education

Department:
Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

LIFE SCIENCES P2

ADDITIONAL EXEMPLAR 2008

MEMORANDUM

MARKS: 150

This memorandum consists of 9 pages.

SECTION A

QUESTION 1

1.1

1.1.1 C✓✓
1.1.2 B✓✓
1.1.3 C✓✓
1.1.4 B✓✓
1.1.5 C✓✓
1.1.6 D✓✓
1.1.7 D✓✓

7 x 2 = **(14)**

1.2

1.2.1 Insecticide ✓
1.2.2 Radiometric dating✓
1.2.3 Mass extinction✓
1.2.4 Biodiversity ✓
1.2.5 Pollution ✓
1.2.6 Sustainable development ✓
1.2.7 Fossil fuels✓ **(7)**

1.3

1.3.1 D✓
1.3.2 G✓
1.3.3 H✓
1.3.4 A✓
1.3.5 F✓
1.3.6 B✓ **(6)**

1.4

1.4.1 During continental drift✓
the tortoise populations were isolated/separated✓ from the original population on different islands ✓
living under different environmental conditions✓
and through natural selection developed into new species✓
not able to interbreed after a period of time✓ (any 4) (4)

1.4.2 Fossils provide evidence of life forms that existed in the past/that are now extinct✓
Intermediate forms of organisms✓ have been discovered
that illustrate the changing forms of plants/animals✓ (any 2) (2)

1.4.3 Only a few of the ancient organisms are preserved as fossils ✓ because they need to be covered soon after death otherwise they will be decomposed by bacteria✓
Only organisms with a solid and resistant skeleton✓ are easily preserved✓
We have not found all the fossils✓ that exist in the earth✓
(any 1 x 2) (2)
(Mark first ONE only) **(8)**

1.5

1.5.1 Province A✓ (1)

1.5.2 $\frac{450 - 375/75✓}{375✓} \times 100 = 20✓\%$ (3)

1.5.3 Pollution and contamination ✓of water sources
Toxic discharge✓ affects aquatic flora and fauna
Decomposition of waste – Bad smell/odours✓
Aesthetically unattractive✓
Causes eutrophication ✓ (any 2) (2)
(Mark first TWO only) **(6)**

1.6

1.6.1 Independent variable – pH✓ (1)

1.6.2 Dependant variable – number of seeds germinating✓ (1)

1.6.3 -Repeat the test using different seeds to get similar results✓.
-Repeat the investigation at each different pH✓. (2)
(Mark first TWO only)

1.6.4 The number of seeds germinating increased as the pH increased. ✓
The optimal pH for seed germination is 7 in this investigation. ✓
No seeds germinated at pH 2✓ (any 2) (2)

1.6.5 Introduce legislation reducing the chemical emission from industries. ✓
Monitor the level of chemical emissions✓
Introduce fines for industries if they exceed the level✓ (3)
(Mark first THREE only) **(9)**

TOTAL QUESTION 1: 50

TOTAL SECTION A: 50

SECTION B
QUESTION 2

2.1

2.1.1 Reproduction/Fusion ✓ (1)

2.1.2 A Prophase I✓
B Metaphase 1✓ (2)

2.1.3 D – Gene mutation✓
E – Chromosome mutation✓ (2)

2.1.4 During meiosis the chromosomes fail to separate ✓ gametes have diploid set of chromosome ✓ offspring have additional sets of chromosome ✓ (3)

2.1.5 (a) **Lethal:** the mutated organism dies and the harmful characteristics are not passed on to the next generation✓
(b) **Neutral:** has no effect on the structure and functioning of the organism✓
(c) **Fixed:** advantageous✓/sometimes the advantageous mutation wipes out all the other alleles controlling the same characteristic within the population (3)
(11)

2.2 Bacteria produce a large number of offspring in a short space of time✓
There is a great deal of variation among the offspring as a result of mutations✓
As a result of natural selection✓
those bacteria that cannot resist the antibiotics will die✓
whilst those that can resist the antibiotics will survive✓
and produce more offspring✓.
Over many generations the proportion of antibiotic-resistant bacteria increases✓
(any 5) **(5)**

2.3

2.3.1 4,6 – 4,8 ✓ million years ago (1)

2.3.2 Bipedalism✓ (1)

2.3.3 *Australopithecus afarensis*✓ (1)

2.3.4 -Little foot
-Mrs Ples
-Taung child (any 2) (2)
(Mark first TWO only)

2.3.5 Bare finger tips✓
Long arms ✓
Freely rotating arms ✓
Stereoscopic vision ✓
Eyes with cones (in addition to rods) ✓
Large brain compared to body mass ✓
Portions of brain centres that process information from hands and eyes enlarged ✓
Olfactory brain centres✓
Few offspring ✓
(Mark first FOUR only) (4)
(9)

2.4
-Formation of large clouds of dust✓
-blocking out the sun✓
-global cooling✓
-stopping photosynthesis✓
-no producers in food chains✓
-food chains involving dinosaurs destroyed✓
-causing extinction (any 5) **(5)**

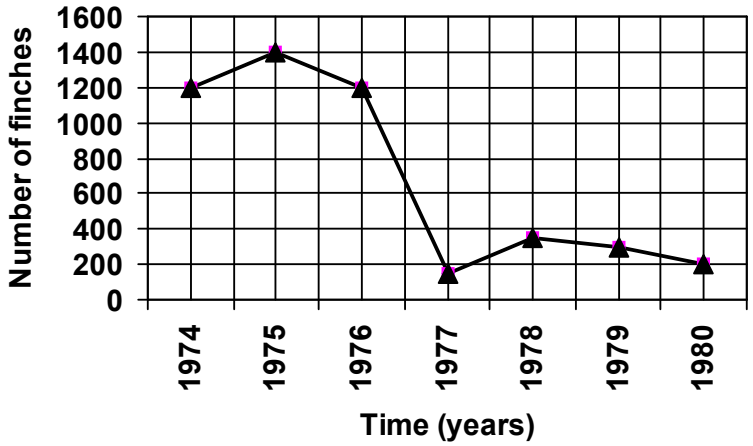
TOTAL QUESTION 2: 30

QUESTION 3

3.1

3.1.1

Number of finches from 1974 to 1980



Rubric for the mark allocation of the graph

Correct type of graph	1
Title of graph	1
Correct label for X-axis	1
Correct label for Y-axis	1
Appropriate scale for X-axis	1
Appropriate scale for Y-axis	1
Correct unit for X-axis	1
Plotting points	1: 1 - 2 correctly plotted 2: 3 - 5 correctly plotted 3: 6 - 7 correctly plotted
Joining of points	1

(11)

NOTE:
If the wrong type of graph is drawn: marks will be lost for "correct type of graph" as well as for the "joining of points".

3.1.2 1977✓ (1)

3.1.3 A drop in rainfall ✓causes the a drop in seeds/plants because of drought✓ that causes a lack of seeds✓/food for finches therefore less finches✓ (any 3)(3)

3.1.4 These finches✓ were not able to eat the large seeds✓ (2)

3.1.5 Yes✓
The surviving finches had bigger beaks to be able to eat the bigger seeds✓
The dead finches had smaller beaks and were not able to eat the bigger seeds✓
(3)
(20)

3.2

3.2.1 South African Highveld ✓ (1)

3.2.2 Inflammation✓ and digestive system illnesses✓ (2)

3.2.3 By people using land for other purposes like agriculture✓,
to plant crops✓, plantations✓ or building houses ✓ (any 2) (2)

3.2.4 If the number of Devil's claw plant is reduced, the smaller animals/herbivores that eat it will decrease in numbers✓,
The carnivores that rely on the herbivores will also decrease in number✓
The energy flow through the habitat will be reduced✓ (3)

3.2.5 By establishing nurseries, to grow the plants✓
Legislation on the amounts to be harvested✓
Collecting only the amount one requires✓
Re-planting the main root after the secondary tubers have been removed✓
(any 2) (10)

TOTAL QUESTION 3: 30

TOTAL SECTION B: 60

SECTION C

QUESTION 4

4.1

4.1.1 Exhaust gases have a negative effect✓/positive effect/no effect on the percentage of seeds that germinate✓. (2)

4.1.2 She replicated the investigation three times✓ and then found the average ✓ (2)
(Mark first ONE only)

4.1.3 Oxygen is required for germination. ✓ Car exhaust fumes contains carbon monoxide✓that negatively affects the % of seeds that germinate. ✓ (any 2) (2)

4.1.4 Do not germinate seeds✓ near roads/where it is exposed to carbon monoxide✓ (1)

(Mark first ONE only) **(7)**

4.2

4.2.1 The limits for each country is determined by the abundance✓
of each type of fish in the waters of each country✓. (2)

4.2.2 The quota for fish 2 is higher since, compared to fish type 2, this fish type is more abundant ✓ in the waters of both countries. ✓ (2)

4.2.3 As the numbers dwindle, correspondingly a lower quota is set✓.
Once the population of each fish type increases due to these conservation measures, the fishing quota is increased. ✓ (2)

4.2.4 Set a fishing season✓ – allows for catching of fish after the breeding season✓
Set a bag limit✓ – to limit the number of fish caught per person✓
Set a size limit✓ – to avoid catching of fish that has not completed breeding✓
Impose heavy fines✓ – to encourage adherence to the fishing regulations✓
(any 3 x 2) (6)
(12)

4.3

4.3.1 The appendix in humans has no known function✓/vestigial structure
The appendix functions in herbivores to digest plant materials✓
This indicates a close evolutionary relationship between humans and the other herbivores (3)

4.3.2 Gill slits in human embryo are non-functional✓
They are functional in fish for gas exchange✓
This indicates a possible aquatic ancestor for humans✓ (3)
(6)

4.3 Possible answer

Arguments for mining

- Provide jobs
- and income for people
- Positive contribution to the economy
- Helps to prevent poverty in communities
- Can become a tourist attraction
- Any other valid reason (any 3) (3)

Arguments against mining

- Health risks
- Exploitation of natural resources
- Can cause harm/pollution to the environment
- Water pollution – leach of chemicals into water resources
- Can destroy ecosystems
- Cause eutrophication
- Any other valid reason (any 3) (3)

Negative impact on health

- Accumulation of heavy metals in food chain – cause diseases
- Mercury and copper is poisonous to humans and can cause death
- can cause different infections and skin allergies
- Any other valid reason (any 3) (3)

Strategies to prevent water pollution

- Disposal of heavy metal and other polluters in proper ways, install solid waste cans which cannot leak
- Manage animal waste – use it as fertilisers
- Prevent the unnecessary use of artificial fertilisers
- Dispose of sewage in proper ways – enough toilets and septic tanks, maintain sewage systems
- Enforce penalties on industries that release waste into rivers and streams
- Educational programmes on water pollution (any 3) (3)

Content (12)

ASSESSING THE PRESENTATION OF THE ESSAY

Marks	Descriptions
3	Well structured – demonstrates insight and understanding of question
2	Minor gaps in the logic and flow of the answer
1	Attempted but with significant gaps in the logic and flow of the answer
0	Not attempted/nothing written other than question number

Synthesis (3)

(15)

TOTAL QUESTION 4: 40

GRAND TOTAL: 150

