

EEB 2208 (Introduction to Conservation Biology)

Sample Test Answers

In each case, the letter A indicates that the statement is correct, and a B indicates that it is not. I have included some notes (in red) to explain my thinking when designing each question. Hopefully, these notes will give you a sense of what I am trying to find out about your knowledge when I ask a question in a particular way.

Which of the following things have been suggested as reasons why conservation is important? (5 points)

1. People like nature. **A**
2. Biodiversity is a source of building materials. **A**
3. Human health can benefit from biological diversity. **A**
4. Ecosystems provide important services to humans. **A**
5. If too many species go extinct there might be an ecological catastrophe, like that on Easter Island. **A**

Note that it is possible for all answers in a set of five to be correct, or for all to be incorrect.

Using data collected from vets, researchers have studied the mortality rate of cats that have fallen from buildings to see whether the height of the fall influences the chance that the cat will die. Surprisingly, they found that cats that fall from floors 1-5 were more likely to die than those that fell from higher up (floors 6-32). Why was this? (5 points)

6. Falling from high up gives the cats time to position themselves so that they land safely. **B**
7. The data are biased. **A**
8. A mean is being compared to a median. **B**
9. Fewer cats fall from high floors than low floors. **B**
10. Vets don't see most of the cats that fall from higher floors. **A**

Note that the correct answers here are two ways of saying the same thing – the first a general statement, the second a specific one. The point of this question is to test whether you can recognize both the specific issue that relates to this data set and the general point. Note too, that it is possible that 9 could be correct (as, I guess, could 6), but we have no evidence to support that conclusion, so you would not get points.

Which of the following statements about species richness are generally true? (5 points)

11. Richness increases with increasing latitude. **B**
12. Richness is highest in the tropics. **A**
13. Richness is higher on islands than on the mainland. **B**
14. Richness is highest at high elevations. **B**
15. Richness is highest in hotspots. **A**

The answers here are simply things you need to learn. But, most of them should that make sense even if you haven't been in class. By writing "generally true" in the question, I am not trying to "trick" you into thinking something other than the correct answer, I am simply acknowledging that there are occasional exceptions to many widespread patterns.

How does the current rate of extinction compare to the background rate? (5 points)

16. They are about the same. **B**
17. It is about ten million times greater. **B**
18. It might be as much as ten thousand times greater. **A**
19. It is estimated to be about 100-1000 times greater. **A**
20. It is impossible to compare them. **B**

If I ask you about numbers presented in class, the questions will be something like those given here. E.g., I will expect you to know things approximately (i.e., to within an order or magnitude or so), but I won't expect you to know them exactly. Numbers 16, 17 and 19 test whether you know the actual rates of extinction – getting these parts right tells me that you know the basic, most important, information. Number 18 tests whether you understand that there is uncertainty, and roughly what magnitude it has – getting this part right tells me that your knowledge is more sophisticated than just basic memorization. Number 20 tests whether you understand that, even though there is uncertainty, we can still draw useful conclusions – getting this part right in addition to all the other parts, tells me that you really understand all the main points I was trying to get across in the lecture.

Climate change has been predicted to cause many future changes. Which of the following things are already happening? (5 points)

21. The length of growing seasons have declined. **B**
22. The extent of permafrost in the Arctic has increased. **B**
23. Globally, net primary production has decreased. **B**
24. Major ocean currents have changed direction. **B**
25. European butterflies have shifted their geographic ranges to the north. **A**

Different parts of this set of question are designed to test different things. Numbers 21 and 25 should be quite easy as they simply test whether you understand the direction of changes that have happened. Numbers 22 and 23 do the same, but also test whether you understand the meaning of technical terms (permafrost and net primary production) – if you know the terms they shouldn't be difficult, but if you don't know the terms they will be harder. Number 24 just tests whether you can distinguish between changes that there is already evidence for and those that are projected as future possibilities.

Which of the following are examples of exotic species?

26. Mongoose in Hawaii. **A**
27. Avian malaria in Hawaii. **A**
28. European rabbits in France. **B**
29. West Nile virus in North America. **A**
30. A single house cat on Stephen's Island. **A**

This is another question that deals with factual information straight from the lecture materials. Number 26 is a straightforward tests of information presented in lecture. Number 28 also relates to a specific example discussed in class. I did not specifically say that rabbits are native to France, but the example related to their introduction to Australia so you should be able to infer that there is no reason to think that it is exotic in France. The name is a bit of a give away too! Numbers 27 and 29 are more examples from class, but are included to test whether you understand that diseases can be considered introduced (= exotic) species. Number 30 adds the twist that an introduced species does not need to be common to cause devastating effects – in this case one individual caused a species extinction.

Look at Figure 3 in the second discussion paper (Orme et al.) [on the test I would simply give you the figure including the legend]. Which of these statements are true? (3 points)

- 31. A total of 1275 cells were classified as hotspots. **A**
- 32. Overall, congruence was high. **B**
- 33. Congruence was greatest between species richness hotspots and endemism hotspots. **A**
- 34. Congruence increased over time. **B**
- 35. Congruence decreased over time. **B**

The goal of this question is to test whether you can interpret graphs – this figure is quite complex, but we talked about it in the discussion. More importantly, all of the information needed to answer the questions is in the figure and its legend, so someone who has developed skill at interpreting graphs should be able to answer these questions even if they had never seen it before (by the final I will assume that you should be able to answer similar questions even if they relate to a figure that is new to you). Numbers 31 and 33 test whether you understand that the point of this figure is to categorize all of the hotspots according to the three types of hotspots studied. So the sum of all the numbers in the Venn diagram is the total number of hotspot cells (#31) and the overlaps between the three big circles shows the number of cells that fall into more than one category (#33). Number 32 tests whether you understood the main result of the paper. Numbers 34 and 35 are designed to test how well attend to axis labels and the figure legend – time is not mentioned anywhere in the figure, so we cannot conclude anything about how things change over time.

PART 2:

36. List five things that make a species especially vulnerable to extinction, and for each say briefly why it is important (10 points).

See notes to Lecture 6 for answers.

37. Define the following terms, and give an example of each (6 points).

a) **Keystone species** See notes to Lecture 3 and text book. Note that an ecosystem engineer can be considered a keystone species, but the reverse is not necessarily true.

b) **Beta-diversity** See notes to Lecture 3 and text book. Note too that this is what I was talking about when discussing how range size affects estimates of extinction rates in tropical rainforest (see lecture 8: 1A(v)).

c) **Endemic species** See notes to Lecture 5.

38. Describe three ways in which conservation biology is similar to medicine (3 points).

See notes to Lecture 1.