

# 1 General Biology

1. Endosperm of flower plants is usually
  - A. haploid
  - B. diploid
  - C. triploid
  - D. tetraploid
  - E. anuclear
2. Coat colour in mice is affected by mutations in genes coding for:
  - A. hyaluronidase
  - B. tyrosinase
  - C. melatonin releasing hormone
  - D. aspartate aminotransferase
  - E. glutathione synthetase
3. Which of the following is the correct description of bryophytes life cycle:
  - A. sporophyte (2n) → spores (1n) → gametophyte (1n) → gametes (1n) → fertilization → sporophyte (2n)
  - B. sporophyte (2n) → spores (2n) → gametophyte (2n) → gametes (1n) → fertilization → spores (2n) → sporophyte (2n)
  - C. sporophyte (2n) → gametes (1n) → fertilization → spores (2n) → gametophyte (2n) → gametes (1n) → sporophyte (2n)
  - D. sporophyte (4n) → spores (2n) → gametophyte (1n) → gametes (1n) → fertilization → spores (2n) → sporophyte (4n)
  - E. sporophyte (4n) → spores (2n) → gametophyte (2n) → gametes (1n) → fertilization → spores (2n) → sporophyte (4n)
4. After a severe reduction in population size, a population often has
  - I. reduced genetic variability
  - II. ability to lay eggs
  - III. reduced genome size
  - IV. increased risk of extinction
  - V. accelerated life cycle
  - A. I, II
  - B. I, III, V
  - C. I, IV
  - D. III, IV, V
  - E. IV
5. The light-dependent phase of photosynthesis requires
  - A. Light , H<sub>2</sub>O, and CO<sub>2</sub>
  - B. Light , H<sub>2</sub>O, P<sub>i</sub>, and ADP
  - C. Light , H<sub>2</sub>O, P<sub>i</sub>, ADP, and NADP<sup>+</sup>
  - D. Light , H<sub>2</sub>O, P<sub>i</sub>, ADP, NADP<sup>+</sup>, and CO<sub>2</sub>
  - E. Light , H<sub>2</sub>O, P<sub>i</sub>, ADP, NADPH, and CO<sub>2</sub>

## 2 Neurobiology

6. Pons is a part of
  - A. Basal ganglia
  - B. Brainstem
  - C. Cortical gray matter
  - D. Cerebellum
  - E. Spinal cord segment
7. Parkinsons disease
  - A. Diffusely affects the entire brain
  - B. Slows down the conduction in peripheral nerves
  - C. Defies Parkinsons laws
  - D. Can be treated by deep brain stimulation
  - E. Is more common for urban population
8. Cerebral cortex
  - A. Has five anatomical layers
  - B. Does not contain inhibitory neurons
  - C. Contains six types of neurons
  - D. Is the core structure of the cerebrum
  - E. Contains neurons with gap junctions
9. Rods and cones
  - A. Are retina ganglion cells with different electrophysiological properties
  - B. Are found only in fovea
  - C. Are segregated in the lateral geniculate nucleus
  - D. Release the same neurotransmitter
  - E. Are found in Pacinian corpuscles
10. Spinal cord
  - A. Is an elongated structure within the peripheral nervous system
  - B. Has two parts interconnected by a commissure
  - C. Contains motoneurons
  - D. Houses cranial nerves
  - E. Is responsible for the long-latency reflex

## 3 Agro-biotechnologies

11. During in vitro culture, plant hormones are added to
  - A. orient organogenesis
  - B. increase the size of regenerated plants
  - C. make the culture medium sterile

- D. Improve photosynthesis
  - E. Prevent growth of roots
12. In a closed animal population, the increase in inbreeding :
- 1. is inevitable even if it is not wanted
  - 2. is associated to a decrease of homozygosity
  - 3. leads to a loss of genetic variability
  - 4. is due to an intensive use of a large number of sires for artificial insemination (AI)
- A. all four
  - B. 1 and 3
  - C. 2 and 4
  - D. 1 and 4
  - E. 2 and 4
13. It is possible to introduce a new allele into the genome of a plant by :
- 1. mutation
  - 2. genetic transformation
  - 3. multiplication
  - 4. back-crosses
- A. all four
  - B. 1 and 2 and 3
  - C. 1 and 2 and 4
  - D. 2 and 3 and 4
  - E. 2 and 3
14. The domestication syndrome :
- A. characterizes a pathological condition common to all domesticated species
  - B. represents morphological, physiological or behavior traits that differentiate spontaneous and cultivated species
  - C. is due to pressures of natural selection
  - D. is a negative consequence of domestication
  - E. deals only with animal species
15. A scientist wants to study the level of  $\beta$ -carotene produced by two varieties of tomato that he/she wants to use as parents in a breeding program.
- 1. the level of  $\beta$ -carotene is a quantitative trait
  - 2. the production of  $\beta$ -carotene may be subject to the environmental effect
  - 3. the scientist must evaluate the 2 varieties under identical growing conditions
  - 4. If the scientist evaluates the 2 varieties under identical culture conditions then the environmental effect on the production of  $\beta$ -carotene will be null.
- A. 1 and 2 and 3
  - B. 2 and 3 and 4
  - C. 2 and 4
  - D. 2 and 3
  - E. 1 and 4