

Brett Robbins Academic Consulting

Biology 30 Practice Test

Unit D: Population & Community Dynamics

25 Questions

Original practice questions written to the Alberta curriculum, in the style of past diploma examinations. Work through each question, then check your answers with the key at the end.

This practice test was made by AI and there may be mistakes. If a question or answer looks wrong, contact Brett for clarification.

Question 1

Which of the following is a density – dependent factor that could limit the growth of a population of nesting birds?

- A) A flood that destroys nests along a riverbank
- B) A drought that reduces the growth of seed – producing plants
- C) Competition for nesting sites that increases as the population grows
- D) A late frost that kills insects eaten by the birds

Question 2

A small population of rabbits is introduced to an island where food is abundant and there are no predators. At first, the population grows rapidly and the growth curve does not level off. The growth pattern and the shape of the growth curve are, respectively,

- A) logistic and S – shaped
- B) exponential and J – shaped
- C) logistic and J – shaped
- D) exponential and S – shaped

Question 3

After a glacier retreats, lichens are the first organisms to grow on the newly exposed rock. In ecological succession, the lichens are described as

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|--------------------|---------------------|
| A) pioneer species | B) climax species |
| C) seral species | D) keystone species |

Question 4

In a population that is in Hardy – Weinberg equilibrium, the frequency of the dominant allele is 0.7. The frequency of the homozygous dominant genotype is

- A) 0.09
- B) 0.42
- C) 0.70
- D) 0.49

Question 5

A clownfish lives among the stinging tentacles of a sea anemone. The clownfish is protected from predators, and the anemone receives nutrients from waste produced by the clownfish. This relationship is an example of

- A) mutualism
- B) parasitism
- C) commensalism
- D) competition

Question 6

In one year, a population of 2000 deer had 300 births, 150 deaths, 50 immigrants, and 100 emigrants. The per capita growth rate of the deer population for that year was

- A) 0.025
- B) 0.075
- C) 0.05
- D) 0.10

Question 7

A population of yeast cells growing in a flask with a limited supply of nutrients follows a logistic growth pattern. The population increases by the greatest number of individuals per hour when the population size is

- A) equal to the carrying capacity of the flask
- B) approximately one – half of the carrying capacity of the flask
- C) greater than the carrying capacity of the flask
- D) at its smallest, immediately after the yeast is added

Question 8

Which of the following sets of characteristics best describes an r – selected species?

- A) long lifespan, few offspring, and extensive parental care
- B) late sexual maturity and a low reproductive rate
- C) large body size and a population maintained near carrying capacity
- D) short lifespan, many offspring, and little or no parental care

Question 9

Two populations of the same wildflower species grow on opposite banks of a river. Bees carry pollen between the two populations. Over time, this movement of pollen will most likely

- A) increase gene flow and decrease the genetic differences between the populations
- B) cause a founder effect in both populations
- C) cause a population bottleneck in both populations
- D) increase genetic drift and increase the genetic differences between the populations

Question 10

A wildfire burns a mature spruce forest, but the soil remains intact.

Grasses, shrubs, and eventually spruce trees regrow in the area.

This regrowth is an example of

- | | |
|-------------------------|--------------------------|
| A) primary succession | B) a climax community |
| C) secondary succession | D) competitive exclusion |

Question 11

Biologists counted 4500 snowshoe hares in a study area of 15 km².

The population density of the hares, in hares per square kilometre, is

Question 12

During a storm, a small flock of finches is blown from the mainland to an isolated island, where the finches establish a new population. The allele frequencies of the island population differ noticeably from those of the mainland population. This difference is best explained by

- A) gene flow between the two populations
- B) genetic drift, as a result of the founder effect
- C) natural selection caused by predators on the island
- D) an increased mutation rate on the island

Question 13

In a population that is in Hardy – Weinberg equilibrium, the frequency of the homozygous recessive genotype is 0.04. The frequency of heterozygous carriers in the population, expressed as a value between 0 and 1, is

Question 14

A disease outbreak kills 90% of the individuals in a population of wild cats. Compared with the original population, the surviving population will most likely have

- A) less genetic diversity and greater vulnerability to environmental change
- B) more genetic diversity and greater resistance to disease
- C) the same allele frequencies as the original population
- D) a higher rate of mutation in its genes

Question 15

Two species of warblers feed on insects in the same spruce trees. One species feeds near the top of each tree, and the other species feeds near the trunk. By feeding in different locations, the two species

- A) increase interspecific competition
- B) demonstrate competitive exclusion
- C) form a mutualistic relationship
- D) reduce competition through resource partitioning

Question 16

Over one year, a population of 800 caribou had 96 births, 40 deaths, 24 immigrants, and 16 emigrants. The per capita growth rate of the population for that year was

Question 17

Oxpecker birds feed on ticks and other parasites found on the skin of zebras. Ticks feed on the blood of zebras. Which of the following rows identifies the relationship between the oxpecker and the zebra and the relationship between the tick and the zebra?

A) Oxpecker and zebra : parasitism

Tick and zebra : mutualism

B) Oxpecker and zebra : commensalism

Tick and zebra : parasitism

C) Oxpecker and zebra : mutualism

Tick and zebra : parasitism

D) Oxpecker and zebra : mutualism

Tick and zebra : commensalism

Question 18

To estimate the size of a grouse population, biologists captured and marked 80 grouse and then released them. Later, the biologists captured 100 grouse, and 20 of the captured grouse were marked. The estimated size of the grouse population is

Question 19

In a sample of 500 butterflies, 180 butterflies show the recessive phenotype for wing colour. The butterflies are from a population that is in Hardy – Weinberg equilibrium. The frequency of the heterozygous genotype, expressed as a value between 0 and 1, is

Question 20

Northern pike were introduced into a lake that contains a population of native minnows. After the introduction, the minnow population begins to decline. The arrival of the pike in the lake is an example of

- A) immigration, and it increases the mortality of the minnows
- B) immigration, and it decreases the mortality of the minnows
- C) emigration, and it increases the mortality of the minnows
- D) emigration, and it decreases the mortality of the minnows

Question 21

Which of the following sequences correctly describes the stages of primary succession on bare rock exposed by a retreating glacier?

- A) grasses → shrubs → lichens → trees
- B) trees → shrubs → grasses → mosses
- C) mosses → lichens → grasses → trees
- D) lichens → mosses → grasses → shrubs → trees

Question 22

A closed population of 1200 elk has a per capita growth rate of -0.05 per year. The size of the elk population after one year is

Question 23

An unusually severe winter kills a large proportion of a deer population. The proportion of deer killed is similar in a small, isolated part of the population and in a large, dense part of the population.

The severe winter is best described as

- A) a density – dependent limiting factor
- B) an increase in the biotic potential of the population
- C) a density – independent limiting factor
- D) a decrease in the carrying capacity of the environment

Question 24

Peppered moths rest on tree trunks. In a forest where the tree bark has been darkened by soot, birds eat more light – coloured moths than dark – coloured moths. Over many generations, the frequency of the allele for dark colour increases in the moth population. This change in the gene pool is caused by

- A) genetic drift
- B) natural selection
- C) the founder effect
- D) gene flow

Question 25

A population will remain in Hardy – Weinberg equilibrium only if

- A) the population is very small
- B) mutations occur at a high rate
- C) individuals move into and out of the population
- D) mating is random and no natural selection occurs

Answer Key

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|------|----------|----------|
| 1. C | 10. C | 19. 0.48 |
| 2. B | 11. 300 | 20. A |
| 3. A | 12. B | 21. D |
| 4. D | 13. 0.32 | 22. 1140 |
| 5. A | 14. A | 23. C |
| 6. C | 15. D | 24. B |
| 7. B | 16. 0.08 | 25. D |
| 8. D | 17. C | |
| 9. A | 18. 400 | |

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