



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

LIFE SCIENCES P1

NOVEMBER 2015 (2)

MEMORANDUM

MARKS: 150

This memorandum consists of 12 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 learners' 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 without consulting the provincial internal moderator 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	A✓✓		
	1.1.2	B✓✓		
	1.1.3	A✓✓		
	1.1.4	B✓✓		
	1.1.5	B✓✓		
	1.1.6	D✓✓		
	1.1.7	C✓✓		
	1.1.8	C✓✓		
	1.1.9	D✓✓	(9 x 2)	(18)
1.2	1.2.1	Precocial✓		
	1.2.2	Multiple sclerosis✓		
	1.2.3	Aqueous humor✓		
	1.2.4	Oogenesis✓		
	1.2.5	Prostate✓ gland		
	1.2.6	Chorion✓		
	1.2.7	Epididymis✓		
	1.2.8	Antidiuretic hormone✓/ADH	(8 x 1)	(8)
1.3	1.3.1	B only✓✓		
	1.3.2	None✓✓		
	1.3.3	A only✓✓		
	1.3.4	B only ✓✓	(4 x 2)	(8)
1.4	1.4.1	A - Pinna✓ D - Semi-circular canal✓		(2)
	1.4.2	(a) B✓		(1)
		(b) G✓		(1)
		(c) F✓		(1)
		(d) C✓		(1)
		(e) E✓		(1)
				(7)

1.5	1.5.1	(a) Spindle fibre✓ (b) Centromere✓ (c) Chromatid✓	(1) (1) (1)
	1.5.2	Anaphase II✓	(1)
	1.5.3	4✓	(1)
	1.5.4	4✓	(1)
	1.5.5	- Has 4 chromosomes✓/8 chromatids - instead of 23✓/46 chromatids	(2)
	1.5.6	Testes✓/seminiferous tubules	(1)
			(9)
		TOTAL SECTION A:	50

SECTION B**QUESTION 2**

- 2.1 2.1.1 A - Cerebellum✓
B - Cerebrum✓ (2)
- 2.1.2 (a) B✓ (1)
- (b) C✓ (1)
- 2.1.3 - **D** is responsible for controlling the breathing rate✓
- thus the person will not be able to breathe✓
OR
- **D** is responsible for controlling the heart rate/beat✓
- thus the heart would stop beating✓ (Any 1 x 2) (2)
- 2.1.4 When Thabo steps on the glass:
- Receptors✓/pain receptors in his skin are stimulated
- and convert the stimulus into an impulse✓
- The impulse is transmitted along a sensory neuron✓
- to the spinal cord✓
- where it makes synaptic contact✓
- with an interneuron✓
- which makes synaptic contact with a motor neuron✓
- The impulse then moves to the effector✓/muscles in the leg
- Muscles will contract✓ and the leg is thus lifted away from the glass. (Any 6) (6)
(12)
- 2.2 2.2.1 40✓ arbitrary units (1)
- 2.2.2 - Object **D** is further away than object **A**✓
- resulting in the curvature of the lens increasing✓
- caused by the ciliary muscles relaxing✓
- Sclera will be pulled forward✓
- Suspensory ligaments will tighten ✓/will be taut
- Tension on the lens will increase✓
- Lens becomes less convex✓/flatter
- Light rays are refracted (bent) less✓
- and light rays will focus on the retina✓ (Any 6) (6)
(7)
- 2.3 - Maculae✓ in the sacculus and utriculus are stimulated
- by changes in the position of the head✓
- and convert the stimulus to nerve impulses✓
- The impulses are transmitted by the auditory nerve✓
- to the cerebellum✓ to be interpreted
- The cerebellum then sends impulses to the muscles✓ to restore balance (Any 5) **(5)**

- 2.4 2.4.1 Pituitary✓gland/hypophysis (1)
- 2.4.2 Hormone 4✓ (1)
- 2.4.3 - High levels of progesterone✓
- will inhibit the secretion of FSH✓
- which will prevent the development of any new follicles✓
OR
- there is a negative feedback relationship✓ between progesterone and FSH✓ (Any 1 x 2) (2)
- 2.4.4 - Hormone 4/progesterone levels will decrease✓
- The endometrium will disintegrate✓
- The embryo will be aborted✓ (3)
- 2.4.5 - Copulation/sexual intercourse will take place✓
- Ejaculation will take place/release of semen✓/sperms
- The sperms swim through the cervix✓
- to the Fallopian tube✓
- The acrosome of the one sperm secretes an enzyme✓
- which makes the membrane of the ovum permeable to the nucleus of the sperm✓
- The haploid nucleus of the sperm✓ enters the ovum
- and fuses with the haploid nucleus of the ovum✓
- resulting in a diploid✓ zygote (Any 4) (4)
(11)
- 2.5 2.5.1 (a) Internal✓fertilisation (1)
- (b) Viviparous✓ (1)
- 2.5.2 Foetus develops in the mother's uterus✓ (1)
- 2.5.3 - Protected as it develops in the mother's pouch✓ } parental
- Nourished with mother's milk✓ } care✓ (2)
(Mark fist TWO only) **(5)**
[40]

QUESTION 3

- 3.1 3.1.1 - Rate of seed germination✓
- Percentage of seed germination✓ (2)
- 3.1.2 - Same amount of water✓
- Same species✓/type of seed
- Same light intensity✓/darkness
- Same temperature✓
- Same time period (24 hours) for all 3 groups✓
- Seed mixtures were treated in the same way✓/filtered and rinsed with cold, distilled water for 2 minutes (Any 3) (3)
(Mark first THREE only)
- 3.1.3 Same volume✓/amount of gibberellins that the seeds were soaked in. (1)
- 3.1.4 - So that the average percentage and rate of seed germination could be calculated✓
- in order to improve the reliability✓ of the results (2)
- 3.1.5 - Seeds usually germinate under the soil✓
- in the absence of light✓ (2)
(10)
- 3.2 When thyroxin levels decrease
- The pituitary gland is stimulated✓
- to produce more TSH✓
- High TSH levels stimulate the thyroid gland✓
- to secrete more thyroxin✓
- The thyroxin levels thus increase back to normal✓ (5)

3.3 3.3.1

Calculations:

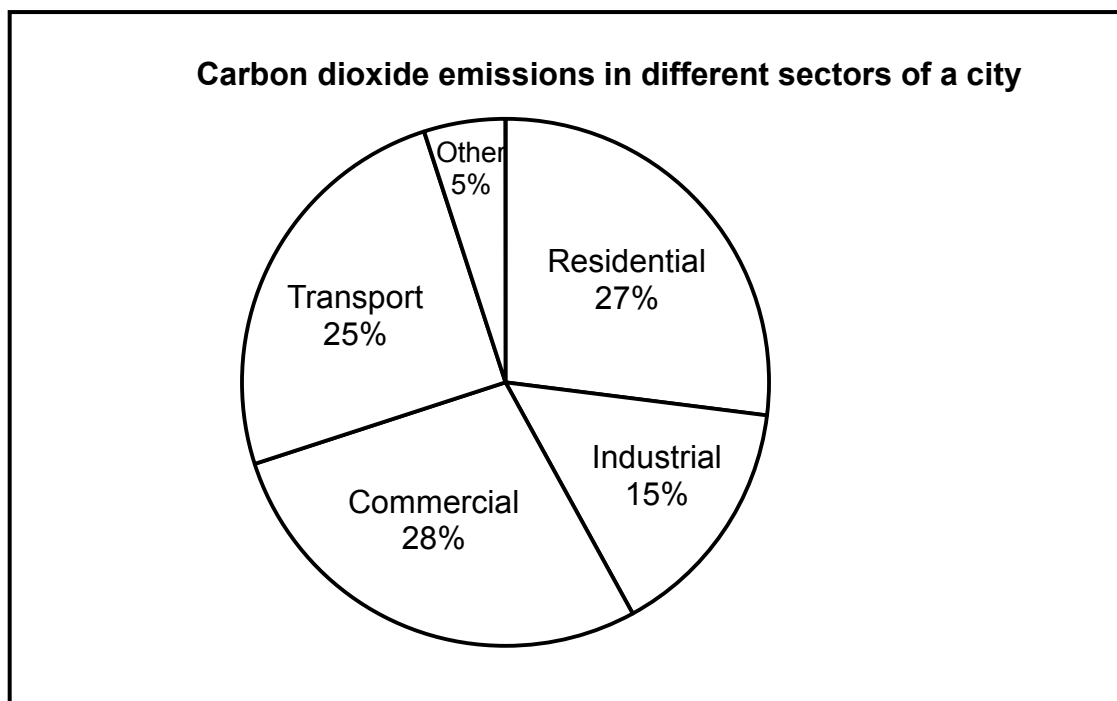
$$\text{Transport} = 25/100 \times 360^\circ = 90^\circ$$

$$\text{Residential} = 27/100 \times 360^\circ = 97,2^\circ$$

$$\text{Industrial} = 15/100 \times 360^\circ = 54^\circ$$

$$\text{Commercial} = 28/100 \times 360^\circ = 100,8^\circ$$

$$\text{Other} = 5/100 \times 360^\circ = 18^\circ$$

**Mark allocation for the pie chart**

Correct type of graph	1
Title of graph(CO ₂ emission + Sector)	1
Calculations:	1: 1-4 calculations correct 2: All 5 calculations correct
Correct proportion for each labelled slice	1: 1 to 2 slices correct 2: 3 slices correct 3: 4-5 slices correct

(7)

- 3.3.2 - Industrial sector✓
- Commercial sector✓
- Transport sector✓ (Any 2) (2)
(Mark first TWO only)
- 3.3.3 More trees absorb more CO₂✓
when they photosynthesize✓ thus reducing CO₂ in the atmosphere (2)
- 3.3.4 - Increased CO₂ will absorb more heat✓
- leading to an enhanced greenhouse effect✓
- and therefore preventing the escape of heat✓ from the Earth's surface
- raising the temperature on Earth's surface✓ (Any 3) (3)
(14)
- 3.4 3.4.1 - Millions of litres of water, combined with sand and chemicals✓
- are pumped under high pressure into horizontally drilled wells✓
- causing the rock to crack✓ allowing gas to be extracted (Any 2) (2)
- 3.4.2 - It releases less dangerous substances✓ into the atmosphere✓ (2)
- 3.4.3 - Water with chemicals is released into the wells✓
- Thus polluting the underground water✓/decreasing water quality (2)
- 3.4.4 - Chemicals used in the water✓
- can kill some plant and animal species in the area✓ thus decreasing biodiversity (2)
- 3.4.5 - Use of sea water✓
- Water used can be recycled✓
(Mark first ONE only) (Any 1) (1)
- 3.4.6 - Create more employment for local communities✓
- Energy supply could be cheaper✓/less transport costs
- Improved infrastructure✓
(Mark first TWO only) (Any 2) (2)
(11)
[40]

TOTAL SECTION B: 80

SECTION C**QUESTION 4****Levels of CO₂**

- * During the marathon, CO₂ levels in the blood increase above normal levels✓
- * due to an increase in cellular respiration✓

- Receptor cells in the carotid artery✓ in the neck are stimulated by high levels of CO₂
- to send impulses to the medulla oblongata✓ in the brain
- The medulla oblongata stimulates the breathing muscles✓/intercostals muscles and diaphragm
- to contract more actively✓
- to increase the rate and depth of breathing✓
- The medulla oblongata also stimulates the heart✓
- to beat faster✓
- More CO₂ is taken to and exhaled from the lungs✓
- The CO₂ level in the blood decreases✓and returns to normal (*2 compulsory + any 4) (6)

Level of glucose

- * During the marathon, the glucose level decreases✓
- * because it provides fuel for cellular respiration✓/provide energy

- The lower glucose levels is monitored by the pancreas✓
- which stimulates the release of glucagon✓
- Glucagon promotes the conversion of glycogen to glucose✓
- in the liver✓ (5)
- which increases the blood glucose level✓ back to normal (*2 compulsory + any 3)

Regulation of body temperature

- * The athlete's body temperature will increase✓ above normal levels
 - * due to heat released✓ during cellular respiration

 - This causes the hypothalamus✓ to be stimulated
 - and sends impulses to the blood vessels of the skin✓
 - the blood vessels dilate✓/vasodilation occurs
 - More blood flows to the surface of the skin✓
 - More heat is lost from the skin✓
 - More blood is sent to the sweat glands✓
 - More sweat is released✓
 - Evaporation of the sweat cools the skin✓ (6)
 - decreasing the body temperature ✓back to normal (*2 compulsory + any 4) (17)
- Content: (3)
Synthesis: (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 in sufficient details
Only information relevant to: - High CO ₂ levels - Low glucose levels - High body temperature is provided. There is no irrelevant information	Logical sequence in describing the regulation of each of the following: - High CO ₂ levels - Low glucose levels - High body temperature	Information provided should include correct content from each of the following sections: - High CO ₂ levels (4/6) - Low glucose levels (3/5) - High body temperature (4/6)
1 mark	1 mark	1 mark

TOTAL SECTION C: 20
GRAND TOTAL: 150