

Populations & Sustainability

Question Paper 2

Level	A Level
Subject	Biology
Exam Board	OCR
Module	Genetics, evolution and ecosystems
Topic	Populations & sustainability
Booklet	Question Paper 2

Time allowed: 34 minutes

Score: /25

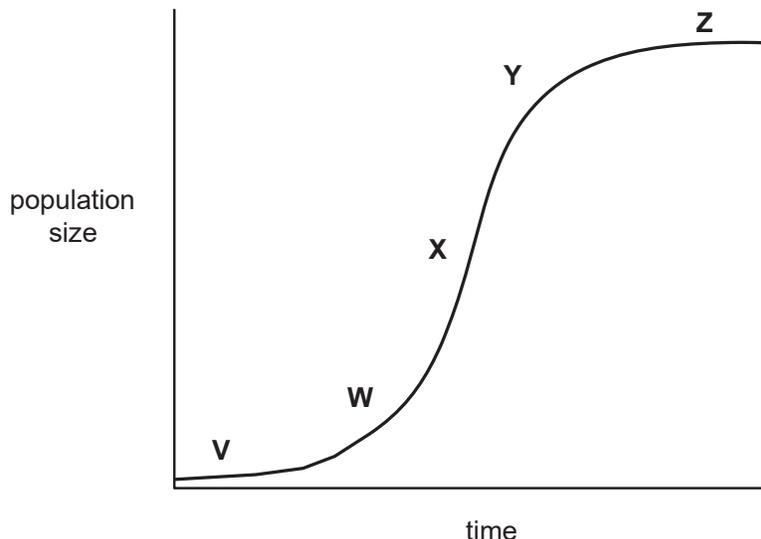
Percentage: /100

Grade Boundaries:

A*	A	B	C	D	E
>69%	56%	50%	42%	34%	26%

Question 1

The graph shows a typical population growth curve.



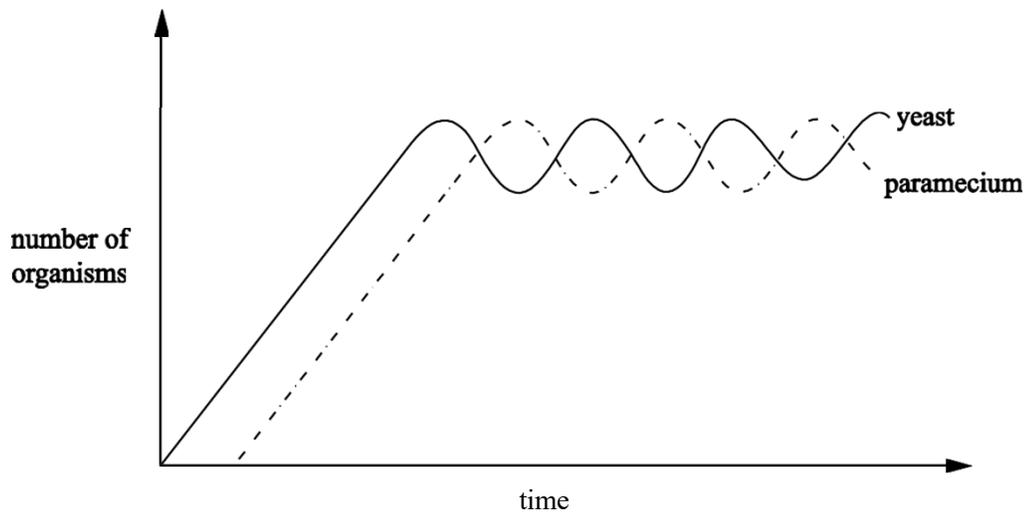
Which row correctly describes what is happening at each of stages V to Z?

	V	W	X	Y	Z
A	reproduction rate is higher than death rate	as time doubles population doubles	population size is proportional to time	population growth is slowing	reproduction rate is similar to death rate
B	reproduction rate is higher than death rate	as time doubles population more than doubles	reproduction rate is much higher than death rate	population growth is slowing	reproduction rate is similar to death rate
C	reproduction rate is higher than death rate	as time doubles population doubles	population size is proportional to time	population growth is decreasing	reproduction rate is similar to death rate
D	reproduction rate is higher than death rate	population is increasing rapidly	reproduction rate is much higher than death rate	population is decreasing	reproduction rate is similar to death rate

[Total: 1]

Question 2

The graph shows a population of yeast and a unicellular organism, *Paramecium*, grown in a fermentation chamber.



Which **one** of the following statements best describes the relationship between the two organisms?

- A. The *Paramecium* and yeast populations are complementary to each other.
- B. The yeast thrives in the relationship at the expense of the *Paramecium* population.
- C. The *Paramecium* feeds on the yeast and reduces the number in the yeast population.
- D. The two populations are in equilibrium and stable due to a type of negative feedback.

[Total: 1]

Question 3

The elk, *Cervus canadensis*, is a large herbivore.

Fig. 2.1, **of the Insert**, shows figures relating to the number of elk in Yellowstone National Park in the USA between 1965 and 2002.

The figures were obtained in two different ways:

- the white bars show estimated numbers of live elk obtained by ecological sampling
- the black bars show numbers of elk that were legally shot by hunters.

In some years no data for live elk were obtained.

- (a) (i) Using Fig. 2.1, describe the pattern shown by the data for the estimated number of live elk from 1965 to 2002.

[3]

- (ii) The recorded number of elk legally shot by hunters provides accurate data.

Suggest why these data are accurate, but the method used to obtain these data is not a valid way of estimating the number of elk in the population.

[2]

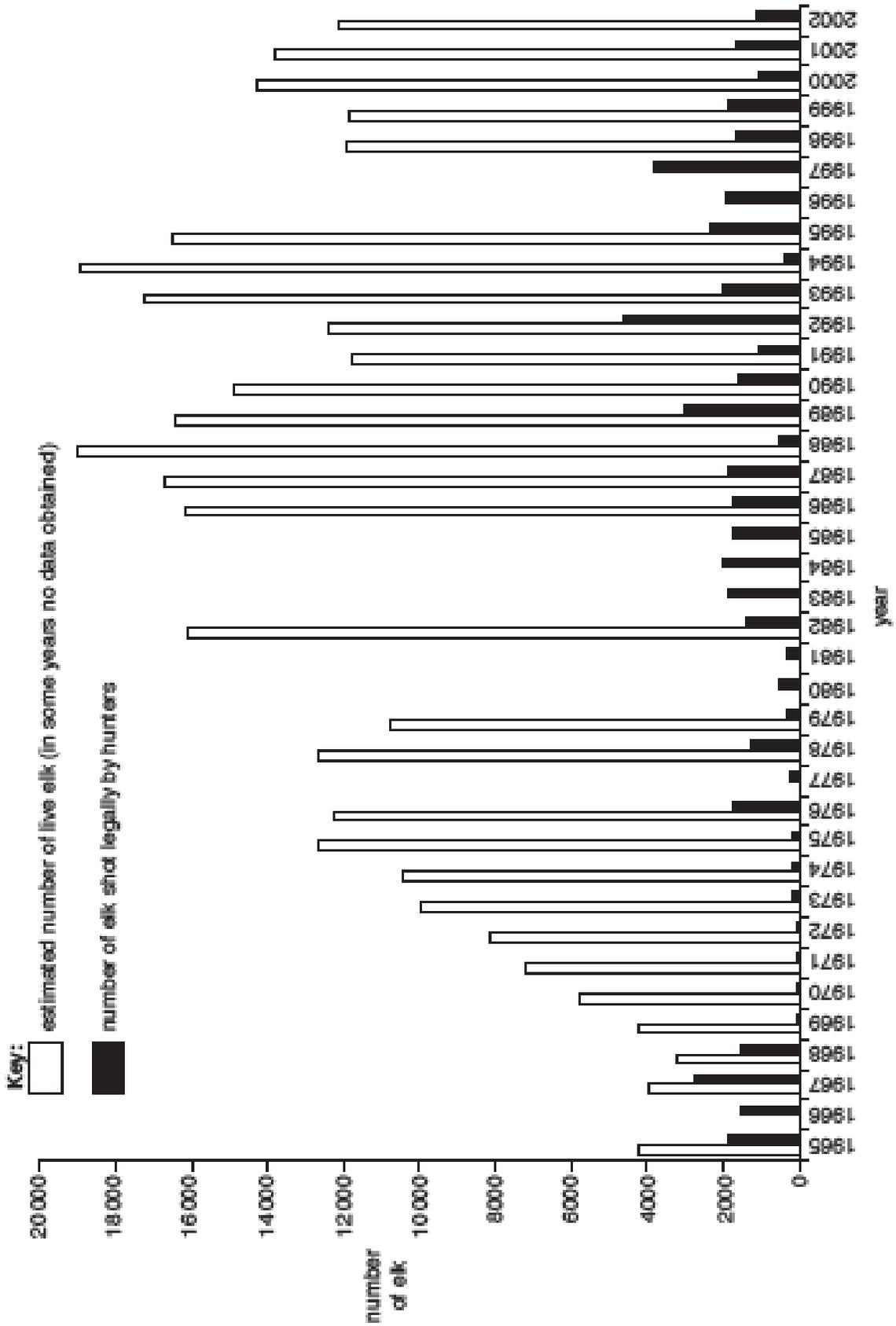


Fig. 2.1

- (b) The grey wolf, *Canis lupus*, is a large predator whose diet includes elk.

By 1926, grey wolves had been hunted to extinction in Yellowstone Park. However, this species could still be found in other parts of the world.

In 1995, a population of grey wolves was introduced to Yellowstone Park and their numbers increased.

- (i) With reference to Fig. 2.1, discuss the factors that may have affected the size of the elk population:

- before 1995
- after 1995.



In your answer you should provide a balanced account referring to factors before and after 1995.

[7]

- (ii) Explain why the introduction of wolves to Yellowstone Park in 1995 is an example of conservation.

[2]

[Total: 14]

Question 4

- (a) Great tits, *Parus major*, are birds that form male-female pairs. The male of each pair then establishes an area of territory, which he defends against other great tits by singing and threat displays.

The birds build a nest within the territory in which the eggs are laid and young chicks are reared. Weasels, *Mustela nivalis*, are predators which eat eggs and young chicks.

Fig. 6.1 shows how the territory size of great tits affects the risk of nest predation by weasels.

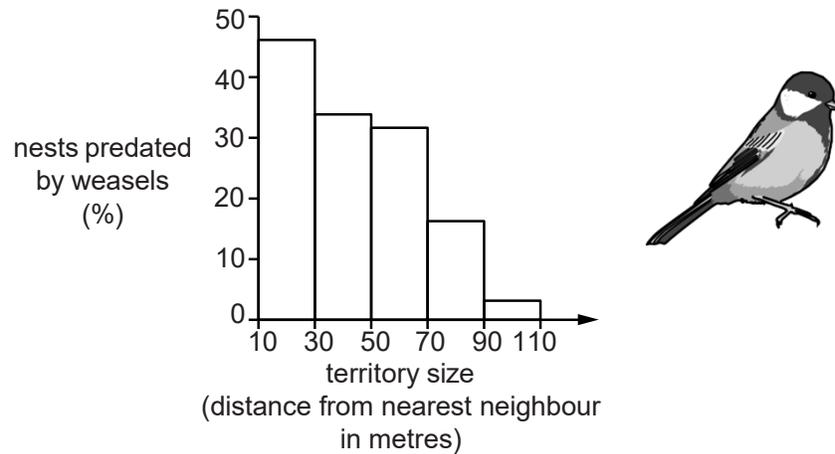


Fig. 6.1

- (i) Describe the relationship shown in Fig. 6.1. [1]

- (ii) Suggest and explain what effect weasels may have on the population size of the great tit. [2]

(b) The ochre starfish, *Pisaster ochraceus*, is a starfish that lives on rocky intertidal shores. It is the top predator in its habitat.

Fig. 6.2 shows part of the food web for this starfish.

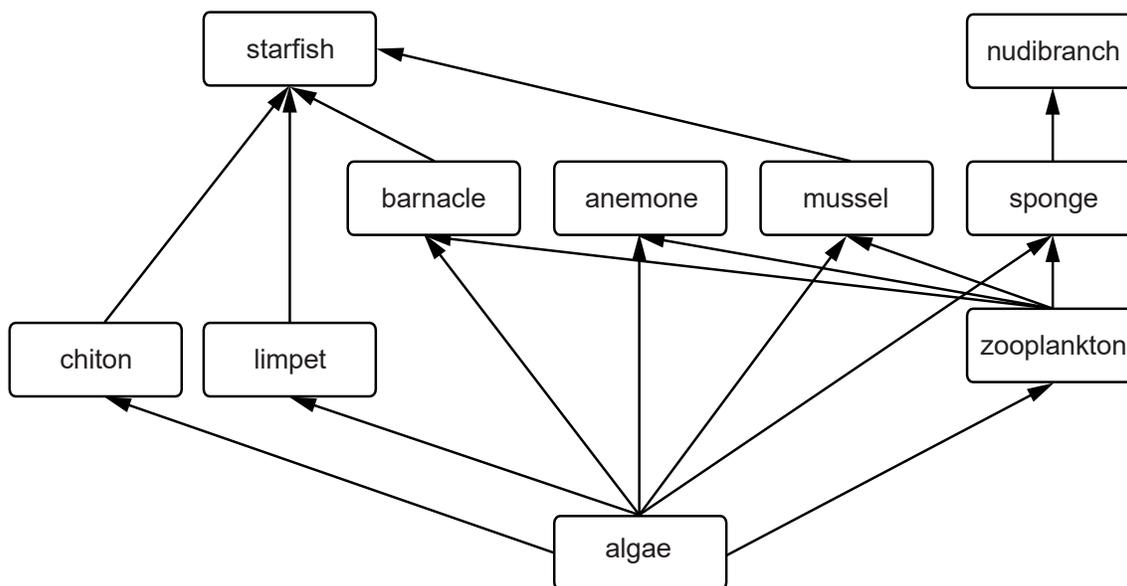


Fig. 6.2

An experiment was carried out in which all the starfish were removed from an 8 m × 2 m area of the shore. In an equivalent area of the same size, the starfish were not removed.

The population sizes of the other organisms in the food web were monitored at intervals. It was found that in the area in which starfish were removed:

- chitons and limpets disappeared
- anemones, sponges and nudibranchs decreased in abundance.

(i) Explain why two areas of the same size were monitored.

[2]

- (ii) Using Fig. 6.2, explain why the chitons and limpets disappeared in the area from which starfish were removed.

[2]

- (iii) Using Fig. 6.2, suggest the sequence of events that led to the decrease in abundance in nudibranchs in the area from which starfish were removed.

[2]

[Total: 9]