

**GAUTENG DEPARTMENT OF EDUCATION
PREPARATORY EXAMINATION**

**LIFE SCIENCES
(Second Paper)**

POSSIBLE ANSWERS

SECTION A

QUESTION 1

- 1.1
- 1.1.1 C ✓✓
- 1.1.2 D ✓✓
- 1.1.3 B ✓✓
- 1.1.4 C ✓✓
- 1.1.5 B ✓✓ 5x2=(10)
- 1.2
- 1.2.1 Sustainable use/sustainability/conservation ✓
- 1.2.2 Mortality ✓
- 1.2.3 Biodegradable ✓
- 1.2.4 Deforestation ✓
- 1.2.5 Speciation ✓
- 1.2.6 Fossils ✓ (6)
- 1.3
- 1.3.1 E ✓
- 1.3.2 D ✓
- 1.3.3 G ✓
- 1.3.4 B ✓
- 1.3.5 A ✓ (5)
- 1.4
- 1.4.1 - Grass ✓
- Trees ✓ (2)
- 1.4.2 Food web ✓✓ (2)
- 1.4.3 - Less organisms to feed on grass ✓
- More grass for deer/mouse ✓
- No food for frogs ✓
- Frogs either move away/die of starvation ✓ (3)
- 1.4.4 Decomposers break down dead organic matter/Decomposers recycle materials in the environment. /✓
Decomposers return nutrients to the soil/Decomposers return materials to the environment. ✓ (2)

- 1.4.5 Hawk✓ predator✓ mouse✓ prey✓
 Frog✓ predator✓ cricket✓ prey✓
 Snake✓ predator✓ mouse✓ prey✓
 Owl✓ predator✓ mouse✓ prey✓
 Owl✓ predator✓ frog✓ prey✓
 MARK FIRST PAIR ONLY (4)

1.5

1.5.1 Paper✓ (1)

1.5.2 Steel✓ (1)

- 1.5.3 Total Plastic = 1,8 000 000 tonnes
 Plastic from industry = 1,8 000 000 tonnes✓ - 1,2 000 000 tonnes✓
 = 0,6 000 000 tonnes✓
 Percentage = 0,6/1,8 (000 000 tonnes) x 100✓
 = 33,3%✓ (4)

1.5.4 Glass✓ (1)

1.5.5 Table showing the mass of waste produced by homes and industries in South Africa in 2007.

WASTE MATERIAL✓	HOME✓ 000 000 tonnes	INDUSTRIES✓ 000 000 tonnes
Paper✓	0,4✓	3,5 ✓
Steel✓	0,2✓	0,5 ✓

(9)

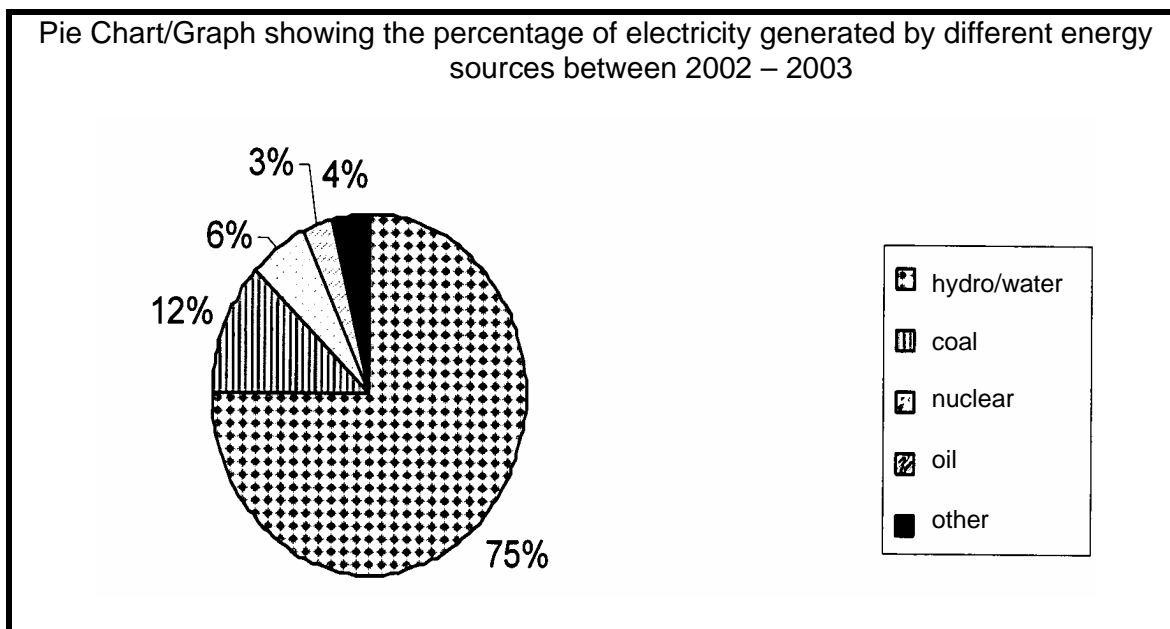
TOTAL QUESTION 1: [50]
TOTAL SECTION A: [50]

SECTION B

QUESTION 2

2.1

2.1.1 Graph showing percentage of electricity generated by different energy sources between 2002 – 2003.

**Rubric for the mark allocation of the graph**

Correct type of graph	1
Title of graph	1
Key	1
Percentage on sectors	1
Correlation of sectors with key	1
Proportions	1 – no sector shown for sum For remaining sectors (5) 1: 1 sector correct 2: 2 sectors correct 3: 3 sectors correct 4: 4 sectors correct 5: 5 sectors correct

Note:

If the wrong type of graph is drawn: marks will be lost for "correct type of graph" as well as for drawing of sectors in correct proportion.

(11)

- 2.1.2 Coal✓/oil✓ (2)
- 2.1.3 Hydro (water) ✓/ solar (Sun)✓ (2)
- 2.1.4 Burning coal can produce air pollution/acid rain/global warming/deplete the ozone layer✓ (1)
- 2.1.5 $(86/4) \checkmark = 21,5\checkmark:1\checkmark$ (3)
- 2.1.6 Wind/biofuels✓ (Any 1) (1)
- 2.2
- 2.2.1 As the pH decreases✓, the bean plants will grow faster✓/
As the pH increases✓, the bean plants will grow slower✓
Bean plants will grow faster/slower✓ in normal rain✓ than in acid rain/
Acid rain limits/stunts/promotes✓ bean plant growth✓
Acid rain has a negative impact/positive impact✓ on the growth rate of bean plants✓ (2)
- 2.2.2 pH✓ (1)
- 2.2.3 Type of soil✓
Nutrients available✓
Amount of liquid✓
Type of bean plant✓
Temperature✓ (*Mark first FOUR only*) (4)
- 2.2.4 To set a standard✓ so that we can compare the results✓ (2)
- 2.2.5 The acid eats into the stone, brick and metal articles✓/ pollutes water sources✓/kills useful micro-organisms (*any ONE*) (1)

TOTAL QUESTION 2: [30]

QUESTION 3

- 3.1
- 3.1.1 Lamarck's theory✓ (2)
- 3.1.2 The suggestion is that the offspring inherited✓ the acquired dark pigmentism /by eating the soot covered leaves✓ (2)
- 3.1.3 The white moth decreased in numbers compared to the dark form of moths due to it being easily ✓ spotted by predator birds ✓ (2)
- 3.1.4 Genetic drift ✓ (1)
- 3.2
- 3.2.1 Speciation✓ (1)
- 3.2.2 Interbreeding between individuals of the same species✓ (1)
- 3.2.3 Ocean/Sea/Mountain range✓ (1)
- 3.2.4 Beak structure ✓ (1)
- 3.2.5 To adapt to the food type/available food✓ in different areas✓ (2)
- 3.3
- 3.3.1 No✓ tails present✓/tail✓ absent✓ (2)
- 3.3.2 (a) Bipedal✓ (1)
- (b) Quadrupedal✓ (1)
- 3.3.3 Their view of surroundings would have been limited. ✓
They would have been slow in ✓moving (in their current environment) (2)
- 3.3.4

MAN	CHIMPANZEES
Straight finger bones	Curved finger bones
Fully opposable thumbs	Longer thumbs
Legs longer than arms	Arms longer than legs
Legs and spine almost straight	Spine rectangular to legs
Reduced snout (nose) - s-shaped	Noticeable snout – c shaped
Smaller teeth	Bigger teeth

(any) 5x2=[10]

- 3.3.5 Makes branchiation (swinging from branches) ✓ more difficult✓ (2)

TOTAL QUESTION 3: [30]**TOTAL SECTION B: [60]**

SECTION C

QUESTION 4

4.1

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

OR

Sudden change✓ in the structure of the genes✓ (2)

4.1.2 – Some chemicals✓/mutagens
– high-energy✓ radiation
– x-rays✓
(Mark first TWO only) (2)

4.1.3 Fixed mutation: when an advantageous✓ mutant gene wipes out✓ all other alleles✓ controlling the same characteristic in the population (any (2))

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)) (6)

4.1.4 Actual organism or parts of it turned into stone✓
Imprints or outlines of organisms left in stone✓ (2)

4.1.5 Ice✓/pits of tar✓/sap from trees✓ (3)
[15]

4.2

4.2.1 Monkey✓ (1)

4.2.2 Monkey and man have common✓ ancestor✓ (2)

4.2.3

- Fossil record✓/
- comparative anatomy✓/
- biogeographical evidence✓/
- embryology✓ (4)

4.2.4 Mould✓ (1)

4.2.5 Most✓ number of differences in Cytochrome C✓ when compared to humans (2)
[10]

4.3

4.3.1

- Due to their rapid✓ rate of reproduction✓ more✓ bacteria than can possibly survive
- Due to genetic differences (variation) ✓, some bacteria had genes✓ making them resistant✓ to the antibiotic and so were better✓ adapted to an environment containing the antibiotic.
- They were the ones most likely to survive✓ and produce the next generation✓
- This is referred to as natural selection✓
- Over several generations✓, a greater percentage of the population was resistant ✓ (adaptation to the environment).

(any 9) (9)

4.3.2

- The earth is only 6 000 years old✓
- The probability of forming a single cell by chance is very small✓
- The fossil record has too many gaps✓
- Accept any ONE acceptable religious argument✓

(any 3) (3)

The following rubric will be used to assess the synthesis

CRITERIA	Marks			
	0	1	2	3
Synthesis	Not attempted/ all information irrelevant	ONE aspect addressed with some irrelevant information	ONE aspect addressed with no irrelevant information OR TWO aspects addressed with some irrelevant information	TWO aspects addressed with no irrelevant information

(3)

(15)

TOTAL QUESTION 4: [40]

TOTAL SECTION C: [40]

TOTAL: 150