



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

LIFE SCIENCES P1

NOVEMBER 2016

MEMORANDUM

MARKS: 150

This memorandum consists of 9 pages.

PRINCIPLES RELATED TO MARKING LIFE SCIENCES

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 a part of it is required**
Read all and credit the relevant part.
4. **If comparisons are asked for, but descriptions are given**
Accept if the 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 the 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 the answer, provided it does not mean something else in Life Sciences or if it is out of context.
13. **If common names are given in terminology**
Accept, provided it was accepted at the national memo discussion meeting.

14. **If only the letter is asked for, but only the name is given (and vice versa)**
Do not 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.
18. **Code-switching of official languages (terms and concepts)**
A single word or two that appear(s) in any official language other than the learner's assessment language used to the greatest extent in his/her answers should be credited, if it is correct. A marker that is proficient in the relevant official language should be consulted. This is applicable to all official languages.
19. **Changes to the memorandum**
No changes must be made to the memoranda. The provincial internal moderator must be consulted, who in turn will consult with the national internal moderator (and the Umalusi moderators where necessary).
20. **Official memoranda**
Only memoranda bearing the signatures of the national internal moderator and the Umalusi moderators and distributed by the National Department of Basic Education via the provinces must be used.

SECTION A**QUESTION 1**

- | | | | | |
|-----|--------|-------------------------------------------------|----------|-------------|
| 1.1 | 1.1.1 | B✓✓ | | |
| | 1.1.2 | B✓✓ | | |
| | 1.1.3 | C✓✓ | | |
| | 1.1.4 | D✓✓ | | |
| | 1.1.5 | B✓✓ | | |
| | 1.1.6 | C✓✓ | | |
| | 1.1.7 | C✓✓ | | |
| | 1.1.8 | B✓✓ | | |
| | 1.1.9 | B✓✓ | | |
| | 1.1.10 | B✓✓ | (10 x 2) | (20) |
| 1.2 | 1.2.1 | Interphase✓ | | |
| | 1.2.2 | Autonomic✓ nervous system | | |
| | 1.2.3 | Abscisic acid✓ | | |
| | 1.2.4 | Carbon footprint✓ | | |
| | 1.2.5 | Cytokinesis✓ | | |
| | 1.2.6 | Allantois✓ | | |
| | 1.2.7 | Endometrium✓ | | |
| | 1.2.8 | Fallopian tube✓/oviduct | | (8) |
| 1.3 | 1.3.1 | None✓✓ | | (2) |
| | 1.3.2 | A only✓✓/B only | | (2) |
| | 1.3.3 | A only✓✓ | | (2) |
| | | | | (6) |
| 1.4 | 1.4.1 | (a) Centromere✓ | | (1) |
| | | (b) Centriole✓ | | (1) |
| | | (c) Chromatid✓/daughter chromosome | | (1) |
| | 1.4.2 | 4 → 2 → 1 → 3✓✓ | | (2) |
| | 1.4.3 | 4✓ | | (1) |
| | | | | (6) |
| 1.5 | 1.5.1 | (a) Jelly✓ layer/zona pellucida | | (1) |
| | | (b) Cell membrane✓/plasma-lemma/plasma membrane | | (1) |
| | | (c) Cytoplasm✓/cytosol | | (1) |
| | | (d) Nucleus✓ | | (1) |
| | 1.5.2 | (a) G✓ - Middle piece✓/neck | | |
| | | OR | | |
| | | C✓ - Cytoplasm✓ | | (2) |
| | | (b) E✓ - Acrosome✓ | | (2) |
| | | (c) D✓ - Nucleus✓ | | (2) |
| | | | | (10) |

TOTAL SECTION A: 50

SECTION B**QUESTION 2**

- 2.1 2.1.1 Seminal vesicles✓ (1)
- 2.1.2 A✓
B✓
D✓ Any (2)
- (Mark first TWO only)**
- 2.1.3 - Fertility is reduced✓
- because the temperature is always high✓
- This will lead to production of abnormal sperm✓/fewer sperm are formed/proteins in the cells that form the sperm will denature
- OR**
- Fertility is reduced✓
- because pressure is increased✓/reducing circulation of blood
- This will lead to production of abnormal sperm✓/fewer sperm are formed (3)
- (6)**
- 2.2 2.2.1 Pituitary✓ gland/hypophysis (1)
- 2.2.2 - High levels of LH✓
- stimulates ovulation✓ (2)
- 2.2.3 - To monitor their fertile periods✓
- to prevent pregnancy✓/to increase chances of falling pregnant (2)
- 2.2.4 - Oestrogen✓
- levels rise✓ (2)
- 2.2.5 Between 16 and 18✓✓ (2)
- 2.2.6 - Progesterone only rises✓
- after ovulation✓
- This shows that the fertility period has already passed✓/when fertility is low (3)
- (12)**

- 2.3 2.3.1 - Body temperature increases✓
- Pulse rate increases✓
OR
Both increase✓✓ (2)
- 2.3.2 30✓ minutes (1)
- 2.3.3 **Vasoconstriction**
- Less blood reaches the surface of the skin✓
- and less heat is lost✓
OR
- Less blood reaches the sweat glands✓
- and less heat is lost✓ Any 1 x 2
Increase in metabolism
- An increase in metabolism results in an increase in respiration✓
- which generates more heat✓ (4)
- 2.3.4 - Amount of energy drink✓
- Length of time when measurements were taken✓
- Amount of caffeine in the energy drink✓
- Type of energy drink✓
- The level of activity of all participants✓
- Gender✓/only men
(Mark first TWO only) Any (2)
(9)
- 2.4 - The pancreas✓/Islets of Langerhans is stimulated
- to secrete glucagon✓ into the blood
- which stimulates the liver✓/muscles
- to convert glycogen into glucose✓
- The glucose level in the blood now increases✓ and returns to normal Any (4)
- 2.5 2.5.1 (a) - The shoot grows straight up✓
- The tip of the shoot does not receive any light✓
- The auxins remain evenly distributed in the tip✓
- All parts of the shoot are equally stimulated to grow✓ Any (3)
- (b) - The shoot bends towards the light✓/stimulus/shows positive phototropism
- because it is exposed to unilateral light✓
- The auxins in the tip move away from the lighted✓/to the darker side of the shoot/are destroyed on the lighted side
- The cells on the darker side are stimulated to grow✓/elongate
- Growth is inhibited in cells on the lighted side✓ Any (4)
- 2.5.2 - Since the apical bud was removed no auxins are produced✓ in the tip
- therefore no apical dominance✓/growth of the lateral buds/branches is not inhibited (2)
(9)
[40]

QUESTION 3

- 3.1.1 Motor✓/multi-polar /efferent (1)
- 3.1.2 - Transmits impulse away from the cell body✓
- Transmits impulse to effector✓
(Mark first ONE only) Any (1)
- 3.1.3 - Insulates✓ the neuron
- causing it to conduct impulse faster✓/prevent a short circuit (2)
- 3.1.4 - There will not be a response✓ to the particular stimulus
- Nerve impulse will not be carried to the effector✓/muscle/gland (2)
(6)
- 3.2 3.2.1 (a) Lens✓ (1)
(b) Choroid✓ (1)
- 3.2.2 Long-sightedness✓/hyperopia/hypermopia (1)
- 3.2.3 - Cannot see nearby objects clearly✓
- causing the image to be blurred✓ (2)
- 3.2.4 - No image will be formed✓/cannot see the object
- No receptors✓ present
- Light will not be converted into an impulse✓ (3)
- 3.2.5 - Lens is elastic✓
therefore can change shape✓/convexity/allow for accommodation
- Lens is transparent✓
to allow light rays to pass through✓
- Lens is biconvex✓
to refract light rays✓
(Mark first TWO only) (Any 2 x 2) (4)
(12)
- 3.3 3.3.1 - Poor taste✓
- Low quality✓ (2)
(Mark first TWO only)
- 3.3.2 (a)
- More fruit will be available✓/for longer periods/longer shelf life (2)
- Making it cheaper✓
(b)
- The farmer will sell more fruit✓/less fruit will go to waste from spoilage/ have better quality fruit/no need for refrigeration
- And therefore make a bigger profit✓ (2)

- 3.3.3 - droughts✓
- floods✓
- rising sea levels✓
- high temperature✓
- low temperatures✓
- desertification✓
- veldfires✓
- extreme wind✓
- (Any TWO different examples of extreme weather)
(Mark first TWO only) Any (2)
(8)
- 3.4 3.4.1 - It can reduce CO/carbon monoxide emissions✓ by 20%
to 30%
- It can reduce greenhouse gas emissions✓ by 2% over
regular petrol (2)
(Mark first TWO only)
- 3.4.2 $34,8 - 23,5 = 11,3$ megajoules (2)
- 3.4.3 - Reduces the amount of crude oil✓
required to make petrol✓
OR
- Gasohol is produced from sugarcane✓/maize
which is easily available✓ Any 1 x 2 (2)
- 3.4.4 - In cooler climates ethanol, will evaporate more slowly✓
- Less fuel is lost✓
- Less pollution is released into the atmosphere✓ (3)
- 3.4.5 - There will be less food available✓ for people to eat/reduces food
security
- Maize and sugarcane will be in demand✓/prices will increase
- It is energy intensive to produce✓
- Gasohol is expensive (1)
(Mark first ONE only) (10)
- 3.5 Water quality
- Results in less oxygen✓/ more carbon dioxide /algal bloom/
eutrophication/ increase in bacteria/death and decomposition of organisms
 - Decreasing the quality of the water✓
- Biodiversity
- Organisms die✓
 - therefore reducing biodiversity✓

(4)
[40]

SECTION C

QUESTION 4

Hearing

- Pinna traps/directs the sound waves✓
- into the ear canal✓/meatus
- This causes the tympanic membrane to vibrate✓
- The vibration is transmitted to the auditory ossicles✓
- The ossicles amplify the vibration✓
- and transmit it to the oval window✓
- The oval window vibrates✓
- creating waves✓
- in the fluid/endolymph of the cochlea✓
- which stimulates the Organ of Corti✓
- to convert the wave into an impulse✓
- The impulse travels along the auditory nerve✓
- to the cerebrum✓ where it is interpreted as the roar of the lion

Max 10

Role of Adrenalin

- More adrenalin is secreted✓
- Adrenalin increases muscle tone✓
- And causes the liver/muscles to convert glycogen into glucose✓
- The heart rate increases✓
- so that the muscles receive more glucose✓
- and oxygen✓
- needed for cellular respiration✓
- to provide the energy✓ for the muscles to contract efficiently
- The rate of breathing increases✓
- and the depth of breathing increases✓
- to exhale carbon dioxide from the muscles faster✓
- and inhale oxygen faster✓
- Constriction of blood vessels to the gut✓/skin
- and dilation of blood vessels to the vital organs✓/brain/muscles
- allowing more blood to be supplied to vital organs✓/brain/muscles

Max 7
Content: (17)
Synthesis: (3)
(20)

ASSESSING THE PRESENTATION OF THE ESSAY

Relevance	Logical sequence	Comprehensive
All information provided is relevant to the question	Ideas arranged in a logical/ cause-effect sequence	Answered all aspects required by the essay
All the information provided is relevant to hearing and how adrenalin ensures that muscles function efficiently	All the information regarding hearing and how adrenalin ensures that muscles function efficiently is arranged in a logical manner	At least the following marks should be obtained for each of the following: - Hearing (7/10) - How adrenalin ensures that muscles function efficiently (4/7)
There is no irrelevant information		
1 mark	1 mark	1 mark

TOTAL SECTION C: 20
GRAND TOTAL: 150