**LFSC**



# ISEBE LEMFUNDO LEMPUMA KOLONI

EASTERN CAPE EDUCATION DEPARTMENT

OOS-KAAP ONDERWYSDEPARTEMENT

IIMVIWO ZEBANGA LOKUGQIBELA

NATIONAL SENIOR CERTIFICATE EXAMINATIONS

NASIONALE SENIOR SERTIFIKAAT-EKSAMEN

### SEPTEMBER 2009

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| **LIFE SCIENCES – SECOND PAPER** |

##### IXESHA: 2½ iiyure TIME: 2½ hours TYD: 2½ uur

**AMANQAKU: 150 MARKS: 150 PUNTE: 150**

*Write on the cover of your answer book, after the word “Subject” –*

**LIFE SCIENCES – SECOND PAPER**

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| This question paper consists of 12 pages. |

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| **INSTRUCTIONS AND INFORMATION**  Read the following instructions carefully before answering the questions. | |
|  |  |
| 1. | Answer ALL questions. |
|  |  |
| 2. | Write all the answers in the ANSWER BOOK. |
|  |  |
| 3. | Start EACH question on a NEW page. |
|  |  |
| 4. | Number the answers correctly according to the numbering system used in the question paper. |
|  |  |
| 5. | If answers are NOT presented according to the instructions of each question, candidates will lose marks. |
|  |  |
| 6. | All drawings should be done in pencil and labelled in blue or black ink. |
|  |  |
| 7. | Draw diagrams and flow charts only when requested to do so. |
|  |  |
| 8. | The diagrams in this question paper may NOT necessarily be drawn to scale. |
|  |  |
| 9. | Graph paper must not be used. |
|  |  |
| 10. | Non-programmable calculators, protractors and compasses may be used. |
|  |  |
| 11. | Write neatly and legibly. |
|  |  |

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| **SECTION A**  **QUESTION 1** | | | |  |
|  |  | |  |  |
| 1.1 | Various possible options are provided as answers to the following questions.  Choose the correct answer and write only the letter (A – D) next to the question  number (1.1.1 – 1.1.5) in the ANSWER BOOK, for example 1.1.6 D | | |  |
|  |  |  | |  |
|  | 1.1.1 | Which of the following may be reasons for the exploitation of natural resources?   1. Poverty and shortage of food 2. Use of indigenous plants for medicinal purposes   3. Use of wood to generate heat energy | |  |
|  |  |  | |  |
|  |  | A 1 and 3  B 1 and 2  C 2 and 3  D 1, 2 and 3 | | (2) |
|  |  |  | |  |
|  | 1.1.2 | The collection of plants or animals by illegal means or from a forbidden area: | |  |
|  |  |  | |  |
|  |  | A culling  B stealing  C picking  D poaching | | (2) |
|  |  |  | |  |
|  | 1.1.3 | Which combination shows the close phylogenic relationship between humans and the other species in the correct order? | |  |
|  |  |  | |  |
|  |  | A Human, chimpanzee, gibbon, gorilla  B Human, rhesus monkey, mouse, chicken  C Human, dog, kangaroo, horse  D Human, frog, sea slug, fish | | (2) |
|  |  |  | |  |
|  | 1.1.4 | The finches on the Galapagos islands … | |  |
|  |  |  | |  |
|  |  | A migrated to the mainland periodically.  B were much larger than the other finches.  C were remarkably similar to each other.  D had beaks adapted for eating different food. | | (2) |
|  |  |  | |  |

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|  | | 1.1.5 | | What process is illustrated by the diagram? |  | |
|  | |  | | A migration  B adaptive radiation  C speciation  D isolation | (2) | |
|  | |  | |  |  | |
| 1.2 | | Give the correct biological term for each of the following descriptions. Write only the term next to the question number (1.2.1 – 1.2.6) in the ANSWER BOOK: | | |  | |
|  | |  | |  |  | |
|  | | 1.2.1 | | Organisms that use food and energy in the ecosystem | (1) | |
|  | |  | |  |  | |
|  | | 1.2.2 | | The term that refers to the large variety of living organisms | (1) | |
|  | |  | |  |  | |
|  | | 1.2.3 | | Scientists who study fossils | (1) | |
|  | |  | |  |  | |
|  | | 1.2.4 | | The evolution of a group of related organisms over a long period of time due to a variety of different environmental factors | (1) | |
|  | |  | |  |  | |
|  | | 1.2.5 | | Remains of organisms which are preserved in sedimentary rocks | (1) | |
|  | |  | |  |  | |
|  | | 1.2.6 | | The movements of continents relative to each other | (1) | |
|  | |  | |  |  | |
| 1.3 | Choose the item from COLUMN B that matches a description in COLUMN A. Write only the letter (A – H) next to the question number (1.3.1 – 1.3.5) in the ANSWER BOOK, for example 1.3.6 J | | | | |  | |
|  |  | |  | | |  | |
|  |  | | |  |  |  | | --- | --- | --- | |  | **COLUMN A** | **COLUMN B** | | 1.3.1 | A list of species that are threatened with extinction | A Preservation | | 1.3.2 | Structures that appear different but have similar evolutionary origin | B Fossil fuels | | 1.3.3 | Chemical energy stored in organisms that lived in the past | C Evaluation of animals | | 1.3.4 | Factors in the environment such as soil, air and water | D Indigenous | | 1.3.5 | A species originally occurring in that country | E Homologous | |  |  | F Red data list | |  |  | G Biotic | |  |  | H Abiotic | |  |  | I Analogous | |  |  | J Alien | | | |  | |
|  |  | | (5 x 1) | | | (5) | |

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| 1.4 | The graph below shows the number of available abalone (perlemoen), the number that may be harvested by fishermen and the number harvested illegally by poachers. This graph represents a marine coastal area in South Africa between 1998 and 2006.  Study the graph and answer the questions that follow: | |  |
|  | C:\Documents and Settings\exams\My Documents\My Pictures\life 03.bmp | |  |
|  | 1.4.1 | State ONE conclusion you can draw from the data on the graph. | (2) |
|  |  |  |  |
|  | 1.4.2 | In which year did poachers harvest the same amount of abalone as that harvested by the legal fisherman? | (2) |
|  |  |  |  |
|  | 1.4.3 | Why do you think the amount of abalone poached seems to have decreased between 2004 and 2006? | (2) |
|  |  |  |  |
|  | 1.4.4 | Predict what would happen to the abalone resource on this coast if the trend shown in the graph continues for the next ten years. | (2) |
|  |  |  |  |
|  | 1.4.5 | Name the process of cultivating marine organisms such as perlemoen (abalone). | (1) |
|  |  |  |  |
|  | 1.4.6 | List TWO uses of perlemoen (abalone). | (2) |
|  |  |  |  |
|  | 1.4.7 | Suggest TWO methods of preventing illegal harvesting of perlemoen (abalone). | (4) |
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| 1.5 | Study the following map and answer the questions that follow:  Life Science graph3 | |  |
|  |  |  |  |
|  | 1.5.1 | Where are the following found on the map? |  |
|  |  |  |  |
|  |  | A Fossil footprints of early humans | (1) |
|  |  |  |  |
|  |  | B The fossil remains of “Little foot” | (1) |
|  |  |  |  |
|  | 1.5.2 | What is the “**Cradle of Humankind**” and where is it found on this map? | (3) |
|  |  |  |  |
| 1.6 | Read the following article and answer the questions that follow: | |  |
|  |  | |  |
|  | *In 1999, the communities in the North West Province started a devil’s claw project with the help of the provincial Department of Agriculture, Conservation, Environment and Tourism. The project has 700 members. The aim of the project is to improve production by domesticating and propagating devil’s claw tubers from the veld. The devil’s claw is processed into a medicine for the treatment of diseases such as diabetes, hepatitis and arthritis. The project aims to support job creation, reduce poverty and improve economy of the rural communities. Community members in these areas have been harvesting devil’s claw from the veld. Chief of Ganyesa has allocated 40 hectares of land to the community for a processing plant and for cultivating a devil’s claw plantation.* | |  |
|  |  |  |  |
|  | 1.6.1 | What is the aim of this project? | (2) |
|  |  |  |  |
|  | 1.6.2 | Give TWO diseases that can be treated with devil’sclaw. | (2) |
|  |  |  |  |
|  | 1.6.3 | Give THREE ways in which the project will help rural communities. | (3) |
|  |  |  |  |
|  | 1.6.4 | What are the advantages of growing devil’sclaw in a plantation compared to collecting it from the veld? | (2) |
|  |  |  |  |
|  |  | **TOTAL SECTION A:** | **50** |

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| **QUESTION 2** | | |  |
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| 2.1 | giraffGiraffes feed on the leaves of trees and are adapted, through evolution, to survive in their environment as shown in the illustration below: | |  |
|  |  |  |  |
|  | 2.1.1 | In what way is the giraffe adapted to its environment? | (2) |
|  |  |  |  |
|  | 2.1.2 | Explain how Jean-Baptiste Lamarck accounted for the evolution of the giraffe. | (3) |
|  |  |  |  |
|  | 2.1.3 | Explain how Charles Darwin accounted for the evolution of the giraffe. | (3) |
|  |  |  |  |
|  | 2.1.4 | Explain the impact of Mendel’s laws of heredity on Lamarck’s hypothesis. | (2) |
|  |  |  |  |

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| 2.2 | The graph below shows how certain characteristics of dairy cows have been enhanced by selective breeding.  Untitled-Scanned-03 | | |  | |
|  |  | | |  | |
|  | 2.2.1 | Which TWO characteristics have been improved? | (2) | |
|  |  |  |  | |
|  | 2.2.2 | How many years has this breeding programme been applied? | (2) | |
|  |  |  |  | |
|  | 2.2.3 | Describe how a farmer would initiate such a breeding programme. | (4) | |
|  |  |  |  | |
|  | 2.2.4 | Give TWO disadvantages of this type of breeding programme.  (2 x 2) | (4) | |
|  |  |  |  | |
|  | 2.2.5 | Differentiate between artificial and natural selection. | (4) | |
|  |  |  |  | |
| 2.3 | Distinguish between micro and macro evolution | | (4) | |
|  |  | | **[30]** | |
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| **QUESTION 3** | | | | |  |
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| 3.1 | Study the table below which represents the following two sets of data and answer the questions that follow: | | | |  |
|  |  |  | | |  |
|  | (1) | The percentage appearance of dark coloured peppered moths in a specific year | | | |
|  |  |  | | | |
|  | (2) | Amount of pollution | | |  |
|  | |  |  |  |  | | --- | --- | --- | --- | | **Year** | **Appearance of dark coloured peppered moth (%)** | **Year** | **Pollution**  **(in pg/m3)** | | 1960 | 95 | 1963 | 150 | | 1965 | 91 | 1964 | 105 | | 1967 | 94 | 1967 | 60 | | 1968 | 91 | 1968 | 70 | | 1969 | 94 | 1970 | 40 | | 1970 | 92 | 1971 | 50 | | 1976 | 84 | 1972 | 35 | | 1977 | 88 | 1973 | 37 | | 1980 | 77 | 1976 | 20 | | 1982 | 73 | 1981 | 15 | | 1985 | 55 | 1985 | 20 | | | | | |
|  |  | |  | |  |
|  | 3.1.1 | | Use the data in the table to draw TWO line graphs on the same set of axes. | | (13) |
|  |  | |  | |  |
|  | 3.1.2 | | Briefly describe the changes in the levels of pollution and the quality of the air from 1960 – 1985. | | (2) |
|  |  | |  | |  |
|  | 3.1.3 | | Suggest a possible reason for the changes mentioned in  QUESTION 3.1.2. | | (2) |
|  |  | |  | |  |
|  | 3.1.4 | | The number of dark coloured peppered moths decreased at a slower rate than the levels of pollution. Explain this phenomenon. | | (4) |
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| 3.2 | LSC1099Study the diagram below and answer the questions that follow: | | |  |
|  | 3.2.1 | Why are the wings on these three different animals said to be analogous? | | (1) |
|  |  |  | |  |
|  | 3.2.2 | Of what evolutionary process is the above an example? Give a reason for your answer. | | (2) |
|  |  |  | |  |
| 3.3 | Study the stages in embryonic development as shown by examples of these three vertebrate classes and answer the questions that follow:  LSC1144 | | |  |
|  |  |  | |  |
|  | 3.3.1 | Name FOUR VISIBLE features that these embryos have in common. | | (4) |
|  |  |  | |  |
|  | 3.3.2 | State what scientists concluded about the similarity in the structure of the embryos of the three vertebrates shown in the above diagram. | | (2) |
|  |  |  | | **[30]** |

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| **SECTION C**  **QUESTION 4** | | | |  |
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| 4.1 | Study the graph below on the energy needed to process new material and the energy to reprocess recycled material and answer the questions that follow: | | |  |
|  |  |  | |  |
|  | 4.1.1 | Which materials save the greatest amount of energy when reprocessed? | | (3) |
|  |  |  | |  |
|  | 4.1.2 | Apart from saving energy, describe TWO other benefits of re-cycling materials. | | (4) |
|  |  |  | |  |
|  | 4.1.3 | Use information from the graph to explain why it would be better to re-use rather than re-process glass products. | | (2) |
|  |  |  | |  |
|  | 4.1.4 | Most of the materials represented in the graph are not bio-degradable. Explain what this means. | | (2) |
|  |  |  | |  |
|  | 4.1.5 | Give TWO examples of materials that are bio-degradable. | | (2) |
|  |  |  | |  |

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| 4.2 | 4.2.1 | Define the term “global warming”. | (2) |
|  |  |  |  |
|  | 4.2.2 | How is the human race responsible for global warming? (4 x 1) | (4) |
|  |  |  |  |
|  | 4.2.3 | Suggest any SIX solutions to the problem of global warming. (6 x 1) | (6) |
|  |  |  |  |
| 4.3 | Read the following statement and answer the questions that follow: | |  |
|  |  | |  |
|  | *Our ability to destroy the Earth’s natural environment has been well tested: we have dug up, chopped down, burned, drained, cleared, ploughed and poisoned our natural environment. Now we have the opportunity to use the same human abilities to* ***sustainably*** *manage Earth’s resources by combining two priorities – development and conservation. The consequences for not taking this opportunity will be a lonely planet populated only by us, our domestic animals and the rodents that adapt to our planetary assault.*  The Learning Generation (Maskew Miller Longman) | |  |
|  |  |  |  |
|  | 4.3.1 | You are a member of a task team that must effectively deal with all aspects of local environmental issues in your town. The team includes you as a Member of Parliament, a health official, a farmer and a traditional healer.  Describe in essay form the input of each member as they try to sustainably manage the region’s resources. |  |
|  |  |  |  |
|  |  | Discussion: 12  Synthesis: 3 | (15) |
|  |  |  |  |
|  |  | **TOTAL SECTION C:** | **40** |
|  |  |  |  |
|  |  | **GRANDTOTAL:** | **150** |
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