This memorandum consists of 8 pages.
PRINCIPLES RELATED TO MARKING LIFE SCIENCES 2012

1. **If more information is given than marks allocated**
   Stop marking when maximum marks are 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 are incorrect, do not credit. If sequence and links become correct again, resume credit.

9. **Non-recognised 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 recognisable accept, provided it does not mean something else in Life Sciences or if it is out of context.

13. **If common names given in terminology**
    Accept, provided it was accepted at the national memo discussion.

14. **If only letter is asked for and only name is given (and vice versa)**
    No 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 a caption.
SECTION A

QUESTION 1

1.1
1.1.1 D ✓ ✓
1.1.2 C ✓ ✓
1.1.3 D ✓ ✓
1.1.4 A ✓ ✓
1.1.5 D ✓ ✓
1.1.6 B ✓ ✓
1.1.7 D ✓ ✓
1.1.8 B ✓ ✓
1.1.9 B ✓ ✓ (9 x 2) 18

1.2
1.2.1 Xerophytes ✓
1.2.2 Food web ✓
1.2.3 Acids ✓
1.2.4 Pericardium ✓
1.2.5 Bypass ✓
1.2.6 Altitude ✓
1.2.7 Biodiversity ✓
1.2.8 Geologic timescale ✓
1.2.9 Sterkfontein caves ✓
1.2.10 Extinction ✓ (10 x 1) 10

1.3
1.3.1 A only ✓ ✓
1.3.2 A only ✓ ✓
1.3.3 B only ✓ ✓
1.3.4 Both A and B ✓ ✓
1.3.5 Both A and B ✓ ✓
1.3.6 B only ✓ ✓
1.3.7 B only ✓ ✓
1.3.8 B only ✓ ✓
1.3.9 A only ✓ ✓
1.3.10 A only ✓ ✓
1.3.11 Both A and B ✓ ✓ (11 x 2) 22

TOTAL SECTION A: 50
SECTION B

QUESTION 2

2.1 2.1.1 (a) Greenfly
(b) Rose

2.1.2 Energy passed to greenfly = 1 000 kJ/m²/year \times \frac{10}{100} = (100 \text{ kJ/m²/year})
Energy passed to ladybird = 100 \text{ kJ/m²/year} \times \frac{10}{100} = (10 \text{ kJ/m²/year})
Energy passed to blackbird = 10 \text{ kJ/m²/year} \times \frac{10}{100} = (1 \text{ kJ/m²/year})

2.1.3 (a) Increase – not eaten by greenflies
(b) Decrease – no food for them to eat
(c) Decrease – as ladybirds die, no food for them also

2.2 2.2.1 (a) A
(b) B
(c) C

2.2.2 Soil becomes waterlogged; roots of the plants can rot

2.2.3 - Fine soil particles that are closely packed

2.2.4 - Improves the aeration of the soil
- Increases the water-retaining ability of the soil
- Improves the mineral content of the soil (any 2)
2.3 2.3.1 Fynbos ✓  
2.3.2 A region with a specific climate together with the plants and animals that live in it ✓  
2.3.3 - Urban expansion ✓  
- Clearing agricultural land ✓  
- Harvesting natural resources for industrial use ✓  
(any 2)  
(2)  
2.3.4 - Prevent extinction of species ✓  
- Preserve natural resources ✓  
- Economic benefit for humans ✓  
(any 2)  
(2)  
2.3.5 9 000 ✓ × 70  
100 ✓ = 6 300 ✓ species  
(3)  
2.3.6 Ecotourism ✓  
(1)  
2.3.7 - Creates jobs/business opportunities for local people ✓  
- Creates awareness of the environment through education ✓  
(2)  
(12)  
2.4 2.4.1 Diagram A  
(1)  
2.4.2 - It has thick muscular wall ✓ to withstand the pressure exerted by the pumping action of the heart ✓  
- The lumen is smaller in diameter ✓ to facilitate faster movement of blood ✓ / Creates higher pressure  
(any 1 x 2)  
(2)  
2.4.3 B ✓  
(1)  
2.4.4 (a) Connective tissue ✓  
(b) Muscle ✓ layer  
(c) Lumen ✓  
(7)  
[40]
QUESTION 3

3.1 3.1.1 *Archaeopteryx* (and ✓ for underlining to show it is a scientific name) (2)

3.1.2 A skull with teeth and jaws ✓ more similar to dinosaurs ✓
Had three claws on the end of the bones of each wing ✓ more similar to dinosaurs ✓
**AND**
Had feathers ✓ more similar to birds ✓
Had three forward-pointing toes and one backward pointing toe ✓
more similar to birds ✓
(any 1 x 2) (2)

3.1.3 The organism had died next to the flood plain ✓
Sediments ✓ piled up over the organism reducing oxygen flow ✓
Soft parts decayed ✓
Over time minerals seeped into the bones ✓ replacing the organic part ✓
(any 4) (4)

3.1.4 *Trinaxodon* ✓ in the Karoo ✓ (2)

3.2 3.2.1 Radiometric dating ✓
Relative dating ✓ (2)

3.2.2 (a) \( X = 28650 \text{ mya} \) ✓ (2)

(b) \( Z = 3125 \% \) ✓ (2)

3.2.3 After 60 million years ✓ there is no more carbon-14 remaining ✓ in the fossil (2)

3.2.4 Not all organisms become fossilised ✓
Some fossils might not have been found ✓ (2)

3.3 3.3.1 (Accept any value from) 55–60 ✓ million years ago ✓/mya (2)

3.3.2 Permian ✓ extinction (1)

3.3.3 \( 400 – 200 = 200 \) families of species ✓
**OR**
\( 400 – (210 to 230) = (190 to 170) \) families of species (3)

3.3.4 The extinction of a large number of families resulted in the availability of empty niches ✓ that could be filled by surviving ✓ species. These species are able to survive ✓ best in these new niches and form new species ✓
(any 3) (3)

(9)
3.4  3.4.1  Fossil evidence/Paleontological studies  (1)

3.4.2  65 million years ago /mya  (2)

3.4.3  - A comet, an asteroid or part of a star from outer space struck the Earth/Gulf of Mexico, which resulted in
- large clouds of dust blocking out the sun
- which stopped photosynthesis
- and also caused global cooling/dinosaurs might have been ectotherms and not able to live in the cold
- Also led to world-wide fires
- and monstrous tsunamis  (any 6)  (6)

TOTAL SECTION B:  80
SECTION C

QUESTION 4

Pulmonary circulation

- Deoxygenated blood flows from the right atrium through the tricuspid valves into the right ventricle. When the ventricles contract during systole, deoxygenated blood from the right ventricle is pumped pass the semi-lunar valve into the pulmonary artery which branches into two arteries entering each lung. In the lung capillaries, carbon dioxide diffuse out of the blood into the lungs and oxygen diffuses into the blood. The capillaries unite to form venules which eventually form four pulmonary veins leaving the lungs carrying oxygenated blood back to the heart through the left atrium.

- Heart has the semi-lunar valves between pulmonary artery and right ventricle to prevent the back flow of blood into the ventricles.
- Heart has the tricuspid valves between right atrium and right ventricle to prevent the back flow of blood into the right atrium.
- Has a septum which prevents mixing of blood in the ventricles/atria.
- Walls are made up of cardiac muscles which allows the constant contraction and relaxation.

(any 13) (13)

(any 2 x 2) (4) (17)

<table>
<thead>
<tr>
<th>Marks</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Well structured – demonstrates insight and understanding of question</td>
</tr>
<tr>
<td>2</td>
<td>Minor gaps or irrelevant information in the logic and flow of the answer</td>
</tr>
<tr>
<td>1</td>
<td>Significant gaps or irrelevant information in the logic and flow of the answer</td>
</tr>
<tr>
<td>0</td>
<td>Not attempted/nothing written other than question number/no relevant information</td>
</tr>
</tbody>
</table>

Synthesis (3)

TOTAL SECTION C: 20
GRAND TOTAL: 150

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