18. \_\_\_\_\_ is a regulatory mechanism in which the end product of a metabolic pathway inhibits an enzyme that catalyzes an early step in the pathway.
- A. Allosteric inhibition
  - B. Cooperative inhibition
  - C. Feedback inhibition
  - D. Metabolic inhibition
  - E. Competitive inhibition

19. Which of the following is the most common pathway taken by a newly synthesized protein that will be secreted by a cell?
- A. rough ER → Golgi → transport vesicle → nucleus
  - B. Golgi → rough ER → lysosome → transport vesicle → plasma membrane
  - C. rough ER → lysosome → transport vesicle → plasma membrane
  - D. rough ER → Golgi → transport vesicle → plasma membrane
  - E. nucleus → endosome → Golgi → transport vesicle → plasma membrane
20. In some cells, there are many ion electrochemical gradients across the plasma membrane even though there are usually only one or two proton pumps present in the membrane. The gradients of the other ions are most likely accounted for by \_\_\_\_\_.
- A. osmosis
  - B. ion channels
  - C. pores in the plasma membrane
  - D. passive diffusion across the plasma membrane
  - E. cotransport proteins
21. One of the major categories of receptors in the plasma membrane functions by forming dimers, adding phosphate groups, and then activating relay proteins. Which type does this?
- A. G protein-coupled receptors
  - B. receptor tyrosine kinases
  - C. steroid receptors
  - D. ligand-gated ion channels
  - E. glycolipid
22. Which electron carrier(s) function in the citric acid cycle?
- A. NAD<sup>+</sup> only
  - B. ADP and ATP
  - C. the electron transport chain
  - D. NADH and FADH<sub>2</sub>
  - E. Glucose
23. Which of the following sequences correctly represents the flow of electrons during photosynthesis?
- A. NADPH → O<sub>2</sub> → CO<sub>2</sub>
  - B. NADPH → chlorophyll → Calvin cycle
  - C. H<sub>2</sub>O → NADPH → Calvin cycle
  - D. NADPH → electron transport chain → O<sub>2</sub>
  - E. Pyruvate → ATP → Calvin cycle

24. At the M phase checkpoint, the complex allows for what to occur?
- A. Separase enzyme cleaves cohesins and allows chromatids to separate
  - B. Cohesins alter separase to allow chromatids to separate
  - C. Daughter cells are allowed to pass into G<sub>1</sub>
  - D. All microtubules are made to bind to kinetochores
  - E. Kinetochores are able to bind to spindle microtubules
25. Which of the following is correctly paired?
- A. forebrain – cerebral cortex
  - B. midbrain - hypothalamus
  - C. hindbrain - thalamus
  - D. diencephalon – medulla oblongata
26. Which one serves as the gateway to the cortex for the sensory systems.
- A. Basal Nuclei
  - B. Amygdala
  - C. Thalamus
  - D. Corpus Callosum
27. Which of the following actions is controlled by the parasympathetic nervous system?
- A. Constricts pupil of eye
  - B. Inhibits activity of stomach and intestines
  - C. Accelerates heart
  - D. Stimulates adrenal medulla
28. What enhances the neural signal conduction speed along the axon in central nervous system?
- A. Oligodendrocytes
  - B. Schwann Cell
  - C. Microglia
  - D. Astrocyte
29. Which ion channels make the inside of the cell more positive and having an increase in magnitude of the membrane potential during action potential generation?
- A. K
  - B. Cl<sup>-</sup>
  - C. Ca<sup>2+</sup>
  - D. Na<sup>+</sup>

科目 普通生物學

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30. The receptor of dynamic equilibrium is associated with \_\_\_\_\_.
- A. electromagnetic receptors
  - B. mechanoreceptors
  - C. thermoreceptors
  - D. chemoreceptors
31. The central sulcus separates the \_\_\_\_\_ from the \_\_\_\_\_.
- A. temporal lobe; frontal lobe
  - B. frontal lobe; parietal lobe
  - C. prefrontal lobe; frontal lobe
  - D. occipital lobe; temporal lobe
32. The Sodium-potassium pump use ATP to actively transport \_\_\_ Na<sup>+</sup> out of the cell and \_\_\_ K<sup>+</sup> into the cell.
- A. 2; 3
  - B. 1; 1
  - C. 3; 2
  - D. 4; 2
33. Patients who have brain damage at \_\_\_\_\_ area is able to understand language but unable to speak, while patients who have brain damage at \_\_\_\_\_ area is abolished the ability to comprehend speech but not the ability to speak?
- A. Wernicke's ; temporal
  - B. frontal ; Wernicke's
  - C. parietal ; frontal
  - D. Broca's ; parietal
34. Which is not mainly associate with motor control and movement?
- A. Thalamus
  - B. Basal Ganglia
  - C. Hindbrain
  - D. Amygdala
35. In the first step of starch digestion, starch is converted to \_\_\_\_\_, which is then digested to \_\_\_\_\_ by the enzyme maltase.
- A. glucose; maltose
  - B. amino acids; proteins
  - C. maltose; glucose
  - D. fat; glycerol and 3 fatty acids

36. Arrange the following steps of mammalian inspiration (inhalation) in the proper sequence.
- Diaphragm contracts and moves down
  - Rib cage moves up and out
  - Thoracic cavity expands and thoracic pressure decreases
  - Air flows into the lungs
- b, a, d, c
  - a, b, c, d
  - b, d, a, c
  - d, c, a, b
37. Which is NOT a function of the kidneys?
- monitoring and maintaining blood pH
  - regulating blood pressure by regulating salt balance in the blood
  - elimination of nitrogenous wastes including urea, uric acid, and creatinine
  - production of water from oxygen and bicarbonate ions ( $\text{HCO}_3$ )
38. In humans, the central nervous system consists of the \_\_\_\_\_, which is housed in the \_\_\_\_\_ and the \_\_\_\_\_, which is housed in the \_\_\_\_\_.
- peripheral nervous system; limbs; brain; skull
  - brain; skull; spinal cord; vertebral column
  - spinal cord; vertebral column; sensory neurons; limbs
  - brain; vertebral column; spinal cord; skull
39. Which of the following statements about axonal membranes is NOT true?
- The resting potential of a typical neuron is -65 mV
  - There is an electrical potential difference across a neuron's membrane
  - The polarity correlates with a difference in ion distribution across the membrane
  - At rest, there is a higher concentration of sodium ions inside the axon
40. At night, we see primarily black and white and shades of gray, except near lights where some color is still evident. This is outward evidence of what internal anatomy?
- Cones detect the color of an object, and are activated by bright light
  - The retina has a circadian rhythm
  - The lens filters differentially the many wavelengths of light
  - The vitreous humor filters much light, and daytime intensity is necessary to get colored light through to the retina