****Province of the

**EASTERN CAPE**

EDUCATION

**NATIONAL**

**SENIOR CERTIFICATE**

**GRADE 11**

**NOVEMBER 2010**

|  |
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| **LIFE SCIENCES – PAPER 2** |

**MARKS: 150**

**TIME: 2½ hours**

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| This question paper consists of 14 pages. |

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| **INSTRUCTIONS AND INFORMATION** |
|  |
| Read the following instructions carefully before answering the questions. |

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| --- | --- |
| 1. | Answer ALL the questions. |
|  |  |
| 2. | Write ALL the answers in the ANSWER BOOK. |
|  |  |
| 3. | Start the answer to EACH question at the top of a NEW page. |
|  |  |
| 4. | Number the answers correctly according to the numbering system used in this question paper. |
|  |  |
| 5. | Present your answers according to the instructions of each question. |
|  |  |
| 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 all necessarily be drawn to scale. |
|  |  |
| 9. | Do NOT use graph paper. |
|  |  |
| 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 options are provided as possible 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), for example 1.1.6 D. | |  |
|  | | |  |
|  | 1.1.1 | Viruses are regarded as non-living because … |  |
|  |  |  |  |
|  |  | A they are immobile.  B of their inability to reproduce independently.  C they do not mutate and therefore cannot adapt.  D their nucleic acid does not code for protein. |  |
|  |  |  |  |
|  | 1.1.2 | A bacterial cell … |  |
|  |  |  |  |
|  |  | A has a nuclear membrane around its genetic material.  B is a prokaryote.  C is a eukaryote.  D contains mitochondria, vacuoles and plastids in the cytoplasm. |  |
|  |  |  |  |
|  | 1.1.3 | Scientists who study microorganisms are called … |  |
|  |  |  |  |
|  |  | A microbiologists.  B embryologists.  C gynaecologists.  D oncologists. |  |
|  |  |  |  |
|  | 1.1.4 | The method of feeding illustrated in the diagram below, is known as … |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  | A pinocytosis  B osmoregulation  C cytokinesis  D phagocytosis |  |

|  |  |  |  |
| --- | --- | --- | --- |
|  | 1.1.5 | Nitrogen-fixing bacteria converts free atmospheric nitrogen to ... |  |
|  |  |  |  |
|  |  | A nitrous oxides.  B nitrogen peroxide.  C nitrates.  D nitric acid. (5 x 2) | (10) |

|  |  |  |  |
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| 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 – 1.2.5) in the answer book. | |  |
|  |  |  |  |
|  | 1.2.1 | All microscopic organisms that are found in the upper layers of the water in the oceans, dams, ponds and lakes. |  |
|  |  |  |  |
|  | 1.2.2 | An organism that causes disease. |  |
|  |  |  |  |
|  | 1.2.3 | Hyphae which are upright and bearing sporangia. |  |
|  |  |  |  |
|  | 1.2.4 | The period between the infection and development of HIV antibodies. |  |
|  |  |  |  |
|  | 1.2.5 | The parasitic protozoan that causes malaria. (5 x 1) | (5) |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 1.3 | For each of the terms/phrases in COLUMN **Ι**,state whether it applies to A only, B only, both A and B, or none in COLUMN **ΙΙ**. Write down A only, B only, A and B, or none in your answer book. | | | |  |
|  |  | | | |  |
|  |  | **COLUMN Ι** | **COLUMN ΙΙ** | |  |
|  | 1.3.1 | The body’s ability to produce antibodies | A | Immunity |  |
| B | Immunisation |  |
|  | 1.3.2 | The nutritional relationship that rusts have with other plants | A | Mutualistic |  |
| B | Parasitic |  |
|  | 1.3.3 | High risk malaria area(s) in South Africa | A | Cape Town |  |
| B | Bloemfontein |  |
|  | 1.3.4 | The method of helping TB patients to take their medicines | A | DOTS |  |
| B | BCG |  |
|  | 1.3.5 | Opportunistic disease(s) | A | Tuberculosis |  |
|  |  |  | B | Pneumonia |  |
|  | (5 x 2) | | | | (10) |

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| --- | --- | --- | --- |
| 1.4 | Study the following diagrams below and answer the questions that follow. | |  |
|  |  | |  |
|  | C:\Documents and Settings\George Family\My Documents\My Scans\scan0029.tif | |  |
|  | 1.4.1 | Mention the plant groups to which the above plants (1 – 4) belong. | (4) |
|  |  |  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1.4.2 | The following table shows comparison of various evolutionary development of plants (1 – 4). Complete the table by writing the missing characteristic next to the appropriate letter in the answer book. | | | | | |  |
|  |  | | | | | | |  |
|  |  | | | **Vascular tissue** | **Roots, stem and leaves** | **Reproductive structures** | **Water in reproduction** |  |
|  | **PLANT 1** | | | **A** | **C** | Spores | Water needed for reproduction |  |
|  | **PLANT 2** | | | Xylem and phloem present | True roots, stems and leaves | **D** | Water needed for reproduction |  |
|  | **PLANT 3** | | | Xylem and phloem present | True roots, stem and leaves | **E** | No water needed for reproduction |  |
|  | **PLANT 4** | | | **B** | True roots, stem and leaves | Male stamens and female pistil found in flowers; seeds enclosed in a fruit. | **F** | (6) |
|  |  | | | | | | |  |
| 1.5 | Read the following information below and answer the questions that follow. | | | | | | |  |
|  |  | | | | | | |  |
|  | Pesticides: DDT and Dieldrin  *Many years ago, mosquito-breeding areas were sprayed with pesticides like DDT and Dieldrin. It was initially very effective against the mosquitoes. However, scientists found that both DDT and Dieldrin were non-biodegradable and are toxic, causing much harm to the environment and other organisms. These pesticides covered the sprayed plants, which were eaten by herbivores which in turn were eaten by carnivores. When the rainwater washed the residues off the plants, they ended up in the water table. The pesticides collected in rivers and other water masses, affecting the aquatic plant and animal life. In 1972, the use of these pesticides was banned internationally. The Department of Agriculture has instituted strict laws to ensure that only pesticides and herbicides that are approved are used to spray crops and to control mosquitoes. These laws have been put in place to ensure that there are legal maximum residue limits for the concentrations of pesticides and herbicides.*  [Source: *Sivlia education for the nation*] | | | | | | |  |
|  |  | |  | | | | |  |
|  | 1.5.1 | | Name the mosquito that spreads malaria. | | | | | (1) |
|  |  | |  | | | | |  |
|  | 1.5.2 | | Which part of the life cycle of the mosquito would DDT and Dieldrin have affected? | | | | | (1) |
|  |  | |  | | | | |  |
|  | 1.5.3 | | Why is DDT and Dieldrin no longer an effective way to control mosquito breeding areas? | | | | | (1) |
|  |  | |  | | | | |  |
|  | 1.5.4 | | At which trophic level are DDT and Dieldrin likely to have the most marked effect and be in the highest concentrations? | | | | | (1) |
|  |  | |  | | | | |  |
|  | 1.5.5 | | ProvideTWO reasons why DDT and Dieldrin were banned in 1972. | | | | | (2) |

|  |  |  |  |
| --- | --- | --- | --- |
|  | 1.5.6 | Suggest an alternative for the use of pesticides. | (1) |
|  |  |  |  |
|  | 1.5.7 | Mention any THREE strategies that can be followed to prevent mosquitoes from biting us, if we happen to be a visitor in a high-risk malaria area. | (3) |

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| 1.6 | The following diagram illustrates various steps of beer production. Study the diagram and answer the questions that follow. | |  |
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|  |  | |  |
|  | 1.6.1 | Name the biological process that takes place during the production of beer. | (1) |
|  |  |  |  |
|  | 1.6.2 | Name the group of organisms to which the yeast belong. | (1) |
|  |  |  |  |
|  | 1.6.3 | Mention THREE economic significances of the organisms mentioned in QUESTION 1.6.2, other than beer production, in the South African food industry. | (3) |
|  |  |  | **[50]** |
|  |  |  |  |
|  |  | **TOTAL SECTION A:** | **50** |

|  |  |  |  |
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| **SECTION B** | | |  |
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| **QUESTION 2** | | |  |
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| 2.1 | The sketches below show the modification of basic pattern of forelimbs of four animals. Similar bones are labelled as A, B, C, D and E. Study the diagrams and answer the questions that follow. | |  |
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|  |  | |  |
|  |  | |  |
|  | 2.1.1 | Name the bones that are similar in each of the above structures. | (6) |
|  |  |  |  |
|  | 2.1.2 | Mention the respective function of each limb (1 − 4) illustrated in the above diagram. | (4) |
|  |  |  |  |
|  | 2.1.3 | Explain how the limbs 3 and 4 are adapted to perform the functions  mentioned in QUESTION 2.1.2. | (4) |
|  |  |  |  |
|  | 2.1.4 | Give a reason why each of the limbs mentioned above performs different functions. | (1) |
|  |  |  |  |
|  | 2.1.5 | The similar body plan shown in the above diagram leads to a conclusion. Briefly state the conclusion regarding the origin of each of the organisms mentioned. | (1) |

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| 2.2 | Bonga conducted a research on biodiversity in South Africa, to complete his assignment. His findings were represented in the form of a bar graph. Study the graph and answer the following questions. | |  |
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|  |  | |  |
|  | 2.2.1 | Which group of organisms has the highest diversity of species? Give a possible reason for this. | (2) |
|  |  |  |  |
|  | 2.2.2 | Why do you think there is a big difference in diversity between the salt water and fresh water fish? | (1) |
|  |  |  |  |
|  | 2.2.3 | Give FIVE possible reasons why the number of species in a group of organisms does not remain constant. | (5) |
|  |  |  |  |
|  | 2.2.4 | Using the information provided in the graph, construct a table to show the data that was used to draw the graph. | (6) |
|  |  |  | **[30]** |

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| **QUESTION 3** | | |  |
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| 3.1 | The diagrams below represent the longitudinal section of three organisms showing their distinct body layers. Study the diagrams and answer the following questions. | |  |
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|  |  | |  |
|  |  |  |  |
|  | 3.1.1 | Name the different phyla to which organisms A, B and C belong. | (3) |
|  |  |  |  |
|  | 3.1.2 | Identify organisms A and B. | (2) |
|  |  |  |  |
|  | 3.1.3 | Give any THREE characteristics that have assisted you to identify animal A. | (3) |
|  |  |  |  |
|  | 3.1.4 | Arrange the organisms in the correct order from the most primitive to the most developed. Write the letters only. | (3) |
|  |  |  |  |
|  | 3.1.5 | Make a labelled diagram of a cross section through the organism C, as shown at “X”. | (7) |

|  |  |  |  |  |
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| 3.2 | The following map shows the world-wide distribution of flightless birds. Study the map and answer the following questions. | | |  |
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|  |  | | |  |
|  |  | | |  |
|  | 3.2.1 | | Flightless birds are commonly known as “Ratites”. The Latin name *ratitie* simply means “a boat without a keel”. Briefly, explain why these birds are called Ratites. | (2) |
|  |  | |  |  |
|  | 3.2.2 | | Give the name and number of the ratite (flightless bird) from New Zealand that recently became extinct. | (2) |
|  |  | |  |  |
|  | 3.2.3 | | On which supercontinent did the ancestor of the ratites live? | (1) |
|  |  | |  |  |
|  | 3.2.4 | | With reference to the current distribution of the ratites, how are scientists able to conclude that their ancestor lived on the supercontinent mentioned in QUESTION 3.2.3? | (1) |
|  |  | |  |  |
|  | 3.2.5 | | Give ONE reason why scientists believe that these flightless birds originated from common ancestors. | (1) |
|  |  | |  |  |
|  | 3.2.6 | | Name the endemic ratite species found in Africa and South America, respectively. | (2) |
|  |  | |  |  |
|  | 3.2.7 | | Scientists think that flightless birds have evolved from ancestral birds which were able to fly. Give a possible explanation why these birds lost their ability to fly, over a long period of time. | (3) |
|  | |  |  | **[30]** |
|  | |  |  |  |
|  | |  | **TOTAL SECTION B:** | **60** |

|  |  |  |  |
| --- | --- | --- | --- |
| **SECTION C** | | |  |
|  | | |  |
| **QUESTION 4** | | |  |
|  | | |  |
| 4.1 | The following diagrams show how cholera vaccine works in the human body. Study it and then answer the following questions. | |  |
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|  |  | |  |
|  | 4.1.1 | What is a vaccine? | (1) |
|  |  |  |  |
|  | 4.1.2 | What is injected in to the human body as a vaccine? | (1) |
|  |  |  |  |
|  | 4.1.3 | Briefly explain what is happening in diagram 2. | (2) |
|  |  |  |  |
|  | 4.1.4 | What happens when a person is exposed to cholera bacteria as shown in the diagram 4? | (2) |
|  |  |  |  |
|  | 4.1.5 | Name the type of immunity obtained through vaccination. | (1) |
|  |  |  |  |
|  | 4.1.6 | Suggest THREE strategies to prevent a cholera outbreak in rural villages of our country. | (3) |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 4.2 | In a world-wide survey done in 2005, the number of people (in millions) living with HIV/AIDS was determined. This information is given below in the form of a table. Study the table and answer the following questions. | | |  |
|  |  |  | |  |
|  | **COUNTRIES** | | **NUMBER OF INFECTED PEOPLE (IN MILLIONS)** |  |
|  | Middle East | | 0,44 |  |
|  | Eastern Europe | | 1,5 |  |
|  | Latin America | | 1,6 |  |
|  | Asia | | 8,33 |  |
|  | Sub-Saharan Africa | | 25 |  |
|  | Other | | 2,56 |  |
|  |  | |  |  |
|  | 4.2.1 | Use the information in the table above to draw a pie-chart showing the number of infected people (in millions) world-wide. | | (7) |
|  |  |  | |  |
|  | 4.2.2 | How many people live with HIV/AIDS world-wide? | | (1) |

|  |  |  |  |
| --- | --- | --- | --- |
|  | 4.2.3 | Mention any TWO myths regarding HIV/AIDS in our communities. | (2) |
|  |  |  |  |
| 4.3 | Study the phylogenetic tree below and answer the questions that follow. | |  |
|  |  | |  |
|  |  | |  |
|  |  |  |  |
|  | 4.3.1 | Describe in your own words what happened at point A. | (2) |
|  |  |  |  |
|  | 4.3.2 | What can you say about the relationship between African and Asian elephants? | (1) |

|  |  |  |  |
| --- | --- | --- | --- |
|  | 4.3.3 | What kind of relationship existed between elephants, dassies and aardvarks? | (1) |
|  |  |  |  |
|  | 4.3.4 | Why did mammoths become extinct? | (1) |
|  |  |  |  |
| 4.4 | The successful hosting of 2010 Soccer World Cup has unlocked many lucrative, future economic opportunities for South Africa. One of them is the possible growth and development of ecotourism. Almost all the tourists who visited this country appreciated the natural beauty and biodiversity of this marvellous country. Their impression of South Africa will certainly provide an unprecedented impetus for the sustainable growth of this industry. | |  |
|  |  |  |  |
|  | Write a mini essay on ecotourism in South Africa using the following guidelines: | |  |
|  |  |  |  |
|  | (a) | Brief explanation of what ecotourism entails | (4) |
|  | (b) | Long term sustainability | (4) |
|  | (c) | Possible threat to ecotourism | (4) |
|  |  |  |  |
|  |  | Synthesis | (3) |
|  |  |  |  |
|  |  |  |  |
|  |  | **TOTAL SECTION C:** | **40** |
|  |  |  |  |
|  |  | **GRAND TOTAL:** | **150** |