

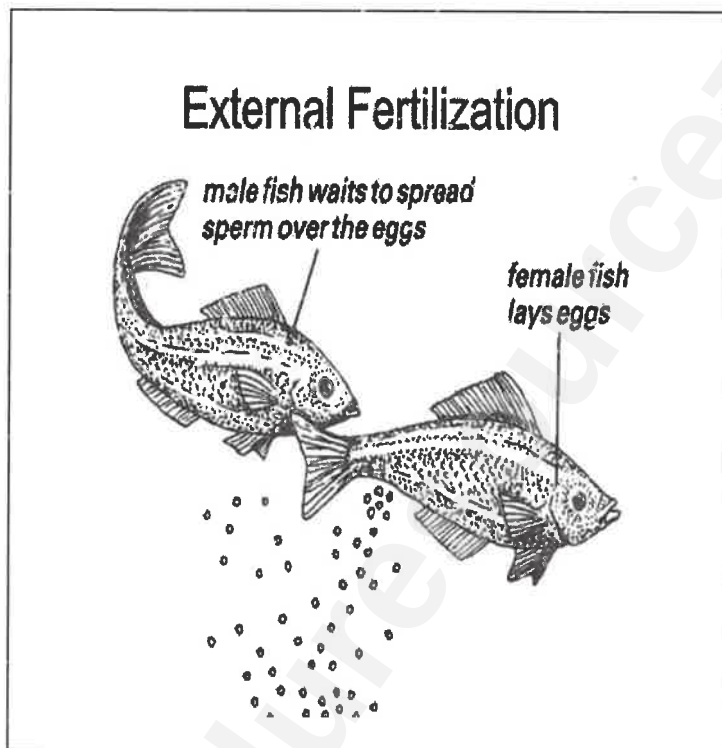


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LIFE SCIENCES

JUNE EXAM 2019

REVISION QUESTIONS



NAME & SURNAME: _____

MEMO

2019

ADAPTED BY MR S.J SILAULE

GRADE 12 JUNE EXAM REVISION

SECTION A

- | | | | |
|-----|-------|--------------|-----|
| 1.2 | 1.2.1 | Meiosis ✓ | |
| | 1.2.2 | Diploid ✓ | |
| | 1.2.3 | Autosomes ✓ | |
| | 1.2.4 | Anaphase 1 ✓ | (4) |

- | | | | |
|-----|-------|-------------------------------------|-------------|
| 1.2 | 1.2.1 | Cataract ✓ | |
| | 1.2.2 | Cristae ✓ | |
| | 1.2.3 | Alleles ✓ | |
| | 1.2.4 | Stem cells ✓ | |
| | 1.2.5 | Auxin ✓ | |
| | 1.2.6 | Pituitary gland / Hypophysis ✓ | |
| | 1.2.7 | Leydig cells ✓ / Interstitial cells | (7 x 1) (7) |

- | | | |
|--------|---------------------|-----|
| 1.2 | | |
| 1.2.1. | Homozygous ✓ | |
| 1.2.2. | Stem ✓ cells | |
| 1.2.3. | Locus ✓ | |
| 1.2.4. | Recessive ✓ | |
| 1.2.5. | Blind spot ✓ | |
| 1.2.6. | Cerebellum ✓ | |
| 1.2.7. | Chiasma/chiasmata ✓ | (7) |

1.2	1.2.1	Eustachian tube ✓		
	1.2.2	Retina ✓		
	1.2.3	Ganglion ✓/Ganglia		
	1.2.4	Homozygous ✓/Homozygote		
	1.2.5	Chiasma ✓/ Chiasmata		
	1.2.6	Metaphase 1 ✓		
	1.2.7	Chromatids ✓		
	1.2.8	Semen ✓		
	1.2.9	DNA profiling ✓		
	1.2.10	Centromere ✓	(10 x 1)	(10)

1.2	1.2.1	Biodiversity✓		
	1.2.2	Oval window✓		
	1.2.3	Vivipary✓		
	1.2.4	Vas deferens✓/sperm duct		
	1.2.5	Ovipary✓		
	1.2.6	Cytokinesis✓		
	1.2.7	Food security✓		
	1.2.8	Eustachian tube✓		
	1.2.9	Short-sightedness✓/Myopia /near-sightedness	(9 x 1)	(9)

1.2	1.2.1	Cytokinesis✓		
	1.2.2	Karyotype✓		
	1.2.3	Stem cells✓		
	1.2.4	Corpus luteum✓/yellow body		
	1.2.5	Hypothesis✓		
	1.2.6	Precocial✓development		
	1.2.7	Ovipary✓		
	1.2.8	Sex-linkage✓	(8 x 1)	(8)

- 1.3 1.3.1 Both A and B ✓✓
 1.3.2 Both A and B ✓✓
 1.3.3 None ✓✓
 1.3.4 Both A and B ✓✓
 1.3.5 B only ✓✓

(5 x 2) (10)

- 1.3
 1.3.1. B only ✓✓
 1.3.2. A only ✓✓
 1.3.3. None ✓✓
 1.3.4. Both A and B ✓✓
 1.3.5. A only ✓✓

(5 x 2) (10)

- 1.3 1.3.1 A only ✓✓
 1.3.2 B only ✓✓
 1.3.3 None ✓✓

(3 x 2) (6)

- 1.3 1.3.1 A only ✓✓
 1.3.2 B only ✓✓
 1.3.3 Both A and B ✓✓
 1.3.4 B only ✓✓

(4 x 2) (8)

SECTION B

Human impact (Grade 11)

3.1	3.1.1	1	Solar radiation penetrates through a blanket of greenhouse gases in the atmosphere and reaches the earth's surface. ✓	
		2	Once absorbed, some of the solar radiation is sent back into the atmosphere in the form of infra-red rays. ✓ Some of the energy passes into space.	
		3	But most of the energy is absorbed by the greenhouse gases in the atmosphere. ✓	
		4	The greenhouse gases redirect this energy back to the earth warming the Earth. ✓	(4)
	3.1.2		Prevents the earth from becoming too cold ✓/warms the earth	(1)
	3.1.3		Coal burning power stations ✓/burning fossil fuels	(1)
	3.1.4	•	Prolonged periods of drought ✓ followed by heavy flooding ✓	
		•	washes away the top soil. ✓	
		•	The soils will not be able to support plant life. ✓	
		•	The land turns into a desert. ✓	(Any 4) (4)

2.1	2.1.1	Northern Cape ✓	(1)
	2.1.2	Eastern Cape ✓	(1)
	2.1.3	74,72 OR 74,7 OR 75 ✓✓✓%	(3)
		OR (if candidate does not have above answer)	
		$\frac{33,4}{44,7} \times 100$ ✓	Max (2)
	2.1.4	- Western Cape ✓ and - Kwazulu-Natal ✓	(2)
		(MARK FIRST TWO ONLY)	

- 2.1.5
- Research alternative methods✓/e.g.desalinate seawater/cloud seeding to supplement the normal water supplies✓
 - Fix/maintain all waterworks✓/pipe systems to prevent water loss by leaking✓
 - Locate aquifers✓/boreholes/underground water to provide additional water sources✓
 - Penalise people who are using too much water✓ to prevent them from wasting water✓
 - Remove alien plants✓in the catchment area of the dam to ensure that more water reaches the dams✓
 - Increase awareness✓ to encourage wise water use✓
 - Offer water tanks at a reduced price✓ to create additional source of water✓
 - Recycle grey water✓ to provide additional water sources✓
 - Build dams✓ to store water✓
- (Any 2 x 2) (4)
- (MARK FIRST TWO ONLY)**

- 2.1.6
- Habitats are destroyed✓ which will lead to a loss in biodiversity✓
 - When flood gates are opened flooding may occur in the areas downstream from the dam✓ resulting in erosion✓/loss of top soil/loss of lives/loss of biodiversity
 - The river downstream from the dam will receive less water✓ which may have a negative impact on aquatic ecosystems✓/lead to biodiversity loss
 - Wall blocks fish migration✓ decreasing spawning✓/reproduction/survival
 - Dam wall restricts movement of organisms✓ affecting food chains/webs✓
- (Any 2 x 2) (4)
- (MARK FIRST TWO ONLY)** (15)

3.2	3.2.1	- Having access to enough food✓ - that is nutritious✓ - all the time✓	Any	(2)
	3.2.2	Western Cape✓		(1)
	3.2.3	- An increase in the population✓ - High levels of unemployment✓ - Droughts✓ - Floods✓ (Mark first TWO only)	Any	(2)
	3.2.4	$100 - 25\% = 75\%$		(2)
	3.2.5	- Pesticides may kill or get into the tissue of healthy plants✓ - reducing crop production✓		
		OR		
		- Pesticides are expensive✓ - which increase the cost of food✓ reducing access to consumers (Mark first ONE only)	Any 1 x 2	(2)

3.2.6	- Increased resistance to cold/heat✓ - will allow the crops to grow in new areas✓ - Increased nutrients✓ - will allow people to get their nutritional requirements from less food✓ - Higher yields✓ - will provide more food from the same farm✓ - Increased resistance to pests✓ - will increase crop yield✓ (Mark first TWO only)	Any 2 x 2	(4)
3.2.7	Food security in Kwa-Zulu Natal is increasing✓✓		(2)
			(15)

DNA code of life

1.4	1.4.1	DNA✓/Deoxyribonucleic acid	(1)
	1.4.2	Nucleus✓/chromosome Mitochondria✓ (Mark first TWO only)	(2)
	1.4.3	(a) Nucleotide✓ (b) Guanine✓ (c) Phosphate✓ (d) Hydrogen✓ bond	(1) (1) (1) (1)
	1.4.4	Double helix✓	(1)
	1.4.5	DNA replication✓	(1)
			(9)

2.1	2.1.1	(DNA) replication✓	(1)
	2.1.2	During interphase✓/ between cell divisions /before cell division/before mitosis/ before meiosis	(1)
	2.1.3	1 - G✓/Guanine 2 - C✓/Cytosine	(2)
	2.1.4	RNA is a single strand✓/while DNA is double stranded RNA has uracil✓/and DNA has thymine RNA has single bases✓/and DNA has paired bases RNA has ribose✓/while DNA has deoxyribose RNA is much shorter✓/whereas DNA is longer RNA maybe linear✓/straight/ looped /and DNA is helix (Mark first TWO only)	Any (2) (6)

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3.3	3.3.1	DNA profiling✓ (DNA fingerprinting)	(1)
	3.3.2	Male 3✓	(1)
	3.3.3	- The bands of the child's DNA is a combination of the DNA from each parent ✓ - Three bands are identical to that of the mother✓ - The remaining (three) bands correspond with that of male 3✓	(3)
	3.3.4	- To investigate crimes✓/resolve disputes - To identify organisms from their remains✓ - To identify missing persons✓ - To identify family relationships other than paternity✓ e.g. siblings or cousins - To test for the presence of specific alleles✓/genes that cause a genetic disorder - To establish matching tissues for organ transplants✓	Any 2 (2)
		(Mark first TWO only)	(7)

1.5.1	1.5.1	Translation✓	(1)
	1.5.2	(a) Ribosome✓	(1)
		(b) mRNA✓/messenger RNA	(1)
		(c) Peptide✓	(1)
	1.5.3	(a) C✓	(1)
		(b) B✓	(1)
		(c) D✓	(1)
			(7)

2.2 2.2.1

- (a) tRNA✓ (1)
 (b) Amino acid✓ (1)
 (c) Peptide✓ (1)

2.2.2 Translation✓ (1)

2.2.3

- (a) AGC✓ (1)
 (b) Arginine✓; glycine✓; serine✓ (3)
 (c) No change✓, they all represent the same amino acid✓ (2)
(10)

2.2

2.2.1 A – Nuclear membrane✓

B – mRNA/RNA✓

D – DNA✓

(3)

2.2.2 - Carrying hereditary characteristics from parents to their offspring✓

- Controls the synthesis (manufacturing) of proteins✓/controls the structure and functioning of cells

(Mark first ONE only)

(1)

2.2.3 Transcription✓

(1)

2.2.4 Enzymes✓

(1)

2.2.5 Ribosome✓

(1)

2.2.6 Translation✓

(1)

- The mRNA strand from the nucleus becomes attached✓ to a ribosome with its codons exposed✓
- each tRNA molecule carrying a specific amino acid ✓ according to its anticodon✓
- matches up with/complements the codon of the mRNA✓
- so that the amino acids are placed in the correct sequence✓
- adjacent amino acids are linked ✓
- to form a protein ✓

any (5)

(13)

Meiosis

1.4	1.4.1	(a) 46✓	(1)
		(b) 44✓	(1)
		(c) 2✓	(1)
	1.4.2	23✓	(1)
	1.4.3	Male✓	(1)
			(5)

1.5	1.5.1	(a) Homologous chromosomes✓/Bivalent	(1)
		(b) Centromere✓	(1)
		(c) Chromatid✓	(1)
	1.5.2	- It holds the (two) chromatids together✓	Any (1)
		- Attaches the chromosome to the spindle fibres✓	
	1.5.3	(a) Crossing over✓	(1)
		(b) Prophase 1✓	(1)
	1.5.4	Introduces variation✓/different gametes	(1)
			(7)

1.5	1.5.1	(a) Prophase I✓	(1)
		(b) Metaphase II✓	(1)
	1.5.2	(a) Centriole✓	(1)
		(b) Nuclear membrane✓/(nucleus)	(1)
		(c) Homologous pair✓/Bivalent	(1)
	1.5.3	(a) - Forms spindle✓✓fibres	(2)
		(b) Carries genetic✓/hereditary material	(1)
	1.5.4	Haploid✓	(1)
	1.5.5	Crossing over✓	(1)
			(10)

Reproduction in vertebrates

1.4	1.4.1	External✓ fertilization	(1)
	1.4.2	- A large amount of sperm are released✓	
		- A large amount of eggs are released✓	
		- The male and female swim close to each other✓/the sperm is released close to the eggs (Any 2)	(2)
		(Mark first TWO only)	
	1.4.3	Ovipary✓	(1)
	1.4.4	- No danger of drying out✓	(2)
		- Water provides support✓	(2)
		(Mark first TWO only)	(6)

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2.1	2.1.1	- The hatchling's eyes are closed✓ - The hatchling can't move✓ - The hatchling can't feed on its own✓ - The hatchling has no feathers✓/wings are not developed	(Any 2)	(2)
		(MARK FIRST TWO ONLY)		
	2.1.2	- Foetus develops inside the uterus✓ for greater protection✓ - Food is supplied by the mother✓ and is therefore supplied for a longer period✓	(Any 1 x 2)	(2)
		(MARK FIRST ONE ONLY)		
	2.1.3	- More yolk allows for greater development✓ of the chick - so that it can be more independent✓ after hatching		(2)
				(6)

Human reproduction

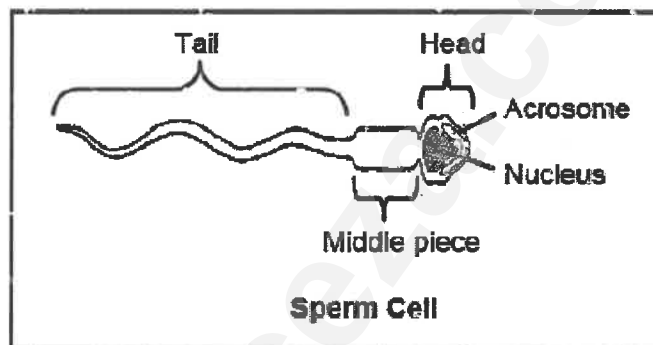
3.1				
3.1.1	A -- prostate gland✓ B -- vas deferens / sperm duct✓ E -- urethra✓ G -- nucleus✓			(4)
3.1.2	C -- Stores sperms temporarily✓/sperms mature here (Mark first ONE only)			
	F - Contain enzymes to break down the cell membrane of the egg cell✓ (Mark first ONE only)			(2)
3.1.3	D✓ testis ✓/seminiferous tubules			(2)
3.1.4	To keep the testes at a temperature that is (about 3 °C) lower than body temperature✓ A lower temperature is necessary for the production and storage of healthy sperm✓/so that healthy sperms can survive			(2)
3.1.5	(a) Interstitial cells✓/Cells of Leydig			(1)
	(b) Testosterone✓			(1)
3.1.6	(a) Yes✓			(1)
	(b) HI virus is carried in body fluids✓/ seminal fluids/saliva/blood Can infect a person through open wounds✓/blood transfusion/ sexual intercourse Therefore vasectomy does not stop the transmission of HIV			(2)
				(15)

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2.1	2.1.1	A - Urethra✓ B - Vas deferens✓/sperm duct F - Fallopian tube✓/oviduct	(3)
	2.1.2	(a) - Protects the sperm cell against the acidic environment of the vagina✓ - Increases the motility of the sperm✓ - Provides nutrients✓ (Mark first ONE only)	Any (1)
		(b) - Place for foetus to develop ✓ - Maintain pregnancy✓ - Assist in childbirth✓ - implantation✓ of blastula - Protects the foetus✓/prevents infectionc(mucus plug forms by cervix) - Passage for sperm cells✓/between vagina and fallopian tubes (Mark first ONE only)	Any (1)
	2.1.3	(a) D✓ (b) G✓	(1) (1)
	2.1.4	(a) Spermatogenesis✓ (b) Oogenesis✓	(1) (1)
	2.1.5	- Serves as a birth canal✓ - Allows for passage of blood/ endometrial lining/amniotic fluid/placenta - Facilitates sexual intercourse ✓/receives semen - Secretes acid which prevents infections✓ (Mark first TWO only)	Any (2)
	2.1.6	- To keep the testes at a temperature that is lower than body temperature✓/optimum temperature for sperm production - which is necessary for the production of healthy sperm✓/so that healthy sperms can survive	(2) (13)

- 2.1 2.1.1 Spermatogenesis✓ (1)
- 2.1.2 Testosterone ✓ (1)
- 2.1.3 Stimulates the development of primary male sex organs✓
Stimulates the development of secondary male characteristics✓
Stimulates development of sperm✓ Any (1)
- 2.1.4 (a) 46 chromosome✓ (1)
(b) 23 chromosome ✓ (1)

2.1.5



Mark allocation for diagram:

Caption✓

Any 4 correct labels✓✓✓✓

(5)

(10)

2.3	2.3.1	(a) Ovulation✓	(1)
		(b) LH✓	(1)
		(c) Oestrogen✓	(1)
	2.3.2	- Level of progesterone remains low✓ - so the endometrium will no longer be maintained✓ - leading to menstruation✓ - In addition, FSH secretion is no longer inhibited✓/FSH secretion resumes - and a new follicle starts to develop✓	(5)
	2.3.3	- Zygote undergoes mitosis✓ - to form a solid ball of cells✓ - called the morula✓ - Which is then converted into a hollow ball of cells✓ - called the blastula✓ - The cells then differentiate to form the embryo✓ - with the chorion✓ - which forms the placenta✓with the endometrium - and the amnion✓	(Any 6) (5)
	2.3.4	- Prevents the foetus from drying out✓ - Allows for easy foetal movement✓ - It acts as a shock absorber✓/prevents mechanical injury - Keeps the foetus within a small temperature range✓ - Helps in birth process✓ (Mark first THREE only)	(Any 3) (3)
	2.3.5	- Gas exchange system✓ - Digestive system✓ - Excretory system✓ (Mark first TWO only)	(Any 2) (2) (19)

2.3	2.3.1	Day 14✓/15	(1)
	2.3.2	Day 0–6✓/day 0–7	(1)
	2.3.3	Stimulates follicle✓/ovum development in the ovary/secretion of oestrogen	(1)
	2.3.4	An increase in progesterone level✓ inhibits the release of FSH✓ OR FSH stimulates the development of the ovum✓ and progesterone prepares for implantation ✓when this ovum is fertilised	(2)
	2.3.5	- Corpus luteum ✓ - starts to secrete progesterone✓ - which thickens✓ the lining of the uterus wall/endometrium Any	(2)
	2.3.6	No✓	(1)
	2.3.7	- Corpus luteum has degenerated✓ - Progesterone level has decreased✓ - FSH level starts to rise✓ - LH level decreases✓ (Mark first TWO only)	Any (2) (10)

1.5	1.5.1	(a) Zygote✓	(1)
		(b) Morula✓	(1)
		(c) Placenta✓	(1)
	1.5.2	(a) Fertilisation✓	(1)
		(b) Implantation✓	(1)
	1.5.3	(a) 46✓/23 pairs	(1)
		(b) 23✓	(1)
			(7)

1.5	1.5.1	A✓	(1)
	1.5.2	A✓ /B	(1)
	1.5.3	E✓	(1)
	1.5.4	B✓	(1)
	1.5.5	D✓	(1)
			(5)

2.3	2.3.1	(a) Umbilical cord✓	(1)
		(b) Cervix✓/endometrium/uterus wall	(1)
	2.3.2	It provides the fluid medium for free movement of foetus✓ It acts as a shock absorber✓ It protects the foetus against dehydration✓ It protects the foetus against temperature changes✓ Promotes lung development✓ Holds waste✓ (Mark first ONE only)	any (1)
	2.3.3	Uterine walls are made up of (strong) muscles✓ – which contract and relax to push the foetus✓/ afterbirth forward Cervix has (elastic) muscles✓ – allowing dilation of the opening to let the foetus out✓	any (1 x 2) (2)
	2.3.4	Respiratory✓/Gaseous exchange system Digestive ✓system Excretory✓ system (Mark first TWO only)	any (2)
	2.3.5	High levels of progesterone✓ inhibits the secretion of FSH✓	(2)
			(9)

GENETICS

- 2.1 2.1.1 (a) White✓fur (1)
 (b) Black✓fur (1)
 2.1.2 (a) 1✓ and 3✓ (2)
 (Mark first TWO only)
 (b) 1✓ (1)
 (Mark first ONE only)

2.1.3

P₁ Phenotype Black X White✓
 Genotype BB X bb✓
 Meiosis G/gametes B, B X b, b✓
 Fertilisation
F₁ Genotype Bb, Bb, Bb, Bb✓
 Phenotype All black
 *0✓%white
 P₁ and F₁✓
 Meiosis and fertilisation✓

(*compulsory mark + 5)

OR

P₁ Phenotype Black X White✓
 Genotype BB X bb✓

Meiosis

Fertilisation

Gametes	B	B
b	Bb	Bb
b	Bb	Bb

1 mark for correct gametes
 1 mark for correct genotypes

F₁ Phenotype All black
 *0✓% white

P₁ and
F₁✓

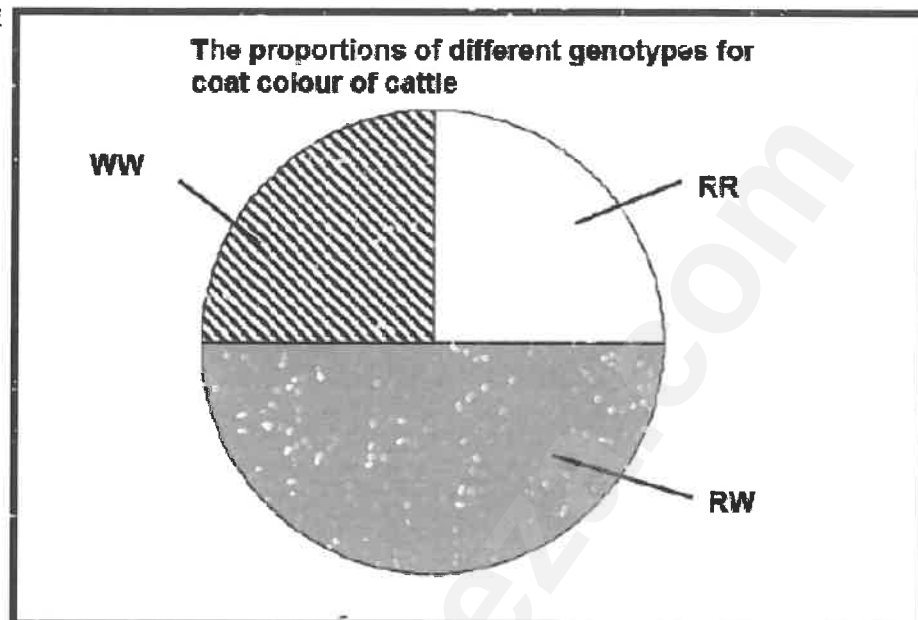
Meiosis and fertilisation✓

(* compulsory
mark + 5)(6)
(11)

4.1.1 1:2:1✓✓

(2)

4.1.2



Rubric for the mark allocation of the pie chart

Correct type of graph	1
Caption	1
Correct proportions of slices	1: 1 correct slice 2: 2 to 3 correct slices
Label / key for each slice	1 mark for each label

NOTE: If the wrong type of graph is drawn: marks will be lost for "correct type of graph" as well as for drawing the slices in correct proportions.

(7)

4.1.3 Both alleles✓ for fur colour are equally dominant✓ and therefore both are expressed in the phenotype✓

OR

Neither of the alleles✓ for red or white colour are dominant over each other✓ and therefore no one colour alone is expressed/ masked in the phenotype✓

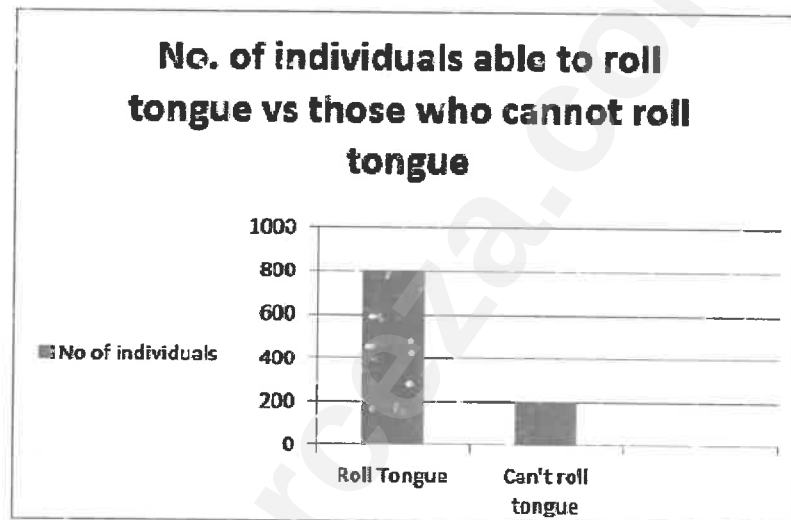
(3)

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2.3 2.3.1 Ability to roll the tongue ✓ (1)

- 2.3.2
- Ask the permission from the participants and the school principal to conduct the investigation. ✓
 - Determine the sample size. ✓
 - Decide on how data will be recorded. ✓
 - Decide on data capturers to collect data. ✓
- (Mark first THREE only) (Any 3 x 1) (3)

2.3.3



Mark allocation of the graph

Criterion	Elaboration	Mark
Type of graph (T)	Bar graph drawn	1
Caption (C)	Includes both variables: number of individuals/able or unable to roll tongue	1
X-axis	Equal width of bars AND correct label	1
Y-axis	Appropriate scale AND correct label	
Plotting (P)	1 bar plotted correctly	1
	2 bars plotted correctly	2

NOTE:

If a line graph is drawn –marks will be awarded for the 'title and label for X-axis and Y-axis' only.

If a histogram is drawn – marks will be lost for the 'type of graph and correct scale' only.

(6)

2.3.4 Discontinuous ✓

(1)

2.3.5 There is no range of different phenotypes for tongue rolling ✓/
there are no intermediates between phenotypes, either one can
roll their tongue or they cannot. ✓

(2)

Max (6)

Max (2)
(10)

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3.3.1 P/parent phenotype: tortoise-shell female x orange male✓
 genotype: $X^B X^O$ x $X^O Y$ ✓

Meiosis
 G/gametes
 Fertilisation

F/offspring genotype
 phenotype: 1 tortoise-shell female, 1 black male, 1 orange female and 1 orange male✓✓

(1 mark for gender and 1 mark for fur colour with correct proportion)

OR

P/parent phenotype: tortoise-shell female x orange male✓
 genotype: $X^B X^O$ x $X^O Y$ ✓

Meiosis
 G/gametes
 Fertilisation

F/offspring genotype
 phenotype: 1 tortoise-shell female, 1 black male, 1 orange female and 1 orange male✓✓

(1 mark for gender and 1 mark for fur colour with correct proportion) (7)

gametes	X^B	X^O
X^O	$X^B X^O$	$X^O X^O$
Y	$X^B Y$	$X^O Y$

$X^B X^O, X^B Y, X^O X^O$ & $X^O Y$ ✓

3.3.2 Because fur colour is sex linked and only carried by the X chromosome✓
 male kittens cannot have tortoise-shell colour because their Y chromosome
 does not carry any allele ✓for fur colour (2)

3.3.3 Because the gene for fur colour is sex linked and only carried by the X
 chromosome ✓ female cats with the allele combination $X^B X^O$ ✓ will
 have the tortoise-shell colour (2)
 (11)

3.4	3.4.1	$I^A\checkmark, I^B\checkmark, i\checkmark$	(3)
	3.4.2	2✓	(1)
	3.4.3	- Any individual inherits one allele✓ - from each parent✓	(2)
	3.4.4	- Each child✓ - has an equal✓/25% chance of having - any blood group✓/ A, B, AB, or O.	(3) (9)

1.3	1.3.1	Y✓ and Z✓ (Mark first TWO only)	(2)
	1.3.2	Y – Tau✓ Z – Chaka✓	(2)
	1.3.3	$I^A I^A\checkmark$ $I^A i\checkmark$ (Any order)	(2) (6)

1.4	1.4.1	(a) $RrTT\checkmark$	(1)
		(b) $rrtt\checkmark$	(1)
	1.4.2	$RT\checkmark, rT\checkmark$	(2)
	1.4.3	(a) Red fruit, short✓ (b) Red fruit, tall✓	(1) (1)
	1.4.4	$RRTT\checkmark\checkmark$	(2) (8)

1.6	1.6.1	(a) BbTt✓✓	(2)
		(b) Black coat✓ short tail✓	(2)
		(c) BbTt✓	(1)
	1.6.2	0✓%	(1)
	1.6.3	Bt✓ bT✓ (MARK FIRST TWO ONLY)	(2) (8)

1.5	1.5.1	Pedigree ✓ /Genetic lineage diagram	(1)
	1.5.2	3 ✓	(1)
	1.5.3	(a) Black ✓ fur	(1)
		(b) Black ✓ fur	(1)
	1.5.4	(a) aa ✓	(1)
		(b) Aa✓	(1)

3.5	3.5.1	- Because they were normal they must each have one dominant allele✓ - and in order for their children to be affected each parent must have one recessive allele✓	(2)
	3.5.2	NN✓ or Nn✓	(2)
	3.5.3	- The father would have been affected✓ if it was sex-linked - In order for the daughter to be affected✓	(2) (6)

3.4	3.4.1	Four/4 ✓✓	(2)
	3.4.2	(a) $X^H X^h$ ✓ (b) $X^h Y$ ✓	(1) (1)
	3.4.3	- The allele for the trait is carried on the X-chromosome ✓ / Y-chromosome does not carry the allele for the trait. - Males only have one X-chromosome ✓ - A male only needs one recessive allele ✓ to be haemophiliac, whereas for a female to be haemophiliac both alleles must be recessive. ✓	(Any 2 x 1) (2)
	3.4.4	50✓%✓ / ½	(1)
	3.4.5	- To determine if the wife is a carrier. ✓ - To determine what the chances are of having a child with <i>haemophilia</i>. ✓ - Help them evaluate whether they would cope with such a child. ✓ - Help them to make an informed decision about whether to have children. ✓	(Any 2 x 1) (2)
3.5	3.5.1	(a) Cloning ✓	(1)
		(b) Oogenesis ✓ / gametogenesis / meiosis	(1)
	3.5.2	- The donor horse has the desired characteristics ✓ - that need to be copied ✓ - and be present in the offspring ✓ / next generation	Any 2 (2)
	3.5.3	The nucleus contains all the genetic information ✓ ✓ / hereditary characteristics / chromosomes of the champion horse	(2)
	3.5.4	(a) 64 ✓	(1)
		(b) 32 ✓	(1)
		(c) 64 ✓	(1)
	3.5.5	- A gamete is generally haploid ✓ - This ovum is diploid ✓ since - it has the nucleus of a somatic cell ✓	Any 2 (2) (11)

Responding to the environment (humans)

1.4	1.4.1	B✓ - Cerebrum✓	(2)
	1.4.2	D✓ - Cerebellum✓	(2)
	1.4.3	A✓ - Pituitary gland✓/Hypophysis	(2)
	1.4.4	C✓ - Corpus callosum✓	(2)
	1.4.5	E✓ - Spinal cord✓	(2)
			(10)

1.4	1.4.1	Motor✓ neuron	(1)
	1.4.2	(a) Nucleus✓/nuclear membrane	(1)
		(b) Cytoplasm✓	(1)
		(c) Dendrite✓	(1)
	1.4.3	(a) C✓ - Axon✓	(2)
		(b) D✓ - Myelin sheath✓	(2)
	1.4.4	Multiple sclerosis✓	(1)
			(9)

2.4	2.4.1	(a)	A	Ganglion ✓	(1)
		(b)	E	Effector ✓/muscle	(1)
	2.4.2	(a)	B	Ensures one directional flow of impulses ✓ (mark first 1 only)	(1)
		(b)	C	Transmits impulses from sensory neuron to motor neuron ✓ (mark first 1 only)	(1)
	2.4.3	-		Spinal cord shortens reaction time by sending impulses directly to the effector ✓ - If the brain is involved, it delays the reaction ✓ - causing injury or even death ✓	(3)
	2.4.4	-		The myelin sheath is damaged by multiple sclerosis ✓ - This will cause a slow transmission of impulses ✓ - resulting in slower reaction time ✓ which might leads to injury or death ✓ (any 2)	(2)
	2.4.5	-		The person will be able to feel the pain ✓ because the sensory neuron is able to transmit the impulses to the brain ✓ since it is not damaged - However no reaction will take place ✓ - because of the fact that no impulse will reach the effector ✓ due to the damage to the motor neuron	(4)

1.5	1.5.1	(a)	Sclera ✓	(1)
		(b)	Cornea ✓	(1)
		(c)	Pupil ✓	(1)
	1.5.2	(a)	D ✓ – Iris ✓	(2)
		(b)	G ✓ – Choroid ✓	(2)
		(c)	E ✓ – Retina ✓	(2)
				(9)

2.3	2.3.1	Have photoreceptors✓/rods and cones to convert light stimuli into impulses✓	(2)
	2.3.2	The iris contains 2 sets of muscles✓ The radial muscles contract✓ and the circular muscles relax ✓ causing the pupil to dilate✓ allowing more light to enter the eye✓ to form a clear image✓	Any (5)
	2.3.3	Number 3✓	(1)
	2.3.4	The relative clarity of the image is the best ✓/has greatest number of cones for colour vision.	(1)
	2.3.5	Blind spot ✓	(1)
			(10)

2.2	2.2.1	(a) 7✓	(1)
		(b) Diameter of the pupil is the largest✓, indicating dim light conditions✓/ allowing more light to enter	(2)
	2.2.2	Since less light enters the eye - the radial✓ muscles of the iris [contract]✓ - the circular✓ muscles of the iris [relax]✓ - causing the pupil to dilate✓/become wider/become bigger thus allowing more light to enter	any (4)
		[] = only allocate mark if linked to correct muscle	(7)

2.1	2.1.1	(a) C ✓	(1)
		(b) B ✓	(1)
	2.1.2	(a) Short sightedness ✓/Myopia	(1)
		(b) Concave ✓ lens	(1)
	2.1.3	*Accommodation ✓	
		- Ciliary muscles contract ✓	
		- Suspensory ligaments slacken ✓	
		- Tension on lens decreases ✓	
		- Lens becomes more convex ✓	
		- Refractive power of lens increases ✓	
		- A clear image now forms on the retina ✓	(*Compulsory 1 + any 4) (5)

1.5	1.5.1	D✓	(1)
	1.5.2	E✓	(1)
	1.5.3	G✓	(1)
	1.5.4	C✓	(1)
			(4)

3.4	3.4.1	(a) Auditory nerve✓	(1)
		(b) Round window✓/Fenestra rotunda	(1)
	3.4.2	Cerebrum✓	(1)
	3.4.3	- The cristae✓in the semi-circular canals - are stimulated by changes in speed and direction✓ - when the endolymph moves✓ - The cristae convert the stimuli to nerve impulses✓ - The nerve impulses are transported along the auditory nerve✓ - to the cerebellum✓to be interpreted - Impulses sent to muscles✓ to restore balance	(Any 5) (5)
	3.4.4	- The mucus will block the opening of the Eustachian tube✓ - Air cannot enter or leave✓the middle ear - to equalise pressure✓/causing imbalance in pressure	
		OR	
		- Mucus may move through the Eustachian tube✓ - causing pressure in the middle ear✓ - pushing on the tympanic membrane✓/part E	(3)
	3.4.5	- The ossicles/structures at A will not be able to vibrate✓ - and hence no vibrations will be passed to the inner ear✓/cochlea will not be stimulated/no amplification	(2)
			(13)

Human endocrine system

1.4	1.4.1	(a) Hypophysis✓/Pituitary gland	(1)
		(b) Adrenai✓ gland	(1)
	1.4.2	(a) D✓ – Testis✓	(2)
		(b) C✓ – Pancreas✓/Islets of Langerhans	(2)
		(c) A✓ – Hypophysis✓/Pituitary gland	(2)
			(8)

1.5	1.5.1	Pancreas✓	(1)
	1.5.2	Insulin✓	(1)
	1.5.3	Glucagon✓	(1)
	1.5.4	Diabetes✓mellitus	(1)
	1.5.5	Negative feedback✓	(1)
			(5)

3.2	3.2.1	Comparison of the blood glucose level of two people✓ over 5 hours✓/before and after ingesting glucose	(2)
	3.2.2	(145 – 125)✓ (Accept numbers in range 144 -146 for the first value and 124 -126 for the second value) = 20✓ mg/100 cm ³ (Accept answer according to the values given by learner)	(2)
	3.2.3	Accept any answer from 1,7 to 1,9✓ hours /102 – 114minutes/ 1h42min – 1h54min	(1)
	3.2.4	(a) Thabiso✓	(1)
		(b) - His glucose level is higher than the normal range✓ - It takes longer for his glucose level to come down to its original level✓ (Any 1)	(1)
		(MARK FIRST ONE ONLY)	

1.5	1.5.1	A - Hypophysis ✓ /Pituitary gland B – Thyroid gland✓	(2)
	1.5.2	1 - TSH✓ 2 - Thyroxin✓	(2) (4)

2.4	2.4.1	To maintain an internal balance✓/set point/homeostasis/regulate metabolism	(1)
	2.4.2	TSH✓/thyroid-stimulating hormone	(1)
	2.4.3	When Y/thyroxin is released at higher levels than normal: - Metabolism will be higher than normal✓/cellular respiration increases - Heart rate increases✓ - thus all the energy from food eaten will be used✓ - leaving nothing to be utilised for storage✓/therefore could lead to a person being underweight - can also lead to anxiety✓ (Any 3)	(3) (5)

3.3	3.3.1	- Group A✓	(3)
		- Group C✓	(2)
	3.3.2	(a) Amount of Thyroxine✓	(1)
		(b) Metabolic rate✓ By measuring the change in mass✓/consumption of oxygen	(2)
	3.3.3	Z, X, Y ✓✓	(2)

3.3.4	Group B✓	(1)
3.3.5	- The mass of the rats decreased✓/changed from 320 g to 309 g	(5)
	- since body fat is used✓/ less fat is stored	
	- The oxygen consumption was the highest✓/(10ml/kg/min)	
	- indicating an increased rate of metabolism✓/respiration	
	- which is caused by the higher thyroxine concentration✓	
3.3.6	- Diet Y is the only diet that contained thyroxine✓/ group B receives thyroxine through diet Y	(Any 5)
	- The age of the rats must be the same✓	(3)
	- All the rats must receive the same amount of food✓	
	- Food must be given at the same time✓	
	- The rats must be of the same species✓/genetically similar	
	- Use the same instrument to measure mass✓	
	- The same person must take the measurements✓	
	- Use identical cages✓	(Any 3)
	(MARK FIRST THREE ONLY)	(16)

SECTION C

QUESTION 4

Describe the location, structure and functions of the DNA molecule and the process whereby copies of this molecule are made.

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

Location, structure and function

- The DNA is located in the nucleus✓/chromosome/genes/mitochondria
- DNA is a nucleic acid✓
- It has a double✓stranded
- helix✓ configuration
- consisting of building blocks called nucleotides✓
- The three components of a nucleotide are as follows:
- Nitrogenous bases✓
- Phosphate portion✓
- Deoxyribose sugar portion✓(in DNA)
- 4 nitrogenous bases are A,T,C,G✓ of DNA:
- adenine (A) bonds with thymine (T)✓
- cytosine (C) bonds with guanine (G)✓
- by hydrogen bonds✓
- Sections of DNA carry hereditary✓ information
- DNA contains coded information for protein synthesis✓

Max (10)

Replication✓

- The double helix unwinds✓
- Double stranded DNA unzips✓
- as the weak hydrogen bonds break✓
- Each original DNA strand serves as a template✓
- Free nucleotides✓build
- a new DNA strand✓onto each of the original DNA strands
- by attaching to their complementary✓nitrogenous bases/(A to T, and C to G)
- this results in two identical✓DNA molecule

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

QUESTION 4

Write an essay in which you describe how invasive alien plants affect the quality of water and discuss various ways of controlling invasive alien plants including their advantages and/or disadvantages.

Content: (17)
Synthesis: (3)

Write an essay in which you describe how invasive alien plants affect the quality of water and discuss various ways of controlling invasive alien plants including their advantages and/or disadvantages.

EFFECT OF ALIEN INVASIVE SPECIES ON WATER QUALITY

- They form a continuous mat on the surface of water. ✓
- This blocks light ✓ from reaching the lower levels of the water.
- Photosynthesis at the lower level of water stops. ✓
- The plants die and decompose. ✓
- The population of decomposers increases, ✓
- using up large amounts of oxygen. ✓
- Aquatic animals/ fish/tfrogs die ✓
- due to lack of oxygen. ✓
- This decreases the quality of water. ✓

MECHANICAL CONTROL ✓

- Removal of invasive species by hand ✓ or with machines
- Effective in controlling small populations ✓
- Advantage: minimizes harm to non-invasive plants and animals ✓
- Disadvantage: Labour intensive ✓ and time consuming ✓

CHEMICAL CONTROL ✓

- Uses chemicals ✓/chemical compounds to control spread of alien invasive species
- Effective in both large and small populations ✓
- Disadvantage: possible contamination of land and water resources ✓ and
- may result in the killing of desirable plants and animal species. ✓
- Target species may develop resistance to the chemicals ✓

BIOLOGICAL CONTROL ✓

- Uses a specific species to control the spread of alien invasive species ✓
- Both indigenous and non-indigenous species may be used ✓
- Can be both environmentally safe ✓ and successful
- Use of non-indigenous species may increase alien invasive species ✓

- 4.3 Start with a cell containing FOUR chromosomes and describe ALL the chromosomal changes that occur during meiosis, resulting in the formation of abnormal gametes due to non-disjunction in meiosis 1.

Content (17)
 Synthesis (3)
 (20)

4.3 Possible Answer:

- Each chromosome shortens and becomes visible✓
- as two chromatids✓
- joined by a centromere✓
- Homologous chromosomes come to lie next to each other✓
- Chromatids from each homologous chromosome overlap✓/crossing over occurs
- The point of overlap is called the chiasma✓
- Genetic material is exchanged✓ between the homologous chromosomes
- The chromosomes line up along the equator✓
- in homologous pairs✓
- attached to the spindle fibres✓
- When the spindle fibres shorten✓/contract
- * All 4 chromosomes are pulled to one pole✓ due to non-disjunction
- Resulting in two cells✓
- * one with 4 chromosomes✓,
- * and one with no chromosomes✓.
- The cell with 4 chromosomes undergoes meiosis 2✓
- The 4 chromosomes line up at the equator✓
- in a single row✓
- When the spindle fibres shorten✓/contract
- the centromeres split✓
- and chromatids✓/daughter chromosomes
- are pulled to the opposite poles of the cell✓
- Two cells result✓
- * Each with a nucleus containing 4 chromosomes✓
- * Resulting in diploid gametes✓

Any 4 compulsory* points + any other 13

4.3 Describe the menstrual cycle and how it is influenced by different hormones.

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

- 4.3
- The menstrual cycle is a series of events that occur in the female body to prepare it for possible pregnancy✓
 - Which involves ovarian cycle✓
 - and the uterine cycle✓
 - It takes an average of 28 days✓
 - The pituitary gland✓/hypophysis
 - secretes FSH✓
 - which stimulates the development of a primary follicle✓ in the ovary
 - The developing follicle✓/Graafian follicle
 - secretes oestrogen✓
 - which stimulates the thickening of the lining of the uterus✓/endometrium
 - Around day 13 pituitary gland✓/hypophysis
 - secretes LH✓
 - which cause ovulation to occur✓
 - The remains of the Graafian follicle develops into the corpus luteum✓
 - which secretes the progesterone✓
 - which continues to stimulate the thickening of the uterus✓
 - High levels of progesterone✓
 - inhibits the production of FSH✓
 - so that the ovaries are no longer stimulated to produce another follicle✓
 - If fertilisation does not occur, the corpus luteum degenerates✓
 - and stops producing progesterone✓
 - The pituitary gland/hypophysis is no longer inhibited in its production of FSH✓ and a new follicle develops
 - The thick endometrium is no longer maintained✓/ it degenerates
 - and is shed together with blood/menstruation takes place

Any (17)

Content: (17)
 Synthesis: (3)

QUESTION 4

Sperm is produced, transported and then combined with secretions from the accessory glands to form semen. The semen is then transferred into the body of the female where it meets the ovum.

Describe all the processes referred to in the statement above and explain THREE structural adaptations of the sperm for fertilisation.

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

Spermatogenesis✓ (S)

- Takes place under the influence of testosterone✓
- in the seminiferous tubules✓/testis
- Diploid cells✓/germinal epithelium
- undergo meiosis✓
- to form haploid sperm cells✓

(Any 4) (4)

Formation and transport of semen (T)

- Sperm mature✓/are temporarily stored
- in the epididymis✓
- During ejaculation✓
- sperm move into the vas deferens✓
- As it passes the seminal vesicles✓,
- prostate gland✓ and
- Cowper's glands✓
- fluids are added that provide nutrition,✓
- promote the movement✓ of the sperm
- and neutralise the acids ✓ produced in the vagina
- The semen passes through the urethra✓
- of the penis✓
- into the vagina✓
- during copulation✓
- and swims up the Fallopian tube✓where it meets the ovum

(Any 7) (7)

Structural suitability of the sperm cell for fertilisation (A)

- The acrosome✓
- contains enzymes to dissolve a path into the ovum✓
- Nucleus of the sperm✓
- carries genetic material of the male✓/haploid number of chromosomes
- Many mitochondria✓in the middle piece
- release energy✓ so that sperms could swim
- The presence of a tail✓
- enables sperm cells to swim ✓ towards the ovum
- The contents of the sperm cell such as the cytoplasm is reduced✓/condensed
- making the sperm light for efficient movement✓
- Sperm is streamlined✓
- to allow for easier movement✓

(MARK FIRST THREE ONLY)

(Any 3 x 2) (6)

ADAPTED BY MR S.J SILAULE

QUESTION 4

A goalkeeper in a soccer match prevented a goal from being scored when he dived to his right after the ball was kicked towards him. Just before he dived, he heard his team-mate shout, 'your ball'.

Describe how his eyes adjusted to see the ball as it travelled towards him and describe how he heard his team-mate and maintained his balance as he dived to save the ball.

As the ball moved towards the goalkeeper:

- Accommodation✓ took place
- Ciliary muscles contracted✓
- Suspensory ligaments became slack✓
- This reduced the tension on lens✓
- Lens became more convex✓/round
- Refractive power of the lens increased✓
- Image of the ball fell on the retina✓

Any (5)

Hearing

The shout of his team-mate was heard by the goal keeper as follows:

- The sound waves were directed by the pinna✓
- through the auditory canal✓
- to the tympanic membrane✓/eardrum
- causing it to vibrate✓
- The vibrations of the tympanic membrane were transferred to the ossicles✓
- In the middle ear
- which eventually caused the oval window to vibrate✓
- This set up pressure waves in the cochlea✓
- This stimulated the Organ of Corti✓ in the cochlea
- to convert this stimulus into a nerve impulse✓
- which was then transmitted along the auditory nerve✓
- and interpreted in the cerebrum✓

Any (7)

Balance and equilibrium

As he dived:

- A change in the direction and speed✓ of the body
- causes the movement of fluid in the semicircular canals✓
- which stimulates the cristae✓
- A change in the position of the head✓
- stimulated the maculae✓ in the utricle and sacculus
- The stimuli were converted into impulses✓
- which were transported along the auditory nerve✓
- and interpreted in the cerebellum✓
- which then sent impulses to the muscles✓
- to restore balance and equilibrium✓

Any (5)

Content (17)

Synthesis (3)

QUESTION 4

Describe how blood groups in humans are determined by different alleles and explain how blood typing can be used to solve paternity cases. Also explain why and how DNA profiling is sometimes required to solve paternity cases.

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

How alleles determine blood groups:

- Human blood groups are determined by multiple alleles✓
- I^A ✓; I^B ✓ and i ✓
- I^A and I^B are co-dominant ✓
- i is recessive✓
- Blood group A can have the genotypes $I^A I^A$ ✓
- or $I^A i$ ✓
- Blood group B can have the genotypes $I^B I^B$ ✓
- or $I^B i$ ✓
- Blood group AB has the genotype $I^A I^B$ ✓
- Blood group O has the genotype ii ✓

Any 9

How blood typing is used to solve paternity cases

- The blood groups of the father, mother and child must be compared✓
- If it proves that it is not possible✓ for the man and woman to have a child with the specific blood group
- the man is not the father✓
- If it shows that the man and the woman can possibly✓ have a child with that specific blood group
- DNA profiling✓
- needs to be done to confirm that he is the father or not✓

Any 4

Why and how DNA profiling can be used to confirm paternity

- The DNA profiles of the possible father and child must be compared✓
- A child receives 50%/half of his/her DNA from his/her father✓
- If half/50% of the dark bands on the DNA profile of the child correlate with that of the possible father✓
- the man is the father of the child✓
- If there is no/little correlation between the DNA of the child and the possible father✓
- the man is not the father of the child✓

Any 4
Content: (17)

QUESTION 4

Describe TWO types of mutations and how they lead to altered characteristics in FOUR genetic disorders you have studied.

Content: (17)
Synthesis: (3)

Mutations

- Mutations refer to sudden changes✓
- in the genetic composition of an individual✓
- Gene mutations✓
- result in a change in the structure of the DNA in a single gene✓
- Chromosomal aberrations✓
- are changes in the normal structure/number of chromosomes✓
- Harmful/lethal mutations✓
- result in genetic disorders✓/characteristics that decrease the survival of an organism

Any 5 (5)

Genetic disorders

- Haemophilia✓
- Blood does not clot✓
- because the protein for blood clotting is not produced✓
- Colour blindness✓
- The person cannot differentiate between different colours✓
- due to the absence of the necessary protein for photoreception✓
- Albinism✓
- The lack of pigment in the skin✓
- due to the absence of the protein that forms melanin✓
- Down syndrome✓
- The person has an extra copy of chromosome 21✓
- due to non-disjunction✓ during meiosis.

(4 x 3) (12)

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

- 4.4 Name and state the functions of FOUR hormones secreted by the pituitary gland in humans. Describe how the pituitary gland controls the functioning of the thyroid gland using negative feedback.

Content (17)
Synthesis (3)
(20)

4.4 Hormones secreted by the pituitary gland

Growth Hormone✓/(GH)

- Stimulates the growth of the long bones✓/skeletal muscles.

Follicle Stimulating Hormone✓/FSH

- Stimulates follicle development ✓in the ovaries of females.

Luteinising Hormone✓(LH)

- Stimulates ovulation✓/formation of the corpus luteum in the ovaries

Thyroid Stimulating Hormone✓/TSH

- Regulates the growth of the thyroid gland✓/secretion of thyroxin

Prolactin✓

- Stimulates the production of milk✓ by the mammary glands

ADH✓

- Regulates the water content✓ in the blood

Any 4x2 (8)

Pituitary Control of Thyroid Function

- The pituitary is sensitive to the concentration of the hormone thyroxin✓ in the blood
- When the thyroxin concentration in the blood decreases✓ below a certain level
- the pituitary gland is stimulated to secrete more TSH✓
- TSH stimulates the thyroid gland✓
- to secrete more thyroxin✓
- thus increasing the level of thyroxin in the blood✓
- back to the normal level✓
- When the thyroxin concentration in the blood increases✓ above a certain level
- the pituitary gland secretes less TSH✓
- The lower TSH level means that the thyroid gland secrete less thyroxin✓
- This decreases the level of thyroxin in the blood✓
- back to the normal level✓

Max (9)

4.3 Describe the negative feedback mechanism involving TSH and thyroxine and describe the consequences if this mechanism does NOT function well.

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

4.3 The pituitary ✓ is sensitive to the concentration of the hormone, thyroxine ✓ in the blood ✓

When the thyroxine concentration in the blood decreases ✓ below the normal level:

- The pituitary is stimulated to secrete more TSH ✓
- TSH stimulates ✓
- the thyroid ✓ gland
- to secrete more thyroxine ✓
- Thus increasing the level of thyroxine ✓
- in the blood to normal levels ✓

When the thyroxine concentration in the blood increases ✓ above the normal level:

- The pituitary is not stimulated to secrete TSH ✓
- There is less stimulation of the thyroid gland to secrete thyroxine ✓
- Thus decreasing the level of thyroxine ✓ in the blood to normal levels ✓

Max (10)

Consequences of mechanism not working

The concentration of thyroxine will not be regulated ✓

(1)

When the thyroxine level increases beyond normal limits ✓ it causes

Hyperthyroidism ✓

Hyperthyroidism causes an increase in rate of metabolism ✓ resulting in:

- Weight loss ✓
- Irritable ✓ / anxiety
- Hyperactive ✓
- Increase in heart rate ✓
- Tiredness ✓

Thyroid gland swells ✓ / goitre

Eye balls protrude ✓

Max (3)

When the thyroxine level decreases beyond normal limits ✓ it causes

Hypothyroidism ✓

Hypothyroidism causes a decrease in rate of metabolism ✓ resulting in:

- Weight gain ✓
- Decrease in heart rate ✓
- Slow growth of hair and fingernails ✓

Max (3)

ADAPTED BY MR S.J. SILAULE

- 4.3 Describe how the principle of negative feedback operates in controlling the glucose concentration of the blood in a normal healthy person. Also describe the causes, symptoms and management of the disease diabetes mellitus which results from an inability of the body to normalise the glucose concentration of the blood.
- Content (17)
Synthesis (3)
(20)

- 4.3
- When abnormal levels of glucose are detected✓
 - by the pancreas✓,
 - the Islets of Langerhans✓ secretes hormones
 - into the bloodstream✓
- When blood glucose level rises✓**
- Insulin✓ is secreted
 - to decrease the blood glucose level✓
 - back to normal✓
 - insulin secretion is then inhibited✓
- When blood glucose level falls✓**
- Glucagon✓ is secreted
 - to increase the blood glucose level✓
 - back to normal✓
 - glucagon secretion is then inhibited✓
- Any (10)
- Causes of diabetes mellitus**
- Inadequate secretion✓
 - Non-secretion of insulin✓
 - Production of defective insulin✓
 - Body cells resistant to the action of insulin✓
 - Inability of the cells to use glucose efficiently✓
- Any (2)

Symptoms

- Glucose in the urine✓
 - Frequent urination✓
 - Extreme thirst✓
 - Fatigue✓/lethargy/fatiness
 - Nausea✓/Vomiting
 - Weight loss✓
 - Blurred vision✓
 - Non-healing of wounds✓
- Any (3)

Management of diabetes mellitus

- Exercise✓
 - Eating diet suitable for diabetic person✓
 - Using prescribed medication/drugs ✓for the management of diabetes mellitus
- Any (2)
Content (17)