**Evolution (answers)**

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| Instructions to students  • You have 50 minutes to complete the test.  • Please answer all questions in the spaces provided.  • There is to be no talking during the test. | Marks  Section I: Multiple-choice questions: 10 marks  Section II: Short-answer questions: 32 marks  Section III: Extended-response questions: 8 marks  Total: 50 marks |

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| Comments: | |

Section I: Multiple-choice questions

For each question, circle the correct answer.

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| 1 A dog breeder noticed that dogs with long curly tails won more prizes at the dog shows than dogs with short tails. He decided that he would mate the female and male dogs with the longest tails to get puppies that might win more prizes. This is an example of: | | L:\1. Publishing and Editorial\1. Product\Oxford Science\Oxford Science VICTORIA\Oxford Science 10 VIC\2. Extras\16. Class tests\Artwork\Final jpegs\CT0201_07059-r.jpg |
| A | selective breeding. |
| B | Darwinism. |
| C | cross-breeding. |
| D | natural selection. |
| 2 According to Lamarck’s theory of inheritance of acquired characteristics, what would happen if a cat lost an eye in an accident as a kitten? | | |
| A | The cat would lose sight in the other eye. | |
| B | The cat’s eye will grow back. | |
| C | The cat would have kittens with one eye. | |
| D | The cat would die. | |
| 3 Evolution by natural selection occurs as a result of: | | |
| A | gene flow between generations. | |
| B | selecting individuals with desirable traits and breeding them. | |
| C | competition between individuals with different traits. | |
| D | mutation within a species. | |

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| 4 Fossils that show intermediate states, between an ancestral form and that of its descendants, are referred to as: | | |
| A | alternative fossils. | |
| B | strata fossils. | |
| C | trace fossils. | |
| D | transitional fossils. | |
| 5 What is meant by the ‘struggle for existence’? | | |
| A | All living things increase in a geometric ratio. | |
| B | Some individuals in a species will die because they are not suited to the environment. | |
| C | There is a great variety of species living on Earth. | |
| D | Some species keep splitting into new species. | |
| 6 Comparative morphology is comparison of the: | | |
| A | depth of the strata in which the fossil was found. | |
| B | structures of living animals that are no longer used. | |
| C | anatomies of different organisms. | |
| D | age of fossils. | |
| 7 The rear legs of a snake are an example of: | | L:\1. Publishing and Editorial\1. Product\Oxford Science\Oxford Science VICTORIA\Oxford Science 10 VIC\2. Extras\16. Class tests\Artwork\Final jpegs\CT0203_07059.jpg |
| A | pentadactyl limbs. |
| B | vestigial organs. |
| C | homologous structures. |
| D | a living fossil. |
| 8 Physical isolation occurs when individuals of a population: | | |
| A | are physically incompatible. | |
| B | behave differently to each other. | |
| C | are separated by a river. | |
| D | reproduce at different times. | |
| 9 Australia has a vast collection of marsupials amongst its native animals. Scientists use the theory of continental drift to explain the location of similar marsupials in: | | |
| A | South America. | |
| B | Africa. | |
| C | Arctic. | |
| D | Indonesia. | |
| 10 The process of natural selection favouring a particular phenotype is known as: | | |
| A | sexual dimorphism. | |
| B | a gene pool. | |
| C | directional selection. | |
| D | sexual selection. | |

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|  | Section I total marks:  /10 marks |

Section II: Short-answer questions

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| 11 Darwin’s book *On the Origin of the Species by Means of Natural Selection* suggested that:  • all living things vary  • all living things tend to increase in geometric ratio  • the number of individuals in a population (or species) tend to remain constant in stable ecosystems.  a What two critical deductions can be made as a result of these observations?  b What implications for the human population do these observations have? | L:\1. Publishing and Editorial\1. Product\Oxford Science\Oxford Science VICTORIA\Oxford Science 10 VIC\2. Extras\16. Class tests\Artwork\Final jpegs\CT0204_07059-rm.jpg | |
| a There is a struggle for existence (1 mark) and in this struggle only the fittest survive (1 mark).  b If there is no struggle to survive, not all in the next generation will be ‘biologically fit’ OR the human population will increase because the struggle to survive is not as vigorous as other species (1 mark). | | |
|  | | /3 marks |
| 12 What was the name of the supercontinent that contained the continents of India, Africa, South America, Antarctica and Australia? | | |
| Gondwana | | |
|  | | /1 mark |

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| 13 How do amino acids provide evidence of evolution? | |
| There are approximately 250/many naturally occurring amino acids, but living things use only 20 of them to make proteins. This suggests that all living things came from a common ancestor that only used these 20 amino acids. | |
|  | /2 marks |
| 14 Name two molecules that can be compared to determine if a recent common ancestor exists. | |
| Any two of DNA, proteins, RNA and haemoglobin | |
|  | /2 marks |
| 15 Using Lamarck’s theory of inheritance of acquired characteristics, describe how giraffes’ necks became elongated. | |
| According to Lamarck’s theory, a giraffe that had to reach for food in tall trees would stretch the length of its neck over a lifetime. This change would then be passed on to its offspring. | |
|  | /2 marks |

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| 16 Give two examples of situations in which a population of a species becomes reproductively isolated from other species. | |
| 1 mark for each example: earthquake, sea level increase, formation of mountain ranges, reproducing at different times, changes in mating behaviour, physical incompatibility. | |
|  | /2 marks |
| 17 A similar molecule was compared between humans and a number of organisms. The results are shown in the table below.   Use the information given to determine the animal most closely related to *Homo sapiens* and the animal that is least related to *Homo sapiens.* | |
| |  |  | | --- | --- | | Organism | Number of differences in the molecule | | Human | 0 | | Gorilla | 12 | | Dog | 25 | | Snake | 42 | | |
| Closest: gorilla  Least: snake | |
|  | /2 marks |
| 18 Write a definition for the term ‘living fossil’. | |
| Existing species of ancient lineages that have not changed in form for a very long time | |
|  | /1 mark |

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| 19 Explain how similar marsupials, which can’t fly or swim, are found in both South America and Australia. | |
| Australia and South America were once part of the land mass Gondwana. When Gondwana began to separate, the species of marsupials became geographically isolated from one another. | |
|  | /2 marks |
| 20 Most modern elephants live in warm environments, but their ancestor, the woolly mammoth, lived during an ice age. Explain how this change might have occurred. | |
| During the Ice Age, some mammoths were born with less hair than others (through mutation). As the weather warmed, these mammoths had a survival advantage. The next generation was born with less hair. This directional selection continued until the modern elephants were born. | |
|  | /3 marks |
| 21 Name two molecules that can be compared to determine if a recent common ancestor exists. | |
| Any two of: DNA, proteins, RNA and haemoglobin | |
|  | /2 marks |

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| 22 What are the major steps in natural selection? | |
| Variation exists in a population. In the struggle to survive, only some individuals are able to mate. These individuals pass on their genetic material to the next generation. | |
|  | /3 marks |
| 23 Describe what relative dating is and explain how it is carried out. | |
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| Relative dating is used to work out the approximate age of rocks and fossils (1 mark). Older sedimentary rocks are deeper than younger rocks (1 mark) and they form layers/strata. The deeper a fossil is buried within the strata, the older it will be (1 mark). The age of the fossil is relative to the age of the rocks/depth it is buried (1 mark); this gives you a measure of how old the fossil is. | |
|  | /4 marks |

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| 24 Archaeopteryx has been shown to have a wishbone and flight feathers, bone-filled regions between the teeth and long V-shaped lines in the tail. Why are these features significant? | |
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| *Archaeopteryx* is a transitional fossil. The wishbone and feathers are similar to birds, and the teeth and V-shaped tails are similar to reptiles. | |
|  | /3 marks |
|  | Section II total marks:  /32 marks |

Section III: Extended-response questions

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| 20 A native garden is covered in mulch to protect it from extreme conditions. Two weeds, one with a small dull brown leaf and the other with a large bright green leaf, try to grow on the mulch. The gardener is busy and only pulls out a single weed (the first one he notices) every few days. Over a period of two months he finds brown weeds have taken over the garden. Explain how this might have occurred. | |
| The gardener notices the bright green leaves most easily and pick these (1 mark). The dull brown weeds are free to pass on their genetic material to the next generation (1 mark) resulting in their spread over the garden. | |
|  | /2 marks |
| 21 Use examples to compare how analogous and homologous structures evolve in different organisms over time. | |
| Students’ examples will vary.  For analogous and homologous: the example (2 mark); whether they share common ancestor (2 mark); link to similar/differing selection pressures (2 mark).  For example, the pentadactyl limb is a homologous structure. The same structure is present in species that have shared a recent common ancestor. Differing selection pressures in the differing environments have resulted in the pentadactyl limb having completely different functions – bats use the pendadactyl limb for flight, monkeys for grasping and whales for swimming.  The wings of birds and butterflies for flight are analogous structures. These structures are completely different, but have the same function as a result of similar selection pressures acting on both birds and butterflies. These unrelated species do not share a recent common ancestor; this is an example of convergent evolution. | |
|  | /6 marks |
|  | Section III total marks:  /8 marks |