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Level: HL IB in Biology
Subject: Biology
Topic: IB HL Biology
Type: Mark Scheme

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All International Baccalaureate IB Topic Questions HL Biology

BIOLOGY

HL - IB

Key skills

****Answer 1****

Option A is correct. ****Increasing the concentration of solutes in the cell sap to lower the freezing point**** helps alpine plants prevent ice crystal formation inside their cells, thereby reducing damage during freezing temperatures.

- Option B is incorrect because deep root systems are more effective for accessing water but do not directly address the problem of freezing temperatures.
- Option C is incorrect as reducing leaf area may help reduce water loss but does not address the issue of freezing temperatures.
- Option D is incorrect because insulating hairs trap heat but may not be effective enough in extremely cold conditions.

****Answer 2****

Option B is correct. ****Utilizing wind currents and thermal updrafts to reduce the need for flapping**** helps migratory birds conserve energy during long-distance flights by taking advantage of natural air movements.

- Option A is incorrect because increasing body mass can actually increase energy expenditure, not decrease it.
- Option C is incorrect since a decreased metabolic rate would make a bird less capable of sustaining long flights.
- Option D is incorrect because nocturnal flights do not necessarily reduce energy expenditure compared to flying during the day.

****Answer 3****

Option A is correct. ****Increased production of myoglobin in muscles to enhance oxygen storage**** allows animals at high altitudes to better store and utilize the limited oxygen available.

- Option B is incorrect because decreasing heart rate would reduce oxygen delivery to tissues, which is detrimental in low-oxygen environments.
- Option C is incorrect as enhanced kidney function is not related to coping with low oxygen availability.
- Option D is incorrect because a decreased red blood cell count would further limit oxygen transport.

****Answer 4****

Option A is correct. ****Utilizing cryptic coloration to blend into the environment and avoid detection**** is an effective behavioral adaptation that helps prey species avoid predation by making them less visible to predators.

- Option B is incorrect as increasing metabolic rate would not directly help in avoiding predation.
- Option C is incorrect because bright warning colors are used by toxic animals to signal danger, not by prey to avoid it.
- Option D is incorrect because forming large social groups can increase detection risk, not decrease it.

****Answer 5****

Option A is correct. ****Secreting excess salts through specialized glands to reduce intracellular salt concentration**** helps plants manage high soil salinity by preventing salt buildup inside their cells.

- Option B is incorrect because accessing deeper soil layers does not address the issue of high soil salinity directly.
- Option C is incorrect as larger leaves would increase water loss and do not specifically address salt stress.
- Option D is incorrect because reducing the concentration of photosynthetic pigments does not solve the problem of high soil salinity.

****Answer 6****

Option A is correct. ****Enlarged eyes to enhance low-light vision and reduce the need for daytime activity**** helps nocturnal mammals in deserts see better in low light conditions, making them more effective in their nighttime environment.

- Option B is incorrect because a high metabolic rate would actually increase energy use, not conserve it.
- Option C is incorrect as thick fur is more suited to insulating against heat loss in cold environments, not for desert conditions.
- Option D is incorrect because increased water storage is not directly related to nocturnal adaptation but rather to general hydration needs.

****Answer 7****

Option A is correct. ****Increased efficiency in thermoregulation through greater heat dissipation**** is a key advantage of a high surface area to volume ratio, which helps small desert-dwelling animals regulate their body temperature in extreme heat.

- Option B is incorrect because small animals typically have less capacity to store fat due to their high surface area to volume ratio.
- Option C is incorrect as smaller animals have higher metabolic rates, not slower ones.
- Option D is incorrect because high surface area to volume ratio does not contribute to camouflage but rather to thermoregulation.
