Edexcel AS Biology B exam practice answers

3 Classification and biodiversity

**1 (a)**

|  |  |
| --- | --- |
| **Taxon** | **Name** |
| **Domain** | **Eukarya** |
| Kingdom | Animalia |
| **Phylum** | Chordata |
| **Class** | Mammalia |
| **Order** | Carnivora |
| **Family** | Felidae |
| Genus | ***Panthera*** |
| Species | ***Tigris*** |

[3]

 **(b)** Leopards are closely related to tigers/leopards and tigers had a common ancestor; the leopard is a different species in the same genus as tigers. [2]

**2 (a)** All the plant populations/all the different species of plants; living in the same area/habitat at the same time. [2]

 **(b)** They have the same species richness of six/they each have six species. [1]

 **(c)** To calculate the index of diversity for area **A**:

D = $\frac{35 × 34}{\left(3 × 2\right) + \left(7 × 6\right) + \left(8 × 7\right) + \left(7 × 6\right) + \left(4 × 3\right) + (6 × 5)}$

 = $\frac{1190}{188}$

 = $6.33$ [1]

 To calculate the index of diversity for area **B**:

D = $\frac{28 × 27}{\left(3 × 2\right) + \left(4 × 3\right) + \left(3 × 2\right) + \left(4 × 3\right) + \left(2 × 1\right) + (12 × 11)}$

 = $\frac{756}{170}$

 = $4.45$ [1]

 **(d)** Area **A** has a higher index of diversity than area **B**. [1]

**3 (a)** Adenine, cytosine, guanine and thymine. (All correct = 2 marks; 1 error = 1 mark; 2+ errors = 0 marks.) [2]

 **(b)** 17 [1]

 **(c)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Fin whale | Humpback whale | Sperm whale | Bottlenose dolphin | Harbour porpoise |
| Fin whale |  |  |  |  |  |
| Humpback whale | **1** |  |  |  |  |
| Sperm whale | **4** | **4** |  |  |  |
| Bottlenose dolphin | 9 | 9 | 11 |  |  |
| Harbour porpoise | 7 | 7 | 7 | **4** |  |

 (All correct = 2 marks; 1 error = 1 mark; 2+ errors = 0 marks.) [2]

 **(d)** Gene/point mutation; (base) substitution. [2]

 **(e)** Humpback whale; there is a difference of only one base. [2]

**4 (a)** Gene mutation confers resistance to the antibiotic; in the presence of an antibiotic, bacterium with the gene for resistance survives; bacteria without the gene for resistance die/are killed by the antibiotic; the bacterium passes on the gene for resistance to its offspring. [4]

 **(b)** Any two from:

* No new classes of antibiotic have been discovered.
* The cost of developing and trialling a new antibiotic is (very) high.
* Other pharmaceutical products give a higher/faster return/profit. [2]

 **(c)** The common cold and influenza are caused by viruses; (viruses) are not affected by antibiotics/have no metabolism. [2]

 **(d)** To promote the growth of animals; to increase profit. [2]

**5 (a)** Using aerial photographs; cover the photograph with a grid and count the squares covered by rainforest. [2]

 **(b)** A suitable graph would show: percentages from 1970 onwards calculated as 100.0, 96.5, 91.3, 90.0, 87.2, 85.5, 83.7, 82.9 (all correct = 2 marks; 1 error = 1 mark; 2+ errors = 0 marks); ‘Year’ on the *x*-axis and ‘Area of forest remaining/%’ on the *y*-axis; students’ calculated points values plotted accurately either as a line graph or a bar chart; the points should be joined together by a straight (ruled) line (if a line graph)/the bars should not touch (if a bar chart). [5]

 **(c)** It lowers the biodiversity of plants by loss of plant species; it lowers the biodiversity of animals by loss of animal species that feed on/nest in (lost) plant species; loss of genetic diversity as alleles of some genes lost from small(er) populations. [3]

**6 (a)** Species can be defined in different ways giving different relationships; it is not possible to always mate organisms to test whether they produce fertile offspring. [2]

 **(b)** It shows the similarities/differences in the sequence of DNA bases; so the number of mutations that explain differences can be estimated; so this shows the (true) evolutionary relationships. [3]

 **(c)** Reports of investigations are checked by other experts in the same field of research; this ensures the methodology/protocol was valid; this ensures the conclusions from the results of the investigation are valid. [3]