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Answers

Pangolins

Answers to practice exam questions on p. 11

Martin Rowland

- 1 Pressure/touch deforms membrane of Pacinian corpuscle/of lamellae.
(Pressure) opens (stretch-mediated) sodium ion channels in the membrane.
Sodium ions diffuse into the corpuscle, depolarising membrane of sensory neurone.
If threshold reached, a generator potential/action potential occurs in the neurone.
- 2 Unrelated organisms have a similar niche.
So similar selection pressures result in similar adaptations (to this niche).

Upgrade: not so scary statistics

Answers to in-text questions on pp. 16–19

Martin Rowland

1

Set A

Choice of statistical test: chi-squared test

Reason for choice: you are comparing differences between values in different categories, in this case, the number of limpets/m² on different zones of the shore.

Null hypothesis: there is no significant difference between the number of limpets on the different zones of the shore.

Set B

Choice of statistical test: Spearman's Rank Correlation

Reason for choice: you are checking to see if there is a correlation between two different variables
Null hypothesis: there is no significant correlation between the concentration of ethanol and % light transmission of the beetroot pigment solution.

Set C

Choice of statistical test: Student's t-test

Reason for choice: you are comparing differences between mean values

Null hypothesis: there is no significant difference in the volume of CO₂ produced by yeast metabolising different carbohydrates.

2

- a** You would use Student's *t*-test because the information states you are comparing **mean** numbers of invertebrates at each site
- b** If you look at the *p* values, only the hog louse row shows the *p* value to be greater than 0.05 so that means there is no significant difference in the number of hog lice between sites A and B. However, all the other *p* values are less than 0.05 (they are less than 0.001) so this means there is a significant difference in the number of all these other invertebrate species between sites A and B because there is less than a 5% probability that the differences in results are due to chance. (Remember you could place NS next to hog louse *p* values and S next to all the other values to keep you on the right track.)

3

- a** The null hypothesis would be 'there is no significant difference in the index of diversity between 2010 and 2020 for each of the habitats'.
- b** $P < 0.01$ means there is less than a 1% probability that the difference in the results is due to chance.
- c** The *p* value for woodland is greater than 0.05, which means there is more than a 5% probability that the difference are due to chance so there is no significant difference in the index of diversity between 2010 and 2020 in the woodland. However, in the meadow there is less than a 5% probability that the difference is due to chance therefore there is a significant difference in the index of diversity between 2010 and 2020 in the meadow.

Effects of microbes on animal behaviour

Answers to practice exam questions on p. 29

Martin Rowland

1

Compare

Will cause an increase in the proportion of females in the population.

Contrast

Kills infected male ladybirds but causes infected male woodlice to become female.

So will reduce population of ladybirds but not reduce population of woodlice.

2

Increases chance that female mosquitoes will mate with (at least one) infected male.

Sperm from infected male disrupts production of viable eggs by uninfected females.

So only infected female mosquitoes would produce offspring / fewer females would produce offspring.