

# Biology

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1. If an interphase cell is treated with cyanide (a metabolic poison), the cell does not divide by mitosis. However, if cyanide is added right after mitosis has started, the same cell completes mitosis. Which of the following explains this observation?
  - A. Metabolic activity ceases during mitosis
  - B. Cell division does not require metabolic activity
  - C. Energy required for mitosis is produced and stored in the cell during interphase
  - D. Mitotic cells make factors that make them resistant to cyanide
2. The symplast pathway is most easily disrupted when
  - A. Water transport channels in the plasma membrane of the root hair cells malfunction
  - B. Water transport channels in the plasma membrane of the root cortex malfunction
  - C. Water transport channels in the plasma membrane of the root endodermis malfunction
  - D. Water transport channels in the plasma membrane of the guard cells malfunction
3. Paleontological studies use fossil pollen because
  - A. Pollen retains viability for long periods of time unlike male gametes in animals
  - B. The intine of pollen is very hard and stable and can be used in rescuing plant populations on a decline
  - C. The exine of pollen retains its structure for long periods of time
  - D. Soil pollen banks, unlike soil seed banks, stay dormant for long periods of time
4. Which of the following is not an assumption of the Hardy-Weinberg principle?
  - A. Mating is random in the population
  - B. There are no mutations
  - C. All individuals have an equal opportunity to survive and reproduce
  - D. Immigration and emigration occurs in the population
5. The lens of many vertebrate eyes is a crystallized form of a protein that also functions in digestion as a metabolic enzyme. This shows that
  - A. Vision and digestion co-evolved
  - B. Digestion necessarily evolved prior to vision since it is a more basic function
  - C. Evolution is opportunistic
  - D. Vision and digestion evolved around the same time
6. On which segment of the human chromosome is the enzyme Reverse Transcriptase located?
  - A. Centromere
  - B. Telomere
  - C. Kinetochore

- D. Satellite
7. Muscle X and muscle Y are of the same size, but muscle X is capable of much finer control than muscle Y. Which of the following is likely to be true of muscle X?
- A. It is controlled by more neurons than muscle Y
  - B. It contains fewer motor units than muscle Y
  - C. It is controlled by fewer neurons than muscle Y
  - D. Each of its motor units consists of more cells than the motor units of muscle Y
8. A National Park associated with rhinoceros is
- A. Kaziranga
  - B. Corbett
  - C. Ranthambore
  - D. Valley of Flowers
9. During HIV infection
- A. Number of helper T-lymphocytes increase
  - B. Number of helper T-lymphocytes decrease
  - C. Number of red blood cells increase
  - D. Number of red blood cells decrease
10. If the blood groups of the father and mother are AB and B respectively, then which one of the following statements is true with respect to their children's blood group?
- A. Blood group is either A or B
  - B. Blood group is either B or AB
  - C. Blood group is AB only
  - D. Blood group can be A or B or AB
11. The sequence of DNA is 5'-ATGGTTCATC-3'. What is the sequence of the complimentary RNA strand?
- A. 5'-TACCAAGGTAG-3'
  - B. 3'-TACCAAGGTAG-5'
  - C. 3'-UACCAAGGUAG-5'
  - D. 5'-UACCAAGGUAG-3'
12. Which one of the following statements is correct with respect to Biochemical Oxygen Demand (BOD)?
- A. Secondary treatment of effluent decreases the BOD
  - B. Secondary treatment of effluent increases the BOD
  - C. Secondary treatment of effluent does not change the BOD
  - D. Secondary treatment of effluent first increases and then decreases the BOD

13. Which of the following is a general nature of plant-pollinator interactions?
- A. Tight one to one co-evolutionary partnership
  - B. A plant species is pollinated by a few pollinator species
  - C. Plants rely on deceit to achieve pollination by pollinator species
  - D. Most pollinators benefit the plant by providing pollinator services, but disadvantage the plant at the same time by laying eggs into the flower and thereby negatively affects fruit formation
14. Sickle cell anemia is a disease resulting from altered haemoglobin structure. This alteration is because of the replacement of a glutamic acid with valine. Identify the protein structure level where this change has been made
- A. Primary
  - B. Secondary
  - C. Tertiary
  - D. Quaternary
15. Which of the following life history adaptations is least likely when predation pressure, on a fish species that grows in size continuously throughout its lifespan, is concentrated on the larger individuals
- A. Allocate more resources preferentially to early reproduction than to growth
  - B. Allocate more resources preferentially to growth than to early reproduction
  - C. Sexual maturity at an early age
  - D. Produce more offspring in very few reproductive seasons