Field Work Past Papers

1. An experiment investigated the effect of an insecticide on local wild bee populations. Scientists sampled each species of bee in proportion to the contribution its population size made to the total number of bees of all species present in the area.

What name is given to this type of sampling strategy?

A Random sampling
B Stratified sampling
C Systematic sampling
D Point count sampling

2. The ship rat (*Rattus rattus*) is an invasive species in New Zealand and threatens critically endangered bird life.

An elimination programme has been developed to reduce the size of the ship rat population on the islands. Scientists estimated the population size of the rats throughout the programme by using mark and recapture techniques.

Which of the following is **not** an assumption of the mark and recapture technique?

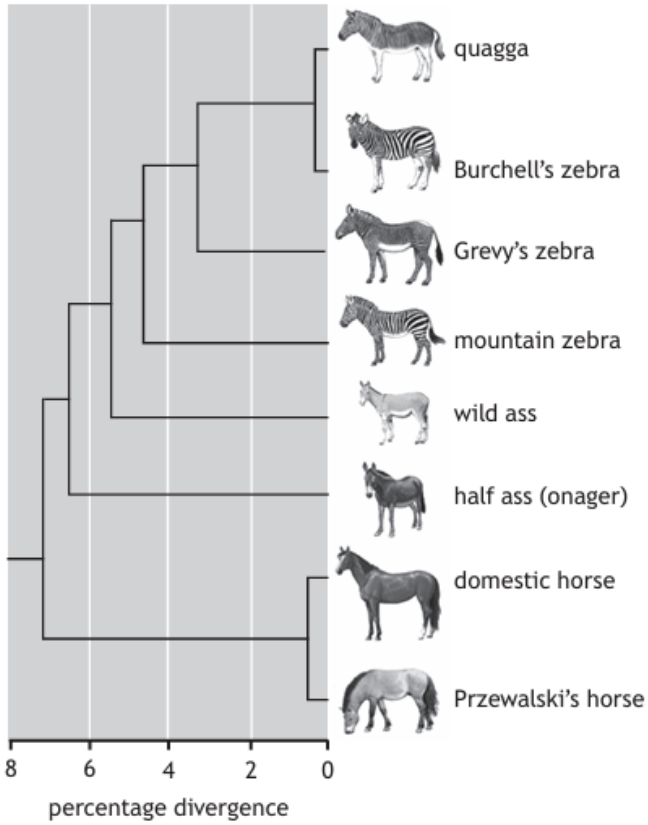
A The ship rat population will increase due to their rapid reproduction rate.
B The marked and released rats can mix fully with the total ship rat population.
C None of the ship rats have left the survey area.
D Every ship rat in the population has an equal chance of being captured during the sample.

3. Which of the following is **not** assumed when the mark and recapture technique is used?

A All animals have an equal chance of recapture.
B No animals are predated before recapture.
C No immigration or emigration occurs.
D Marked animals mix randomly after release.

4. Phylogenetic trees show the evolutionary relationships amongst a group of organisms.

The diagram shows a phylogenetic tree for members of the Equidae family.



Using the information given, which of the following statements is true?

A Horses are more closely related to asses than they are to zebras.
B Quagga and Burchell's zebras do not share a common ancestor with Grevy's and mountain zebras.
C Horses are as closely related to zebras as they are to asses.
D The half ass is more closely related to horses than the wild ass.

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5. Which row in the table shows a model organism correctly classified?

	Model organism	Taxonomic group
A	*Caenorhabditis elegans*	Bacteria
B	*Escherichia coli*	Nematoda
C	*Arabidopsis thaliana*	Chordata
D	*Drosophila melanogaster*	Arthropoda

6. Which of the following descriptions of animal behaviour is anthropomorphic?

A Woodlice consistently prefer damp environments.

B Rats may be very cautious about eating new foods presented to them.

C Lekking behaviour in a male black grouse encourages females to mate.

D A greedy herring gull was recently observed swallowing a whole blackbird.

7. In animal behaviour studies, which of the following units could be used in measurements of latency?

A Metres

B Metres per second

C Seconds

D Seconds per metre

8. Biological fieldwork can sometimes be more dangerous than laboratory work.

Which of the following would **not** generally be involved in a risk assessment for carrying out fieldwork safely?

A Identify hazards

B Specify control measures

C Assess safety training records of participants

D Consider hazard severity and likelihood of occurring

9. Biological fieldwork often requires the estimation of population size for a prey species. One method used is mark and recapture. If the method of marking reduced the camouflage coloration of this species, what effect would this be likely to have on the population estimate obtained?

A Recapture numbers would be increased and population size would be overestimated

B Recapture numbers would be increased and population size would be underestimated

C Recapture numbers would be decreased and population size would be overestimated

D Recapture numbers would be decreased and population size would be underestimated

10. In a study of transmission of the rabies virus by vampire bats, the density of bat colonies was estimated using mark and recapture techniques.

The total population estimate is given by (MC)/R where the first sample captured is M, the second sample captured is C and the number recaptured is R.

One colony was estimated to have a bat population of 440 following the capture of a second sample of 64 bats, of which 8 were marked.

The number of bats captured initially, marked and released was

A 32

B 55

C 110

D 128

11 Which statement includes representatives of all three domains of life?

A Insects can be vectors for bacterial infections in plants.

B Photoreceptor proteins are found in archaea, plants and animals.

C Scientists have cloned genes from archaea that can be expressed in *Escherichia coli*.

D Diseases in potato crops can be caused by the transmission of viruses by nematodes.

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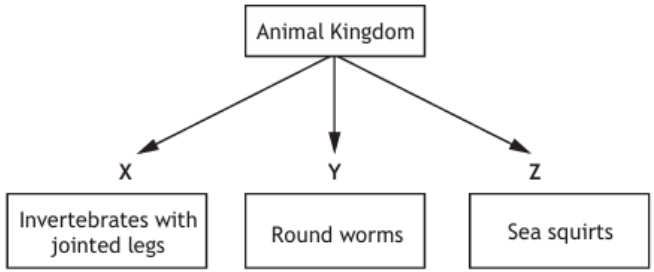
12. The diagram below shows some phyla in the animal kingdom.



Which row in the table identifies the phyla X, Y and Z?

	Phylum		
	X	*Y*	*Z*
A	Chordata	Nematoda	Arthropoda
B	Arthropoda	Nematoda	Chordata
C	Nematoda	Arthropoda	Chordata
D	Arthropoda	Chordata	Nematoda

13. Which of the following descriptions of animal behaviour avoids the use of anthropomorphism?

A In some primate species, alpha males often bully lower-ranking animals.

B In late summer, worker bees like to visit heather flowers.

C The grin on the chimpanzee's face showed that it was amused by the gesture.

D The male moth is attracted to the female by the scent molecules that she emits.

14. *C. elegans* is a model organism of the phylum

A Chordata

B Arthropoda

C Nematoda

D Mollusca.

15. A population of chafer beetles were damaging the tees and greens of a golf course. Results from a mark and recapture study suggested a population size that was too small to account for the extent of the damage caused.

One possible reason for this is that the

A white paint used to mark the beetles washed off some of them before the recapture

B white paint used to mark the beetles made them more visible to predators than unmarked beetles

C total number of beetles in the recaptured sample was less than the number first captured and marked

D marked beetles did not have enough time, after release, to spread out and mix with the rest of the population.

16. *Dicrocoelium dendriticum* is a flatworm parasite of grazing vertebrates such as sheep and cattle.

Which row in the table below shows the phyla to which these species belong?

	Dicrocoelium	*cattle/sheep*
A	Nematoda	Chordata
B	Platyhelminthes	Arthropoda
C	Nematoda	Arthropoda
D	Platyhelminthes	Chordata

17. The formula N = MC/R is used to estimate population size using mark and recapture data.

N = population estimate

M = number first captured, marked and released

C = total number in second capture

R = number marked in second capture

In a survey to estimate a woodlouse population, the following data were obtained:

Woodlice captured, marked and released = 80

Marked woodlice in second capture = 24

Unmarked woodlice in second capture = 96

The estimated population of the woodlice was

A 200

B 320

C 400

D 3840.

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18. The following formula can be used to estimate population size from mark and recapture data.

$$N = MC/R$$

Where N = population estimate
M = number first captured, marked and released
C = total number in second capture
R = number marked in second capture

In a survey to estimate a rabbit population, the following data were obtained:

Rabbits captured, marked and released = 240
Marked rabbits in second capture = 80
Unmarked rabbits in second capture = 280

The estimated population of the rabbits was

A 560
B 600
C 840
D 1080.

19. *Dicrocoelium dendriticum* is a flatworm parasite of grazing vertebrates such as sheep and cattle.

Which line in the table shows the phyla to which these species belong?

	Dicrocoelium	*Cattle/sheep*
A	Nematoda	Chordata
B	Platyhelminthes	Arthropoda
C	Nematoda	Arthropoda
D	Platyhelminthes	Chordata

20. A student observing the behaviour of a female chimpanzee and one of her offspring made the following field notes:

1 offspring displayed lower teeth to mother
2 offspring begged mother for food
3 offspring clung to mother's back
4 offspring smiled at mother

Which of the notes demonstrate anthropomorphism?

A 2 and 3 only
B 2 and 4 only
C 1, 2 and 4 only
D 2, 3 and 4 only

21. A quadrat with sides 50 cm long was used to estimate the density of a plant species in two areas X and Y. Five random samples were taken in each of the two areas and the results are given below.

Quadrat number	*Number of plants*	
	Area X	*Area Y*
1	27	15
2	19	16
3	39	42
4	19	31
5	11	16

The mean density per square metre in each of the two areas is

	Area X	*Area Y*
A	23	24
B	46	48
C	92	96
D	115	120

Field Work Past Paper Answers

1. B
2. A
3. B
4. C
5. D
6. D
7. C
8. C
9. C
10. B
11. C
12. B
13. D
14. C
15. D
16. C
17. D
18. B
19. C
20. C
21. C