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basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE EXAMINATIONS/ NATIONAL SENIOR CERTIFICATE EXAMINATIONS

LIFE SCIENCES P1

2021

MARKING GUIDELINES

MARKS: 150

These marking guidelines consist 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 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	D✓✓		
	1.1.2	B✓✓		
	1.1.3	C✓✓		
	1.1.4	C✓✓		
	1.1.5	B✓✓		
	1.1.6	B✓✓		
	1.1.7	D✓✓		
	1.1.8	B✓✓		
	1.1.9	C✓✓		
	1.1.10	A✓✓	(10 x 2)	(20)
1.2	1.2.1	Monoculture✓		
	1.2.2	Deforestation✓		
	1.2.3	Penis✓		
	1.2.4	Peripheral✓		
	1.2.5	Binocular✓/stereoscopic vision		
	1.2.6	Corpus luteum✓		
	1.2.7	Synapse✓		
	1.2.8	Aquifer✓		
	1.2.9	Oestrogen✓	(9 x 1)	(9)
1.3	1.3.1	Both A and B✓✓		
	1.3.2	A only✓✓		
	1.3.3	Both A and B✓✓	(3 x 2)	(6)
1.4	1.4.1	(a) Semi-circular canals✓		(1)
		(b) Auditory nerve✓		(1)
	1.4.2	(a) E✓ Oval window✓		(2)
		(b) D✓ Round window✓		(2)
	1.4.3	(a) Cerebellum✓		(1)
		(b) Hair cells✓/Organ of Corti		(1)
				(8)
1.5	1.5.1	Reflex arc✓		(1)
	1.5.2	To minimise injury✓		(1)
	1.5.3	(a) Interneuron✓/connector		(1)
		(b) Ventral root✓		(1)
		(c) Effector✓/muscle		(1)
	1.5.4	A✓ Sensory✓neuron		(2)
				(7)

TOTAL SECTION A: 50

SECTION B**QUESTION 2**

	2.1.1	Centromere✓	(1)
	2.1.2	Metaphase I✓	(1)
	2.1.3	<ul style="list-style-type: none"> - A pair of chromosomes with the same structure✓/ location of centromere/ length and - the same sequence of genes✓ - One is of maternal origin and the other of paternal origin✓ Any	(2)
	2.1.4	<ul style="list-style-type: none"> - Some chromatids have a mixture of genetic material✓from its homologue - as crossing over✓ took place - during prophase I✓ 	(3)
	2.1.5	(Contracts) to pull the chromosome to the pole✓	(1)
	2.1.6	48✓✓ arbitrary units	(2)
			(10)
2.2	2.2.1	Sweat gland✓	(1)
	2.2.2	<ul style="list-style-type: none"> - Structure A will constrict✓/vasoconstriction occurs - Less blood flows towards the surface✓of the skin - Less heat is lost✓ through the surface of the skin - Temperature increases✓ / returns to normal Any	(3)
	2.2.3	<ul style="list-style-type: none"> - Enzymes function optimally✓ at normal body temperature✓/37° C - Enzymes/proteins will denature✓ at high temperatures✓ - Enzymes will become inactive✓ at low temperatures✓ Any (1 x 2)	(2)
		(Mark first ONE only)	(6)
2.3	2.3.1	Pituitary gland✓/Hypophysis/Hypothalamus	(1)
	2.3.2	<ul style="list-style-type: none"> - Water levels are higher than normal in blood✓ - since less water is lost through sweating✓ - therefore less/no ADH will be secreted✓ - renal tubules become less permeable to water✓ - Therefore, less water is reabsorbed✓/ more urine is produced Any	(3)
	2.3.3	<ul style="list-style-type: none"> - Water cannot be reabsorbed✓/the water is in the urine since renal tubules are resistant to the effects of ADH - Water levels are lower than normal in blood✓ - therefore, more ADH is secreted✓ 	(3)
			(7)

2.4	2.4.1	Internal✓ fertilisation	(1)
	2.4.2	<ul style="list-style-type: none"> - Sperm are deposited inside the female body✓ thereby increasing the chances of fertilisation✓ - Gametes/zygotes are inside the body✓ therefore protected from the predators✓/ environmental dangers 	(2 x 2) (4)
		(Mark first TWO only)	
	2.4.3	<ul style="list-style-type: none"> - The eggs hatch inside the female's body✓ - and the young are born live✓ 	(2) (7)
2.5	2.5.1	<ul style="list-style-type: none"> - Progesterone maintains/thickens the endometrium✓ - and therefore, maintains the pregnancy✓ 	(2)
	2.5.2	(a) Progesterone treatment✓	(1)
		(b) Development of gestational diabetes✓	(1)
	2.5.3	<ul style="list-style-type: none"> - Glucose levels were taken✓ daily - When the glucose level of a pregnant woman remains high continuously✓ it indicates the development of gestational diabetes 	(2)
	2.5.4	<ul style="list-style-type: none"> - (Same) dosage✓/250 mg of progesterone - (Same) period of time for injection✓/injections given between weeks 16 and 20 - (Same) frequency of injections✓/ weekly injections 	Any (2)
		(Mark first TWO only)	
	2.5.5	<ul style="list-style-type: none"> - Group B did not receive progesterone✓ - If gestational diabetes develops in group A it would be due to the progesterone treatment✓ 	(2) (10) [40]

QUESTION 3

- 3.1 3.1.1 Sclera✓ (1)
- 3.1.2 - Absorbs light rays✓/prevents internal reflection of light in the eye
 - Blood vessels in part B supply the cells of the eye with oxygen✓/nutrients Any (1)
(Mark first ONE only)
- 3.1.3 - Part **D** contains photoreceptors✓/cones
 - therefore the (clearest) image forms✓ if light falls on this part
 - Part **E** has no photoreceptors✓/rods and cones
 - therefore, no image✓ will form if light falls on this part (4)
- 3.1.4 (Bi)concave✓ lenses (1)
- 3.1.5 - Biconcave lenses will help to diverge the light✓ before they enter the eye
 - to focus on the retina✓ (2)
- 3.1.6 - It is elastic✓
 and can change its shape✓ to focus light rays on the retina
(Mark first ONE only) (1 x 2) (2)
- 3.1.7 - Radial✓/ dilator muscles
 - Circular✓/sphincter muscles (2)
(Mark first TWO only)
- 3.1.8 - Astigmatism✓
 - Light is refracted unevenly✓/distorted
 - forming a blurred image✓ (3)
(16)
- 3.2 3.2.1 They stimulate cell elongation✓/cell division (1)
(Mark first ONE only)
- 3.2.2 - To prevent weeds from competing with crops✓
 - for water✓/nutrients/space/sunlight (2)
- 3.2.3 - They may kill other organisms✓
 - They may accumulate in ecosystems✓
 - They may disrupt ecosystems✓ Any (1)
(Mark first ONE only)
- 3.2.4 - The application of auxin-based herbicides is less labour intensive✓✓/less time-consuming/less expensive than mechanical removal
 - Auxin-based herbicides will kill the whole plant but with physical removal only part of the plant may be removed✓✓ Any (1 x 2) (2)
(Mark first ONE only)
- 3.2.5 - Auxin-based herbicides selectively kill broad leaved plants✓
 - and the farmer will lose money✓/the bean crop will fail (2)
(8)

3.3.1	Sheep and goats✓	(1)
3.3.2	To trap heat energy/ keep Earth warm enough to sustain life✓ (Mark first ONE only)	(1)
3.3.3	4 623 – 1 826✓ (668+684+474) million tonnes = 2 797✓ million tonnes / 2 797 000 000 (tonnes)	(2)
3.3.4	<ul style="list-style-type: none"> - Landfills✓ - Rice paddies✓ - Waterlogged soil✓/wetlands - Mining of coal✓ - Fossil fuels✓ - Biofuels✓ - Fracking✓ - Sewage✓ - Decomposition✓ - Melting of ice in glaciers✓ (Mark first ONE only)	Any (1)
3.3.5	<ul style="list-style-type: none"> - More greenhouse gases✓/ carbon dioxide/ methane is released into the atmosphere - Therefore, more heat is trapped✓/causing an enhanced greenhouse effect - leading to an increase in (global) temperatures✓ hence global warming increases 	Any (3) (8)
3.4	3.4.1 Thermal pollution refers to the change from the normal temperature of an aquatic ecosystem✓	(1)
	3.4.2 <ul style="list-style-type: none"> - Thermal pollution lowers the oxygen content✓/causes algal bloom/increased number of bacteria in the water - which reduces✓ the quality of the water 	(2)
	3.4.3 <ul style="list-style-type: none"> - The hot water can be stored until it is cooled down✓ before it is released into the river - After cooling down the hot water, it can be re-used to cool down the plant again✓ - Use fans/other technology for cooling down of machinery✓ (Mark first ONE only)	Any (1)
	3.4.4 <ul style="list-style-type: none"> - The warm water may cause fish to die✓/move away - which will cause a loss of income✓ to the fishermen 	(2)
	3.4.5 <ul style="list-style-type: none"> - The biodiversity increased✓ - since no thermal pollution occurred✓ 	(2) (8) [40]
TOTAL SECTION B:		80

SECTION C**QUESTION 4****Development of zygote and the formation of placenta and umbilical cord**

- The zygote divides by mitosis✓
- to form a (solid) ball of cells✓
- called the morula✓
- which further divides to form a hollow ball of cells✓
- called the blastocyst✓/blastula
- The blastocyst/blastula enters the uterus✓
- It implants in the endometrium✓
- This is called implantation✓
- The outer layer of the embryo becomes a chorion✓ and
- inner layer becomes an amnion✓
- with the amniotic fluid inside✓
- After implantation the chorion develops many finger-like outgrowths✓
- called chorionic villi✓
- The endometrium together with the chorionic villi forms the placenta✓
- The placenta consists of blood rich embryonic and maternal tissues✓
- The umbilical cord develops between the foetus and the placenta✓
- It consists of a hollow tube✓
- that contains the umbilical artery✓
- and the umbilical vein✓
- Up to 8 -12 weeks of development it is called the embryo✓
- When differentiation of tissues into organs occurs✓
- and now is called a foetus✓

Any (17)

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 in sufficient detail
All the information is relevant to:	The sequence of the events in the:	The following must be included:
<ul style="list-style-type: none"> - Development from the zygote to the formation of the placenta and umbilical cord 	<ul style="list-style-type: none"> - Development from the zygote to the formation of the placenta and umbilical cord 	<ul style="list-style-type: none"> - Development from the zygote to the formation of the placenta and umbilical cord (11/17)
No irrelevant information	are in a logical sequence	
1 mark	1 mark	1 mark

TOTAL SECTION C: 20
GRAND TOTAL: 150