

Assignment Answers

Question 1:

Question 1: What functions could be served by axons with many boutons en passant? Describe two possibilities.

Answer: Axons with many boutons en passant could serve various functions such as integrating information from different neuronal inputs and enhancing the chance of synaptic transmission. These boutons could facilitate spatial and temporal summation of inputs for effective neuronal communication.

Assignment Answers

Question 2:

Question 2: Give two examples of behavior patterns that a reflex model of behavior (or, more broadly, an S- R model) cannot adequately explain.

Answer: Reflex models are incapable of explaining complex behaviors such as decision making and problem-solving. They also fail to account for behaviors molded by learning and memory, such as conditioned responses.

Assignment Answers

Question 3:

Question 3: What is the axons-of-passage problem one must deal with when using stains for axon degeneration for the tracing of axonal pathways and connections? What axon tracing technique overcomes this problem?

Answer: The axons-of-passage problem arises when using stains for axon degeneration because it makes it difficult to determine the origin of the axons stained. Anterograde and retrograde tracer techniques can overcome this problem as they clearly highlight the source and termination of axonal projections.

Assignment Answers

Question 4:

Question 4: Do web searches to find evidence of a primitive chordate (Haikouella). Write noting similarities to, and differences from, the lancelets (amphioxus).

Answer: Haikouella is a primitive chordate similar to amphioxus in possessing a notochord, primitive gills, and segmented muscles. However, it differs from amphioxus by having a distinct head and heart, attributes which are more streamlined with higher vertebrates.

Assignment Answers

Question 5:

Question 5: Do web searches for information on the brains of cynodonts. Start by explaining how a fossil skull can tell us anything about the brain.

Answer: Evidence about the brain structure of extinct species like cynodonts can be inferred from the fossil imprints. The impressions left by the brain on the inner neurocranium provide indirect information about the size and shape of the brain, its division into regions, and possible connections.

Assignment Answers

Question 6:

Question 6: Describe the three major expansions of the vertebrate forebrain depicted in chapter 4.

Answer: The three major expansions of the vertebrate forebrain are the development of the cerebral hemispheres, the enlargement of the olfactory bulbs, and the expansion of the diencephalon. These enhancements represent adaptive evolution to deal with complex sensory input and higher cognitive functions.