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GRADE 12
LIFE SCIENCES
PRELIMINARY EXAMINATION
PAPER 2
MARKING GUIDELINES

SECTION A

QUESTION 1

1.1.1 Pollination ✓ (1)

1.1.2 Angiosperms ✓ (1)

1.2 Wind pollination is not precise / pollen not guaranteed to land on stigma of correct species / must make a lot more pollen to increase chance of pollination. ✓

Animal pollination requires the production of reproductively expensive traits (e.g. flowers and/or nectar / relies on an animal (pollinator) for pollination. ✓ (2)

1.3 How (two marks):

Anthers are shorter than stigma. ✓

Prevents pollen from accidentally falling on stigma when there is wind. ✓

Why (one mark):

Self-pollination decreases genetic variation / increases homozygosity, etc. ✓ (3)

1.4

Structure numbered	Structure's name	Structure's function
3	Style ✓	Pollen tube carrying the male gamete grows along the style towards the ovary. ✓
4 ✓	Ovary	Contains the ovule / becomes the fruit ✓

(4)

1.5.1 Selection that operates through the ability of members of one sex (usually males) to gain access to the members of the opposite sex for the purposes of mating. ✓ (1)

1.5.2 When a male of a species helps to raise offspring that are not genetically his. ✓ (1)

1.6 Monogamy reinforces pair-bonding. ✓
 This increases survival of offspring as both parents are involved in parental care. ✓
 Polygamy increases genetic variation. ✓
 As female mates with multiple males, each with their own unique set of DNA. ✓ (4)

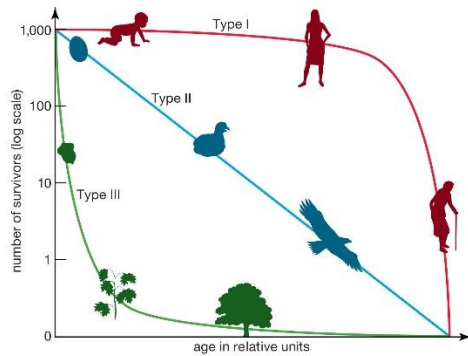
1.7 Any THREE from:
 Building nests, guarding eggs, incubating eggs, providing food for offspring after hatching, teaching offspring, brooding, protecting against predators, etc. ✓✓✓ (3)

1.8 Graph:

X-axis: Age ✓

Y-axis: Number of survivors ✓

Shape: Linear, Decreasing ✓



Explanation:

Steady survivorship / steady mortality at all ages. OR

Individuals have the same chance of dying at any age. ✓

(4)

1.9.1 Yolk / yolk sac ✓ – Nutritious food for developing embryo. ✓

1.9.2 Amnion / amniotic fluid ✓ – surrounds & protects embryo from dehydration & mechanical injury. ✓

1.9.3 Allantois ✓ – Reservoir for nitrogenous waste. ✓

(6)

[30]

QUESTION 2

2.1.1 Tube that provides a pathway between uterus and ovary for eggs, sperm and the zygote / Site of fertilisation and initial cell division of the zygote. ✓ (1)

2.1.2 The fusion of the sperm nucleus with the egg nucleus to form a diploid cell, known as a zygote. ✓ (1)

2.1.3 The release of a mature egg from a Graafian follicle in the ovary. ✓ (1)

2.2.1 Sperm cells are also influenced by chemicals/hormones/chemotaxis and temperature/thermotaxis (*from text*). ✓
(Any two points on the importance of controlled variables) – Examples:
These are controlled variables and must be kept constant so that we can observe the effect of only one independent variable (fluid flow). ✓
If other variables vary, we do not know which is having an effect on the sperm's orientation. ✓ (3)

2.2.2 48 – 49 % ✓ (1)

2.2.3 (a) 3 ✓ - Mitochondrion ✓ (2)

(b) 1 ✓ - Acrosome ✓ (2)

2.3 Formula: $M = \frac{I}{A}$ ✓

Substitution – Diameter measured accurately (Image size)

(marker to check final printed size): ✓

Substitution – Actual size: 0,1 mm ✓

Final answer: ✓ (4)

2.4.1 The average number of eggs ✓ found in women of different ages. ✓ (2)

2.4.2 18 – 31 years old ✓ (1)

2.4.3 More than 10 000, but less than 25 000 ✓ (1)

2.4.4 A woman of 45 has very few (about 5000) eggs left. ✓

Which makes the chance of fertilization and falling pregnant lower. ✓

IVF increases the chance of fertilization by bringing egg cells into direct contact with sperm cells. ✓

(Accept answers related to maternal age affect, Down Syndrome, etc.) (3)

2.5.1 Nucleus removed from mother's egg



Nucleus inserted into egg whose nucleus has been removed
(mitochondrial donor)



Sperm is introduced to egg



Zygote

Short statements ✓, going down the page. ✓

Sufficient information from two eggs to zygote ✓ ✓ (4)

2.5.2 Mark merit of student's answer. Any TWO answers, well-explained.

Don't know the future risks it may pose ✓. May affect future lineages /
increase mitochondrial genetic disorders. ✓ **AND/OR**

Changing an embryo in this way could pave the way for designer
babies. ✓ Any explanation on the ethics of designer babies (only wealthy
having genetic advantage / patenting genes / beauty standards) ✓ **AND/OR**

Some people find it unethical to manipulate cells and DNA. ✓

Accept references to "playing God" ✓

(4)

[30]

SECTION B

QUESTION 3

“Hormones and hormone-based treatments are essential for human health and survival.”	
Agree – D+	Disagree – D-
SOURCE A	
Hormones are essential for life and your health.	Alternatives to hormone-based treatments: Your provider may recommend certain lifestyle changes to help manage a hormonal imbalance, such as managing your stress levels and getting routine exercise.
Hormones control many different bodily processes, including: metabolism, homeostasis (constant internal balance), growth and development, sexual function., reproduction, sleep-wake cycle, mood.	
If you have lower-than-normal hormone levels, the main treatment is hormone replacement therapy.	
Many nutritional supplements in stores claim to treat different hormonal imbalances, but few of them have been scientifically proven to have a beneficial effect.	
SOURCE B	
HRT can be used to replace oestrogen that your body stops making during menopause.	HRT has a number of health risks – Heart disease, stroke, blood clots, breast cancer.
HRT treats menopausal symptoms like hot flashes & vaginal discomfort.	Patient must be continuously monitored by doctor.
HRT proven to reduce bone loss and fractures in postmenopausal women.	Hot flashes may be reduced with healthy-lifestyle approaches such as keeping cool, limiting caffeinated beverages and alcohol, and practicing paced relaxed breathing or other relaxation techniques.
Patient can be monitored to assess if benefits still outweigh risks. Treatment can be tailored, can adjust dosage, etc.	For vaginal concerns such as dryness or painful intercourse, a vaginal moisturizer or lubricant may provide relief.

	There are also several non-hormone prescription medications that may help relieve hot flashes, as well as vaginal discomfort.
Symptoms of hormone imbalance wreak havoc in the female body. Quick treatment is of utmost importance.	Can use lifestyle changes (diet, exercise, stress-relief, addiction control) to treat hormonal imbalances.
Surgery is only helpful for symptom relief	Can use alternative medicine (supplements, acupuncture, aromatherapy)
	Can use surgery for symptom relief.
If HRT is not used in older age – chance of affecting blood glucose levels.	
SOURCE C	
Steroids/corticosteroids – anti-inflammatory & is used to treat a range of conditions.	Anabolic steroids – Often used illegally to increase muscle mass.
SOURCE D	
Transgender youth that have access to gender-affirming hormone therapy have lower rates of depression (60%), self-harm & suicidal thoughts (73%) – MAX 2	
SOURCE E	
Erythropoietin (EPO) has been used by athletes to stimulate the bone marrow to produce more red blood cells. This enables more oxygen to be carried.	Training at high altitudes and hypoxic air machines can naturally increase EPO production.
Some feel - no difference between taking EPO and using training at high altitudes and hypoxic air machines.	Some people cannot afford alternative / “natural” methods of increasing EPO.
Other hormones (GH, testosterone) also used to increase athletes’ performance.	Increased number of red blood cells can cause health problems, such as risk of stroke or heart attack.
	Negative affects of using anabolic androgenic steroids – thrombosis, tendon rupture, cardiovascular disease, reduced fertility, acne, mood swings, liver damage, etc. – MAX 2 for listing
SOURCE F	
Hormones for IVF are extremely important because they help control the treatment and maximize the patient’s chance of successful pregnancy.	IVF expensive & thus not accessible to some, partly due to cost of hormones (R12 000 – R15 000).

Hormones increase chance of pregnancy by 23% with fertility pills & 32% with fertility injections.	Risks and sides effects of hormones with IVF: higher risk of multiple pregnancies, Ovarian hyperstimulation syndrome (OHSS), Ectopic pregnancy
SOURCE G	
South African meat has been produced with the aid of hormones for decades, and it is known to be a completely safe practice.	Public concern over addition of hormones to meat products.
Hormones maximise efficiency of agriculture during times of difficult farming conditions.	Use of hormones in meat products – prohibited in Europe.
Hormones in meat – not at high enough concentrations to have an effect on humans.	Some belief that it may lead to low sperm counts in men, boys developing breasts and early onset of puberty in girls.
Some hormones used in meat production occur naturally.	
OWN INFORMATION	

The following key will be used to mark the plan:

D+ - Agree

D- - Disagree

D: Decision

F: Facts – Three in plan

I: Integration

S: Sources

CA: Counter arguments – Three in plan

O: Own info – One in plan

The following key will be used to mark the essay:

PL: Planning (Carried from plan)

D: Decision

K: Facts for argument. From sources.

(1 – 3) (4 – 6) (7 – 9) (10+)

O: Own information

1 = Some facts 2+ = Many facts

R: Content relevance. (SR – Source Relevance)

S: Synthesis

CA: Counter argument

P: Presentation

Me: Merit

The following rubric will be use to assist in the marking of the essay:

[40]

TOTAL: 100 marks

	1 mark	2 marks	3 marks	4 marks	Possible mark (40)
Planning X2	* Decision given *Key points present for and against the argument	* Decision given * Key points developed for and against the argument	* Decision given *Key points developed for and against the argument *Source references identified (e.g. Source A /own information)		6
Decision	*Vague *Changed position within essay	*Clear decision made			2
Use of knowledge from sources x2	*Up to ¼ of potential detail in sources used to support argument	*Up to ½ of potential detail in sources used to support argument	*Up to ¾ of potential detail in sources used to support argument	* Source detail very close to full potential used to support argument	8
Use of own knowledge to support argument	*Some facts given beyond the source to support argument	*Many facts given beyond the source to support argument	Some facts given beyond the source to support argument *Facts integrated into the argument	*Many facts given beyond the source to support argument *Facts integrated into the argument	4
Content Relevance	*Repetition mostly avoided *Some minor digression * Supporting argument relevant	*Repetition mostly avoided *Some minor digression * Supporting argument relevant *Quality of source extracts acknowledged			2
Quality of argument supporting decision X2	*Writing consists of facts with little linkage or reasoning *Reasoning incorrect	* Maximum if no clear decision in support *Reasoning correct, but hard to follow *Ordinary: some linkage evident	*Supports the position *Reasoning is clear *Minor errors in flow *Linkage sometimes missed	*Strongly supports a clear position * Reasoning is very clear and succinct *Flow is logical *Compelling with regular linkage *Well integrated argument	8
Fairness-counter opinions to decision	*One - two counter opinion given from the sources	*Three - four counter opinions given from the sources	*Integration of one to two counter opinions from the sources into argument	* Integration of three - four counter opinions from the sources into argument	4
Presentation	*Writing is almost unintelligible *Tone, language, terminology unscientific and very weak *Introduction and/or conclusion not present	*Tone, language, terminology weak *Introduction and conclusion present	*Tone is consistent and suited to scientific language *Good and appropriate language and terminology *Mostly appropriate paragraphing *Introduction and conclusion have merit	*Tone is mature and suited to scientific language *Excellent and appropriate language and terminology *Correct paragraphing with good transitions *Interesting introduction, satisfying conclusion	4
Scientific merit	Essay shows academic rigour, accurate reasoning, insight and cohesiveness.				2