

**GRADE 12
LIFE SCIENCES
P2
PREPARATORY EXAMINATION
MEMO
SEPTEMBER 2009**

Marks: 150

Duration : 2h30

This memorandum consist of 9 pages

PRINCIPLES RELATED TO MARKING LIFE SCIENCES 2009

1. **If more information than marks allocated is given**
Stop marking when maximum marks 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 whole process is given when only part of it is required**
Read all and credit relevant part.
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 is incorrect, do not credit. If sequence and links becomes 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 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 only letter is asked for and only name is given (and vice versa)**
No credit
14. **If units are not given in measurements**
Candidates will lose marks. Memorandum will allocate marks for units separately
15. Be sensitive to the **sense of an answer, which may be stated in a different way.**
16. **Caption**
All illustrations (diagrams, graphs, tables, etc.) must have a caption

SECTION A

QUESTION 1

1.1

1.1.1 D ✓✓

1.1.2 B ✓✓

1.1.3 C ✓✓

1.1.4 ✓✓

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 x 1 (10)

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 x 2 (12)

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 ✓

Mark first ONE only

any 1 x 2

(2)

(8)

- 1.5
- 1.5.1 Province A ✓ (1)
- 1.5.2 $450 - \frac{375}{75} \times 100 = 20\%$ ✓ ✓
375 ✓ (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 ✓
- Mark first TWO only any 2 (2)
- (6)
- 1.6
- 1.6.1 number of seeds germinating ✓ (1)
- 1.6.2 Repeat the test using different seeds to get similar results ✓
Repeat the investigation at each different pH ✓ (2)
- (Mark first TWO only)
- 1.6.3 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)
- 1.6.4 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) (8)

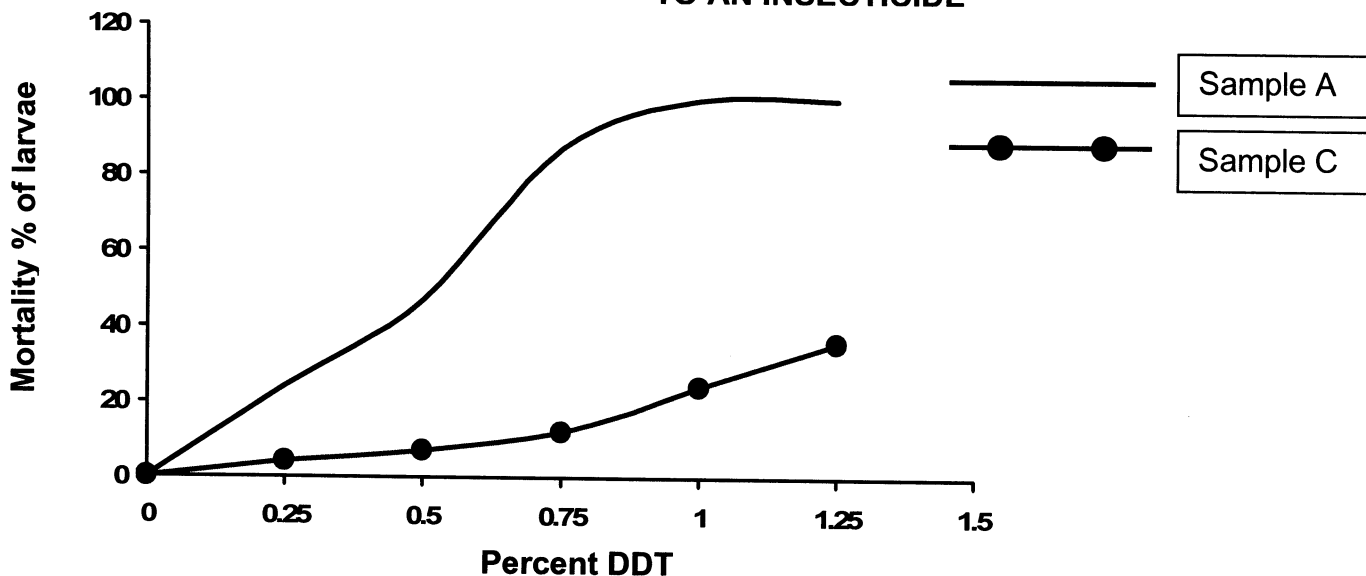
TOTAL SECTION A: [50]

SECTION B
QUESTION 2

- 2.1
- 2.1.1 Sample C ✓ (1)
- 2.1.2 Sample A ✓ (1)
- 2.1.3 1,25% DDT ✓ (1)
- 2.1.4 It gives 85% mortality. ✓✓ (2)

2.1.5

A GRAPH SHOWING RESISTANCE OF MOSQUITO LARVAE TO AN INSECTICIDE



Suggested mark allocation:

Heading	✓
Key	✓
Label on Y-axis	✓*
Label on X-axis	✓*
Correct type of graph	✓
Title of graph	✓
Scale on Y-axis	✓
Scale on X-axis	✓
Correct plotting of points for Sample A	✓ ✓ ✓*
Correct plotting of points for Sample C	✓ ✓ ✓*
Correct joining of points for Sample A	✓
Correct joining of points for Sample C	✓
Bars are labelled	✓

If axes are incorrect/switched, then lose marks for items marked*

Any (11)

2.1.6 Long periods of spraying in the city have led to an immune/resistant mosquito population due to natural selection. ✓ There has been less time for such a population to develop in the city outskirts and no selection has occurred in the countryside. ✓

(2)

2.1.7 Possible answer: Encourage the use of a different/rotate the use of insecticide until immunity develops, ✓ then change again. ✓
Accept other possible explanations.

(2)

(20)

2.2

- 2.2.1 4,7 ✓ million ✓ (2)
- 2.2.2 Extinction ✓ (1)
- 2.2.3 Bipedalism ✓✓ (2)
- 2.2.4 *H. habilis* ✓ (1)
- 2.2.5 Hands & feet have flat nails (not claws) ✓✓ (2)
- First digit (thumb) separated from other fingers ✓✓ (2)
- (10)**
- (30)**

QUESTION 3

3.1

- 3.1.1 Natural selection ✓✓/survival of the fittest (2)
- 3.1.2 - There is variation ✓ in the types of leaves among the cacti plants
 - The cacti with thorns on leaves ✓/are better protected from herbivores
 - also better adapted for surviving under dry/unfavourable conditions ✓
 - more of the cacti with thorns on leaves survive ✓
 - most of the cacti without the thorns are eaten by herbivores ✓
 its number eventually decreases over generations/ becomes extinct ✓
 - most of the offspring produced have long roots ✓
 - number of cacti with thorns on leaves increases any FIVE (5)
- 3.1.3 A group of organisms that have similar characteristics ✓ and can interbreed ✓
 to produce fertile ✓ offspring (3)
- (10)**

3.2

3.2.1

KEY FEATURE	SKULL A	SKULL B	SKULL C
Size of the brain with regard to the rest of the skull.	Relatively small ✓	Larger brain ✓	Very large brain ✓
The brow ridges above the eyes.	Brow ridges are prominent ✓	Brow ridges less prominent ✓	Brow ridges absent ✓
Sloped or flat facial angle.	Pronounced sloped angle ✓	Slope less prominent ✓	Flat facial angle ✓

- 3.2.2 *H. erectus* is direct ancestor of *H. sapiens*. ✓ (9)
- 3.2.3 Increasing brain size / decreasing facial slope points to *H. sapiens*. ✓ ✓ (1)
- (2)**
- (12)**

3.3

- 3.3.1 When more organic waste is deposited into the river, ✓ the decomposing bacteria multiply quickly ✓ and use up the oxygen; ✓ level of oxygen in the water drops rapidly. ✓ Further downstream the organic matter decreases gradually, ✓ and the decomposing bacteria decreases at the same rate ✓ while the amount of oxygen slowly starts to increase. ✓
 Max (6)
- 3.3.2 Proper sewage facilities must be provided, ✓ make detergents and soap powders biodegradable, ✓ etc. Max (2)

(8)**[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)

4.4 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 pollutants 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)

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)
Content (12)
(15)

TOTAL QUESTION 4: 40
GRAND TOTAL: 150