education

Department:
Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

LIFE SCIENCES P2

MEMORANDUM

EXEMPLAR 2008

This memorandum consists of 11 pages.

SECTION A

Question 1

1.1

1.1.1 C✓✓
1.1.2 D ✓✓
1.1.3 C ✓✓
1.1.4 A ✓✓

4 x 2 = **(8)**

1.2

1.2.1 Biodiversity✓
1.2.2 Deforestation✓
1.2.3 Fossils✓
1.2.4 Continental drift✓
1.2.5 Biodegradable✓
1.2.6 Sustainable use/sustainability/conservation✓

(6)

1.3

1.3.1 E✓
1.3.2 D✓
1.3.3 C✓
1.3.4 A✓
1.3.5 B✓ **(5)**

1.4

1.4.1 - factories✓
- refineries✓
- motor vehicles✓
- burning✓
- cigarette smoking✓ any (3)

(Mark first THREE only)

1.4.2 1995✓ (1)

1.4.3 - When the SO_2 concentration increases✓
- the number of respiratory diseases reported per week increases✓

OR

- When the SO_2 level is low✓
- the number of respiratory diseases per week is also low✓

OR

- The SO_2 concentration increases up to 1995 and then decreases✓and the number of respiratory diseases follow the same pattern✓ (2)

1.4.4
- asthma✓
- bronchitis✓
- allergies✓
- emphysema✓
- lung cancer✓
- coughing✓
- shortness of breath✓ any (3)

(Mark first THREE only)

1.4.5
- Reduce the burning of wood and coal✓
- Use public transport – reduce number of vehicles on the road reduce SO_2, CO, CO_2 etc ✓
- Use vehicles which don't require fossil fuels✓/electric cars
- Use unleaded petrol – decrease amount of lead in atmosphere✓
- Use catalytic converters on cars and in factories✓
- Monitor emission from industries so that they comply with government regulations✓
- Educate people (school/community) on importance of caring for our environment✓ any (3)

(Mark first THREE only) **(12)**

1.5

1.5.1 Evolutionists believe that this is biological evidence✓ for evolution✓

OR

All evolved ✓from a common ancestor✓ (2)

1.5.2 A ✓ (1)

1.5.3 Vertebrates thought to develop from aquatic form✓ which breathes by means of gills✓ (2)

(5)

1.6

1.6.1 When a geographical barrier✓ e.g. mountain, river, sea, etc. separates a subpopulation of breeding individuals from the parent population✓ (2)

1.6.2 (Less) seeds available on the island✓/competition for seeds available/availability of different sources of food (1)

1.6.3 - There was a great variety within the species because of genetic variation✓
- leading to natural selection✓
- Many seed-eating finches died✓
- Those finches that were able to eat different foods/non-seed food survived in greater numbers✓
- to pass on their genes to their offspring✓
- Species became distinct and adapted to the specific food on that island✓ any (5)
(8)

1.7

1.7.1 - Shortage of food✓/suitable habitat
- Cheetahs are endotherms and could not survive the cold✓ (2)
(*Mark first TWO only)*

1.7.2 - Farmers kill cheetahs because they prey on their livestock✓
- Hunters kill cheetah for a trophy/skin/sport✓ (2)
(Mark first TWO only)

1.7.3 Increase the gene pool✓ by introducing individuals from breeding populations✓ from the different parts of the world✓ any (2)
(6)

TOTAL QUESTION 1: [50]
TOTAL SECTION A: [50]

SECTION B

Question 2

2.1

2.1.1 Change in colour of methylene blue indicator✓at two places, A and B, along a river✓ (2)

2.1.2 Oxygen level is higher before✓ the sewage outflow pipe and lower after the sewage outflow pipe✓

OR

Oxygen level is lower before✓ the sewage outflow pipe and higher after the outflow pipe ✓

OR

Oxygen levels are the same✓ before and after the sewage outflow pipe✓

OR

Oxygen levels differ✓ before outflow pipe and after the outflow pipe✓

any (2)

2.1.3
- The water in the river may have been fast flowing or very deep. It is much safer to lower a bucket into the water than risk drowning✓
- Sewage is potentially harmful so protective gloves prevent sewage getting onto the skin✓ (2)

2.1.4 To see if sewage had any effect on oxygen level✓/one with sewage and one without sewage/the first one serves as a the base/the control/ oxygen levels differ before and after the outflow pipe (1)

2.1.5 B✓ (1)

2.1.6
- The loss of blue colour shows low levels of oxygen✓
- because bacteria and other decomposers✓are abundant in the water
- because of the sewage✓
- and therefore use up the oxygen✓ any (3)

2.1.7 Low oxygen levels✓ will decrease✓ the fish numbers (2)

2.1.8 They could collect several samples✓and over many days✓ of water from before and after the sewage outflow pipe and test them for oxygen levels (2)
(Mark first TWO only)

(15)

2.2

2.2.1
- Neem leaves are cheaper than chemical pesticides ✓
- Using neem leaves prevents any side effects which chemical pesticides cause✓/not toxic to the environment
- Neem leaves are easy to use✓ (3)
(Mark first THREE only)

2.2.2 - Brushing plants three times a week is labour intensive✓
- The neem trees could be exploited✓/over-used (2)
(Mark first TWO only)

2.2.3 - The government can fund research✓ into the use of the indigenous knowledge which could benefit the population✓
- Disseminate information to everyone✓ so that usage of chemical pesticides is reduced or stopped✓
- Increase tax/price of chemicals pesticides✓ so that environmental friendly resources are used✓

OR any other acceptable answer any 2 x 2 (4)

(Mark first TWO only)

(9)

2.3

2.3.1 - Perlemoen could be in danger✓ of becoming extinct✓/endangered
- Disturbing the food chain✓/web so that other organisms are also affected✓ 2 x 2 (4)
(Mark first TWO only)

2.3.2 - Limit number caught✓
- Only licensed fishermen catch perlemoen✓
- Heavy penalties/fines for those who contravene regulations✓
- Stipulate minimum size of perlemoen that can be caught to minimize the impact on the population✓
- Patrol all those beaches where perlemoen is found to ensure compliance with regulations✓ any 2 (2)
(Mark first TWO only)

(6)

Total Question 2: [30]

Question 3

3.1

3.1.1 93✓% (accept 92 - 95) (1)

3.1.2 - As the pollution decreased✓
- the percentage of the dark-coloured moths also decreased✓ (2)

3.1.3 - The dark-coloured moths are not being camouflaged✓/can easily be seen against the light lichen-covered bark
- and have become easier targets/prey for birds✓ (2)
(5)

3.2. - Lamarck believed that structures✓ of individuals in a population became better✓ or less adapted✓ to the environment✓ depending on the frequency of their use✓
and that these adaptations could be inherited from generation to generation✓
He suggested that change was driven by living things themselves✓ as they strove to perfect their way of life✓
More complex organisms developed from less complex organisms✓
He supported the idea of common descent and linked diversity with adaptation to the environment✓
He supported the idea of the inheritance of acquired characteristics✓

any **(5)**

3.3

3.3.1 A mutation is a mistake✓/alteration due to a change in the composition of DNA ✓

OR

Sudden change✓ in the structure of a gene✓ (2)

3.3.2 - by accident during meiosis✓
- some chemicals✓/mutagens/high energy radiation (2)
(Mark first TWO only)

3.3.3 Neutral mutation - these are of no benefit✓ to the organism and they are not harmful to the organism✓and are not affected by natural selection✓ any (2)

Lethal mutation - they are harmful✓/ cause the death of the individuals that inherit✓ them because natural selection selects against them✓ any (2) (4)
(8)

3.4

3.4.1 A - Modern human *(Homo sapiens)* ✓
B - Gorilla (*Gorilla gorilla)* ✓
C - Taung child (*Australopithecus africanus)* ✓ (3)

3.4.2

Organism A	Organism B
Flat face✓	Protruding jaws✓
Chin prominent✓	Chin not prominent✓
Foramen magnum occurs towards middle of the skull✓	Foramen magnum towards the back of the skull✓
No central ridge on the cranium✓	Central ridge on the craniuml✓
Eye sockets in front of skull✓	Eye sockets on top, front part of the skull✓
Less pronounced eyebrow ridge✓	Pronounced eyebrow ridge✓

any 2 x 2 (4)

(Mark first TWO only)

3.4.3 B✓ (1)

3.4.4 It has most developed✓ canines✓ (2)

3.4.5 A✓ and C✓ (2)
(Mark first TWO only)

(12)

Total Question 3: [30]

TOTAL SECTION B: [60]

SECTION C

Question 4

4.1

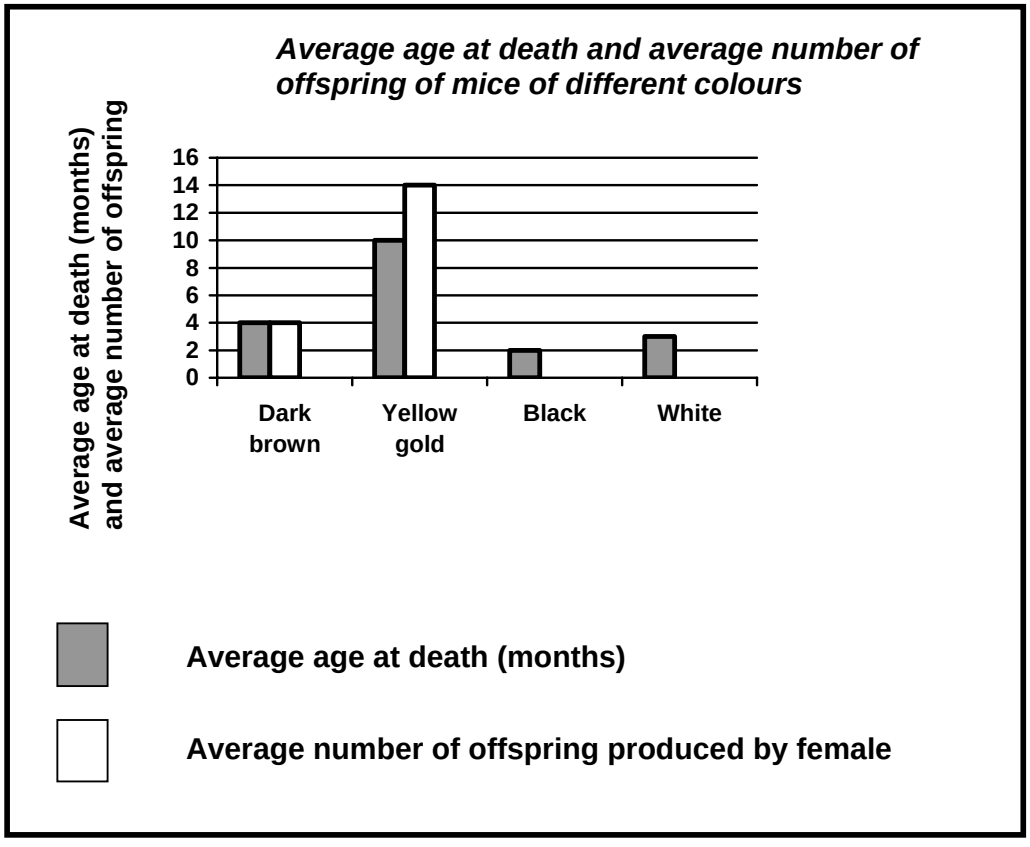
4.1.1 B✓ (1)

4.1.2 Not easily seen by predators because it blends✓ in with the environment and survived to produce the highest number of offspring✓ (2)

4.1.3 They were too young✓/killed before they could reproduce✓ (1)

4.1.4 The yellow-gold mouse has a high survival ability because its colour blends in with the surrounding✓ – therefore it does not require a high running speed to run away from predators✓ (2)

4.1.5



Rubric for the mark allocation of the graph

Correct type of graph	1
Title of graph	1
Correct label for X-axis	1
Two sets of data used	1
Correct label for Y-axis	1
Appropriate scale for X-axis/ correct width of bars	1
Appropriate scale for Y-axis	1
Plotting of the bars	1 - for no bars drawn for number of offspring of black and white mice
	For remaining 6 bars 1: 1 - 2 bars drawn correctly 2: 3 - 4 bars drawn correctly 3: 5 - 6 bars drawn correctly

Note:
If the wrong type of graph is drawn: marks will be lost for "correct type of graph" as well as for drawing of the bars.
If graphs are not drawn on the same system of axes, mark the first graph only using the given criteria (11)
(16)

4.2

4.2.1
- If a large population, showing a great deal of variation✓
- becomes separated by geographical barrier (or any example such as a mountain) ✓
- The population splits into two groups✓
- Within each group there is a great deal of variation✓
- Each group undergoes natural selection and develops differently✓
- genotypically✓ and phenotypically✓
- When these differences prevent them from interbreeding✓
- then one or both of the groups becomes a new species✓

any 6 (6)

4.2.2
- All living forms have been created by a Supreme Being✓ at the same time✓
- The organisms that have been created have not changed since their creation✓

(Accept any other reasonable explanation)

any (2)
(8)

4.3 Possible answer

- Landfill and burning with energy recovery✓
- Incorporate private companies✓ to utilise the heat generated ✓from the burning of landfill sites to generate electricity✓ thus saving on the electricity bill✓
- Investigate methods to collect and utilise methane gas as a fuel✓

- Recovery and recycling✓
- Encourage citizens of the city to put different types of waste✓ into different waste containers/bins of different colours✓
- Partnership with recycling companies for collection of different wastes✓
- This could generate income✓ and reduce the transport cost ✓
- Educate lower income groups to use organic waste✓ for example to make compost✓ which could fertilise soil, they can plant vegetables that will benefit poor people✓

- Educate citizens and companies to reuse waste✓ for example glass containers for milk, cold drinks and alcohol etc✓
- This will reduce the need to produce more from these items✓
- thus saving energy and money✓

- Reducing waste✓
- Charge people extra if they generate more waste. ✓
- Fines for people that do not separate the waste into different bins✓
- To encourage citizens to manage waste more efficiently✓

Or any other acceptable strategy

The following rubric will be used to assess the essay

CRITERIA	marks			
	1	2	3	4
State his/her waste managing strategy	One appropriate strategy given	Two appropriate strategies given	Three appropriate strategies given	Four or more appropriate strategies given
Description of strategy	One appropriate strategy described	Two appropriate strategies described	Three appropriate strategies described	Four or more appropriate strategies described
Motivation of strategy	One appropriate strategy motivated	Two appropriate strategies motivated	Three appropriate strategies motivated	Four or more appropriate strategies motivated
Synthesis	Significant gaps in the logic and flow of the answer	Minor gaps in the logic and flow of the answer	Well structured- demonstrates insight and understanding of the question	

(15)

Total Question 4: [40]