Answers to Option C test yourself questions

1 Any three of: temperature (suitable temperature is essential for enzyme activity); light (essential for photosynthesis); water (essential for photosynthesis and transport of dissolved substances); breeding sites (essential for animals, must be safe and within reach of food); food supply (animals need a source of food to survive).

2 Competitive exclusion occurs if two different species require the same resource, which is in short supply. No two species can occupy the same niche, so one will dominate and exclude the other.

3 The fundamental niche is the potential mode of existence of a species, whereas the realised niche is the actual mode of existence the species has as a result of competition from or interaction with other species.

4 An open system exchanges both matter and energy across the boundaries of the system. A closed system exchanges energy but not matter across the boundaries of the system.

5 Food conversion ratio (FCR) is a measure of an animal's efficiency in converting food mass into increased body mass (biomass). It is calculated by dividing the mass of food eaten by the gain in body mass over a period of time.

6 rainfall, temperature

7 An alien species is one that is not native to the ecosystem in which it is found. It may have been introduced either accidentally or deliberately.

8 Biomagnification is the process that leads to the accumulation of chemical substances in food chains so that they become more concentrated at higher trophic levels.

9 physical damage (such as cuts and abrasions), entanglement, filling the stomach so that feeding ceases and the animal starves

10 *In situ* programmes occur in conservation areas such as nature parks. *Ex situ* programmes are breeding programmes undertaken by zoos away from the organisms' natural home.

11 An indicator species is one that is used to assess a specific environmental condition e.g. lichens indicate the level of sulfur dioxide present in the air (or other suitable example).

12 Richness is the number of different species present, whereas evenness is a measure of the relative abundance of each species present – if populations of species are similar in size the habitat is said to have 'evenness'.

13 increase in the availability of food; reduction in the number of predators; increase in the available nest sites; reduction in numbers of a competing species

14 natality + immigration = mortality + emigration

15 **a** A sample of organisms is captured, marked and released. Later, a second sample is taken and the proportion of marked individuals in the second sample is noted. The proportion marked in the second sample is assumed to be the same as the proportion of the total population that was originally marked.

b This method is only useful for mobile small animals with limited territories; assumes there is no immigration or emigration; not useful for very small populations.

16 Maximum sustainable yield is the largest proportion of fish in a population that can be caught without endangering the population by ensuring there are sufficient fish to re-stock the population.

17 Either one of: *Azotobacter* or *Rhizobium*.

18 Eutrophication is the natural or artificial addition of nutrients (especially nitrates and phosphates) to water, which leads to a reduction or depletion of the oxygen content of the water.

19 In nitrogen-poor and phosphorus-poor environments such as bogs and acidic moorlands, waterlogging encourages the growth of denitrifying bacteria. Conditions like these limit the amount of nutrients plants can extract from the soil. Plants can supplement their nutrition by digesting insects and other small arthropods, to provide the nitrogen they need to form proteins.