

Populations: practice questions

6 questions • 21 marks • mark scheme at the back

For Cambridge IGCSE Biology 0610 (and 0970, which has the same content). **Supplement** is Extended content, only examined on Papers 2 and 4.

Name

Total / 21

1 Which statement describes a population? [1 mark]

- A. ☐ All the organisms in an ecosystem
- B. ☐ A group of organisms of one species, living in the same area, at the same time
- C. ☐ All the species in a habitat
- D. ☐ A group of different species living together

2 A woodland contains oak trees, foxes, rabbits, fungi and soil, light and water. (a) State what is meant by the term community. [1] (b) State what is meant by the term ecosystem. [1] (c) Name one population in the woodland. [1] [3 marks]

3 State four factors that affect the rate of population growth of an organism. [4 marks]

- 4** A small number of bacteria were added to a flask of nutrient broth. The number of bacteria was counted every 2 hours. (a) Name the phase of growth between 4 and 6 hours. [1] (b) Name the phase of growth between 8 and 12 hours. [1] (c) Describe what happens to the number of bacteria between 12 and 14 hours. [1] (d) Calculate the increase in the number of bacteria between 2 and 6 hours. [1] **[4 marks]**

Number of bacteria in the flask	
time / hours	number of bacteria / millions per cm ³
0	2
2	3
4	12
6	60
8	100
10	100
12	100
14	40

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- 5** **Supplement** Explain why the number of bacteria in the flask in the previous question became constant between 8 and 12 hours. **[4 marks]**

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Supplement

[5 marks]

Explain why a population of yeast cells grows slowly at first, then very quickly, in a closed container with a limited supply of sugar.

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Mark scheme

One mark for each point unless a maximum is given. Words in brackets are not needed for the mark.

1. [1]

B B (1)

2. [3]

- (a) all of the populations of different species in an ecosystem (1)
- (b) a unit containing the community of organisms and their environment, interacting together (1)
- (c) all the foxes / all the rabbits / all the oak trees (1) reject an answer naming more than one species

3. [4]

- food supply (1)
- competition (1)
- predation (1)
- disease (1)

4. [4]

- (a) exponential / log (phase) (1)
- (b) stationary (phase) (1)
- (c) falls / decreases (from 100 to 40 million per cm³) (1)
- (d) $60 - 3 = 57$ million per cm³ (1) allow 57 000 000 per cm³

5. [4] **Supplement**

- (nutrients / food become) limiting factor(s) (1)
- nutrients / food running out / lack of space / toxic waste products build up (1)
- more competition (for nutrients) (1)
- rate of reproduction / birth rate equals death rate (1)
- so there is no overall change in numbers (1)
- Max 4

6. [5] **Supplement**

- at the start there are few cells to reproduce / cells adjusting (1)
- so the birth rate is low and growth is slow (lag phase) (1)
- sugar and space are plentiful, so there is little competition (1)
- cells reproduce faster than they die, and each new cell can reproduce (1)
- so numbers increase rapidly (exponential phase) (1)
- limiting factors are not yet acting (1)
- Max 5