

**PREPARATORY EXAMINATION**

**2019**

**MARKING GUIDELINES**

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| **LIFE SCIENCES (PAPER 2) (10832)** |

**11 pages**

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| **GAUTENG DEPARTMENT OF EDUCATION****PREPARATORY EXAMINATION****LIFE SCIENCES****(Paper 2)** **MARKING GUIDELINES** |

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| PRINCIPLES RELATING TO THE MARKING OF LIFE SCIENCES1. **If more information than marks allocated is given**Stop marking when maximum mark is reached and put a wavy line and 'max' in the right hand margin. |
|  |
| 2. **If, for example, three reasons are required and five are given** Mark the first three, irrespective of whether all or some are correct / incorrect. |
|  |
| 3. **If the whole process is given when only part of it is required** Read all and credit relevant parts. |
|  |
| 4. **If comparisons are asked for and descriptions are given** Accept if differences / similarities are clear. |
|  |
| 5. **If tabulation is required but paragraphs are given** Candidates will lose marks for not tabulating. |
|  |
| 6. **If diagrams are given with annotations when descriptions are required** Candidates will lose marks.  |
|  |
| 7. **If flow charts are given instead of descriptions** Candidates will lose marks. |
|  |
| 8. **If sequence is muddled and links do not make sense**Where sequence and links are correct, credit. Where sequence and links are incorrect, do not credit. If sequence and links become correct again, resume credit. |
|  |
| 9. **Non-recognized abbreviations**Accept if first defined in answer. If not defined, do not credit the unrecognised abbreviation but credit the rest of the answer if correct.  |
|  |
| 10. **Wrong numbering**If answer fits into the correct sequence of questions but the wrong number is given, it is acceptable. |
|  |
| 11. **If language used changes the intended meaning**Do not accept. |
|  |
| 12. **Spelling errors**If recognizable accept, provided it does not mean something else in Life Sciences or if it is out of context. |
|  |
| 13. **If common names are given in terminology** Accept, provided it was accepted at the memo discussion meeting. |
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| 14. **If only letter is asked for and only name is given (and vice versa)**Do not credit. |
| 15. **If units are not given in measurements**Candidates will lose marks. Memorandum will allocate marks for units separately. |
| 16. **Be sensitive to the sense of an answer, which may be stated in a different way.** |
| 17. **Caption.** All illustrations (diagrams, graphs, tables, etc.) must have captions. |
| 18. **Code-switching of official languages (terms and concepts)** A single word or two that appears in any official language other than the learners' assessment language used to the greatest extent in his / her answers should be credited, if it is correct. A marker that is proficient in the relevant official language should be consulted. This is applicable to all official languages. |
| 19. **Changes to the memorandum** No changes may be made to the ratified memorandum without consultation with the Provincial Internal Moderator. |

|  |  |
| --- | --- |
| **SECTION A** |  |
|  |  |
| **QUESTION 1** |  |
| 1.1 | 1.1.11.1.21.1.31.1.41.1.51.1.61.1.71.1.81.1.9 | B🗸🗸B🗸🗸C🗸🗸C🗸🗸A🗸🗸B🗸🗸D🗸🗸D🗸🗸C🗸🗸  |  |
|  |  | (9 x 2) | **(18)** |
| 1.2 | 1.2.1 | Multiple allelic🗸 / multiple alleles |  |
|  | 1.2.2 | Gene🗸 |  |
|  | 1.2.3 | Co-dominance🗸 |  |
|  | 1.2.4 | Stem cells🗸  |  |
|  | 1.2.5 | Cloning🗸 |  |
|  | 1.2.6 | Mitochondrion🗸 |  |
|  | 1.2.7 | Heterozygous🗸 |  |
|  | 1.2.8 | Genome🗸  |  |
|  |  |  (8 x 1) | **(8)** |
| 1.3 | 1.3.1 | B only🗸🗸 |  |
|  |  |  |  |
|  | 1.3.2 | None🗸🗸 |  |
|  |  |  |  |
|  | 1.3.3 | Both A and B🗸🗸 |  |
|  |  |  (3 x 2) | **(6)** |
|  |  |  |  |
| 1.4 | 1.4.1 | DNA replication  | (1) |
|  |  |  |  |
|  | 1.4.2 | Nucleotide | (1) |
|  |  |  |  |
|  | 1.4.3 | 1 – guanine |  |
|  |  | 2 – cytosine | (2) |
|  |  |  |  |
|  | 1.4.4 | Double helix | (1) |
|  |  |  |  |
|  | 1.4.5 | Hydrogen bond | (1) |
|  |  |  | **(6)** |

|  |  |  |  |
| --- | --- | --- | --- |
| 1.5 | 1.5.1 | **A** cell membrane / plasmalemma**B** homologous chromosomes / bivalent**D** spindle fibres | (3) |
|  |  |  |  |
|  | 1.5.2 | The chromosomes are of the:* Same size🗸
* Same shape🗸
* Same length🗸 Any

**(Mark first TWO only)** | (2) |
|  |  |  |  |
|  | 1.5.3 | **I** metaphase 1🗸**II**  prophase 1🗸**III** metaphase 2🗸 | (3) |
|  |  |  |  |
|  | 1.5.4 | * Single row of chromosomes🗸
* at the equator🗸
 | (2) |
|  |  |  |  |
|  | 1.5.5 | * Crossing over🗸
* Random arrangement of chromosomes🗸
 | (2) |
|  |  |  | **(12)** |
|  |  |  **TOTAL SECTION A:** | **50** |

|  |
| --- |
| **SECTION B** |
| **QUESTION 2** |

|  |  |  |  |
| --- | --- | --- | --- |
| 2.1 | 2.1.1 | CCT✓  | (1) |
|  |  |  |  |
|  | 2.1.2 | * Amino acid isoleucine will be coded for✓
* instead of phenylalanine✓
* A different protein may form✓ / nonsense protein formed / protein’s function may be affected
 | (3) |
|  |  |  |  |
|  | 2.1.3 | * In replication DNA is formed✓

and in transcription mRNA is formed✓* In replication 2 strands of DNA act as a template✓

and in transcription 1 strand of DNA is used as a template✓* In replication thymine is complementary to adenine✓

and in transcription uracil is complementary to adenine✓**(Mark first TWO only)** Any 2 x 2 | (4) |
|  |  |  | **(8)** |
|  |  |  |  |
| 2.2 | 2.2.1 | Peptide ✓bond | (1)  |
|  | 2.2.2 | tRNA ✓ | (1) |
|  | 2.2.3 | GCA✓ | (1) |
|  | 2.2.4 | Ribosome✓ | (1)**(4)** |
| 2.3 | 2.3.1 | Tom and Harry✓ | (1) |
|  | 2.3.2 | They both have blood type O ✓ | (1) |
|  | 2.3.3 | Type A ✓ and Type B✓ | (2) |
|  |  |  | **(4)** |
|  |  |  |  |
| 2.4 | 2.4.1 | Incomplete dominance✓ | (1) |
|  | 2.4.2 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| P2 | Phenotype | Grey coat rat | x | Grey coat rat🗸 |
|  | Genotype  | WB | x |  WB 🗸 |
| *Meiosis* |  |  |  |  |
|  | G/gametes |  W , B | x | W , B 🗸 |
| *Fertilisation* |  |  |  |  |
| F2 | Genotype |  WW : WB : WB : BB🗸\* |
|  |  |  |
|  | Phenotype | 1 White coat : 2 Grey coats: 1 Black coat🗸\* |
| P2 and F2🗸 |   |  |  |  |
| Meiosis and fertilisation 🗸  |
| 2 compulsory + Any 4 |

**OR**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| P2 | Phenotype | Grey coat rat | x | Grey coat rat✓ |
|  | Genotype | WB | x |  WB🗸 |
|  |

|  |  |  |
| --- | --- | --- |
| Gametes | W  | B |
| W  | WW | WB |
| B | WB | BB  |

 1 mark for correct gametes🗸*1 mark for correct genotypes🗸\** |
| *Meiosis* |
|  |
| *Fertilisation* |
|  |
|  |
| F2 | Phenotype | 1 White coat: 2 Grey coats: 1 Black coat🗸\* |
|  |  |  |  |  |
| P2 and F2🗸 |  |  |  |  |
| Meiosis and fertilisation🗸  |  |  |
| 2 compulsory + Any 4 |

 | (6) |
|  |  |  | **(7)**  |
|  |  |  |  |
| 2.5 | 2.5.1 | Purple flowers, long pollen grains ✓ | (1) |
|  |  |  |  |
|  | 2.5.2 | ab ✓✓ | (2) |
|  |  |  |  |
|  | 2.5.3 | Purple flowers, long pollen grains 🗸: purple flowers, round pollen grains 🗸  | (2) |
|  |  |  | **(5)** |
|  |  |  |  |
| 2.6 | 2.6.1 | (a) Time✓ / Source of milk (b) Mass✓/ Weight | (1)(1) |
|  |  |  |  |
|  | 2.6.2 | * Same age ✓
* Same mass to start off with ✓
* Same time intervals of measurement ✓
* Same unit of measurement of mass✓

**(Mark first ONE only)** Any | (1) |
|  |  |  |  |
|  | 2.6.3 | 15,8 – 4  x 100 = 295%  4 | (3) |
|  |  |  |  |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 2.6.4 | Mass gain of two babies from ages 2-8 months fed on two sources of milkRubric for assessment of the graph

|  |  |
| --- | --- |
| **Criterion** | **Mark Allocation** |
| Correct type of graph (**T**) | 1 |
| Caption for graph (**C**) | 1 |
| Correct labels including units for X-axis and Y-axis (**L**) | 1 |
| Correct scales for y-axis and size of bars and spaces between bars (**S**) | 1 |
| **Plotting of points:** |  |
| 1 to 7 bars correct (**P**) |  1 **OR** |
| Graph drawn for **required months** only, with all 8 bars correct | 2 |

 |  (6)**(12)** |
|  |  |  |  **[40]** |

**QUESTION 3**

|  |  |  |  |
| --- | --- | --- | --- |
| 3.1 | 3.1.1 | * Due to use or disuse✓ /more or less use of an organ
* it becomes more or less developed✓
* and this acquired characteristic✓
* is passed on to the offspring✓
 | (4) |
|  | 3.1.2 | * Punctuated equilibrium explains the speed at which evolution
* occurs✓
* it involves long periods of time✓
* where species do not change ✓/change gradually through natural

 selection* known as equilibrium✓

 alternating with short periods of time✓where rapid changes✓ occur through natural selection Any  | (4) |
|  | 3.1.3 |

|  |  |
| --- | --- |
| **Natural selection** | **Artificial selection** |
| The environment or nature is the selective force✓  | Humans represent a selective force✓ |
| Selection is in response to suitability to the environment✓ | Selection is in response to satisfying human needs✓ |
| Occurs within species✓ | May involve one or more species✓ |

 |  |
|  |  | **(Mark first TWO only)** ✓table | (5) |
|  |  |  | **(13)** |
|  |  |  |  |
| 3.2 | 3.2.1 | *Anolis scriptus*🗸  | (1) |
|  |  |  |  |
|  | 3.2.2 | * Short hind limbs✓
* Bigger toepads✓
* Longer arms✓

**(Mark first TWO only)** Any  | (2) |
|  |  |  |  |
|  | 3.2.3 | * Longer hind legs acted as sails✓catching the wind✓ / carrying the lizard away into the sea
 | (2) |
|  |  |  | **(5)** |
| 3.3 |  | * There was variation in the spike shape of the cell wall🗸 of the bacteria population.
* Bacteria with triangle spikes and square spikes🗸
* were not antibiotic resistant🗸/ antibiotics were able to bind to the surface
* and were killed by the antibiotics 🗸/ did not survive
* The bacteria with the round spikes🗸
* were resistant to the antibiotics🗸/ antibiotics were unable to bind to the surface
* and they survived🗸
* and reproduced, passing the characteristic of round spikes to the next generation✓ increasing the proportion of these bacteria

 Any  | **(6)** |
|  |  |  |  |
| 3.4 | 3.4.1 | **X** – foramen magnum✓**Y** – canines✓ | (1)(1) |
|  |  |  |  |
|  | 3.4.2 | * The more forward position of the foramen magnum✓/ X
* allows the spinal cord to exit the skull directly downwards✓
* This acts as an axis for the skull✓
* making it favourable for bipedalism✓/ an upright position

 Any  | (3) |
|  |  |  |  |
|  | 3.4.3 | (a) **B**✓  | (1) |
|  |  |  |  |
|  |  | (b) **A**✓ | (1) |
|  |  |  |  |
|  | 3.4.4 | * There is an increase🗸
* in the cranium size🗸from organism **B** to organism **C**
* This will allow it to house a larger brain🗸/ cerebrum which

suggests greater intelligence | (3) |
|  |  |  |  |
|  | 3.4.5 | (a) * The spine changed from C-shaped to more curved ✓/ s-shape,
* which provides better support for bipedalism✓

(b) * The pelvis changed from being long and narrow to shorter and wider✓,
* to support the body weight in an upright position✓
 | (2)(2) |
|  |  |  |  |
|  | 3.4.6 | * The oldest fossils of *Homo erectus* were found in Africa✓,
* while the younger fossils were found in other parts of the world✓
* suggesting that *Homo erectus* originated in Africa✓ Any
 | (2) |
|  |  |  | **(16)** |
|  |  |  | **[40]** |
|  |  | **TOTAL SECTION B:** | **80** |

**SECTION C**

**QUESTION 4**

**Speciation**

* If a population of a single species becomes separated
* by a geographical barrier (sea, river, mountain, lake)
* There is now no gene flow between the populations / the populations can no longer interbreed.
* Since each population may be exposed to different environmental conditions,
* natural selection occurs independently in each of the two populations
* such that the individuals of the two populations become very different
* genotypically and phenotypically.
* Even if the populations were to mix again,
* they will not be able to reproduce with each other.
* They have thus become different species.

 Any (9)

**Reproductive isolating mechanisms**

* **Breeding at different times of the year**
* One species is fertile when the other is not
* **Species-specific courtship behaviour**
* Courtship behaviour of one species will not attract other species
* **Adaptation to different pollinators**
* Pollinator of one species is not adapted to pollinate another species
* **Infertile offspring**
* A new species cannot form because they cannot produce fertile offspring
* **Pheromonesare used to attract mates**
* If the pheromones are not correct, they will not mate
* **Different genitalia**
* Unsuited / incompatible reproductive organs prevent mating Any 4 x 2 (8)

**NOTE:** NO marks will be awarded for answers in the form of flow charts, tables or diagrams.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **ASSESSING THE PRESENTATION OF THE ESSAY**

|  |  |  |  |
| --- | --- | --- | --- |
| **Criterion** | **Relevance (R)** | **Logical sequence (L)** | **Comprehensive (C)** |
| **Generally** | All information provided is relevant to the topic. | Ideas are arranged in a logical / cause-effect sequence. | All aspects required by the essay have been sufficiently addressed.  |
| **In this essay in Q4** | Only information relevant to:* Geographic speciation
* Reproductive isolation

mechanisms was included.There is no irrelevant information | The description of:* Geographic speciation is logical and sequential
* Reproductive isolation mechanisms are in a logical sequence
 | Minimum correct points include:* **6/9** for Geographic speciation
* **5/8** for Reproductive isolating mechanisms
 |
| **Mark** | 1 | 1 | 1 |

 |

|  |  |  |
| --- | --- | --- |
|  | **Total Section C:****TOTAL:**  |  **20****150** |