



eduresourceza.com



ST BENEDICT'S COLLEGE

SUBJECT	LIFE SCIENCES PRELIMINARY EXAMINATION PAPER II	DATE	2 AUGUST 2024
	12		100
GRADE	MRS S. STEGMANN	MARKS	MRS B. ZAJAC
		MODERATOR	2 HOURS
EXAMINER		DURATION	

MARKING GUIDELINES

SECTION A

Question 1:

1.1.

1.1.1. (a) TRUE ✓

(b) FALSE ✓

(c) TRUE ✓

(3)

1.1.2. (a) H ✓

(b) J ✓

(c) I ✓

(3)

1.1.3. (a) in the neck region/ behind the head/ mid piece/ mid section ✓

(1)

(b) the blood tissue barrier is between the germinal epithelium ✓ and the developing sperm cells. ✓

ARVs cannot get past germinal epithelium/ further into seminiferous tubules. ✓

(3)

(c) **2 marks (how ARVs affect mitochondria):**

ARV drugs are mitochondrial toxins ✓

the toxins reduce the amount of mitochondrial DNA in the sperm ✓ by inhibiting the action of their enzymes/DNA polymerase ✓ which aids in the replication of DNA/ synthesis of mitochondria/ damages mitochondria ✓

(any 2)

2 marks (how it contributes to infertility):

affect/disrupt/destroy sperm ✓

mitochondria release less energy for proper meiosis ✓

interferes with sperm production ✓

spermatozoa require numerous mitochondria for energy ✓ and motility to reach/ fertilise ova ✓

(any 2)

(4)

1.1.4. (a) B/ combination of three or more ARVs

levels of testosterone, FSH and LH not significantly altered

sperm production not as affected/ is normal

OR

D/ Drug 5 and Drug 4

higher percentage of motile sperm/ increased vitality of sperm.

sperm will be able to fertilise/ swim to egg cell

OR

F/ Drug 7 and Drug 8

higher testosterone levels

so sperm production will still take place

1 mark drug ✓ 1 mark fact from table ✓ 1 mark reason/explanation ✓

(3)

(b) NO: it takes 72 hours from sperm to fully mature and the samples are taken after 21 day

OR drugs are tested on animals which might have a different time for spermatogenesis or they may react differently to the drugs compared to humans ✓✓

OR

YES: although sperm take 72 days to mature fully there will be sperm at different stages/ times of development

(2)

(c)

Heading (H)- bar graph showing/comparing duration of investigation of TWO types of drug therapies/ ARV treatments ✓

X-axis label (X)- type of ARV treatment ✓

Y-axis label (Y)- duration of investigation ✓

Scale (S): correct on both axes ✓

Plotting (P) ✓

(5)

[24]

1.2.

1.2.1. Pituitary gland/ hypophysis ✓

(1)

1.2.2. (a) LH/ICSH stimulates synthesis/release of testosterone in testes ✓

Testosterone stimulates the development of sperm/ spermatogenesis ✓

FSH stimulates complete maturation/ development of sperm cells ✓

High levels of testosterone result in LH and FSH levels declining/ high levels of testosterone are detected by the pituitary gland ✓

(4)

(b) Growth of facial/ underarm/ chest/ pubic hair

Muscle development/ angular features/ less body fat/ broadening of shoulders

Enlarging larynx/ stretching of vocal cords/ deepening of voice

Enlargement/ development of testes and penis

(any 1)

[6]

Total Question 1: 30 marks

Question 2

- 2.1.
- 2.1.1. (a) endometrium tissue ✓ grows outside the uterus ✓ (2)
(b) shedding of the endometrium, blood and mucous ✓ from the vagina ✓ (2)
(c) they are unable to reproduce ✓ / produce viable offspring (1)
- 2.1.2. (a) B ✓ (1)
(b) thickened layer that receives the blastocyst/ fertilised ovum ✓
provides nutrients for implanted blastocyst ✓ (2)
- 2.1.3. (a) progesterone ✓ (1)
(b) When FSH levels are high progesterone is inhibited ✓
When progesterone levels increase/ are high then FSH is inhibited ✓
They function on a negative feedback loop/ principle ✓ (3)
- 2.1.4. (a) reproductive ages range from puberty ✓ till menopause ✓ (20-54 on graph)
oestrogen ✓ levels are at the highest ✓
regulate the endometrium thickening ✓
endometriosis can occur as a result ✓ (any 4)
(b) 4-4.5% ✓ (1)
(c) age ranges can be smaller/ very wide age ranges to give more reliable data
more recent data would be more reliable
a clearer link to oestrogen levels would be more reliable
increase sample size to outside of USA for more accurate and reliable data ✓✓ (any 1 x 2)
- 2.1.5. Yes: a lot of dioxin in the environment and women could easily be exposed to it; rhesus monkeys are also primates and therefore dioxin could have similar effects on humans
NO: rhesus monkeys are not humans and the effects in humans are not the same as in the monkeys; these effects were only seen in one population of monkeys- the sample group not large enough to provide reliable results. ✓✓ (2)
[21]
- 2.2.
- 2.2.1. Supports the developing foetus allowing free movement
Cushions and protects from external injury
Provides a medium to practice breathing and swallowing
Regulates temperature
Prevents dehydration ✓✓ (any 2)

- 2.2.2. Allows for the exchange of gases; transports nutrients and oxygen to the foetus; removes wastes from the foetus; ensures foetal and maternal blood do not mix ✓ (1)
- 2.2.3. Introduction of pathogens; stimulates labour leading to a miscarriage (OR other reasonable deductions) ✓✓ (2)
- 2.2.4. Any logical answer that supports a stated opinion ✓ (2)
- 2.2.5. Cervix dilated; mucous plug shed; amniotic fluid drained; baby's head engaged; amnion broken ✓✓ (any 2)
[9]

Total Question 2: 30 marks

60 marks

SECTION B

Question 3

	Yes- doping should be legalised	No- doping should not be legalized
SOURCE A	Performance enhancing drugs have been used for a long time. Many of these drugs are natural hormones	Certain performance enhancing drugs are very dangerous
SOURCE B	Excellence in performance	Respect for laws and rules Dedication and commitment Fair play and honesty Courage, community and solidarity Respect for self and other participants Promotions of health Excellence in performance
SOURCE C	Drugs used for other ailments- why not for sport Drugs used in the same way as supplements Biological manipulation embodies the human spirit-the capacity to improve ourselves on the basis of reason and judgement Levels playing field- prevent people with best genetics from always winning Musicians use drugs to help performing	Unfair advantage over other athletes Endanger health Encourage others to endanger health Unfair if winning is due to a drug For athletes who want to compete clean, the threat that they may be beaten by a competitor who is not faster, stronger, or more dedicated, but who takes a drug to gain the edge, is profoundly personal. Performance enhancing drugs affect the individual athlete psychologically We expect the winning athlete to combine natural talents with effort, training, and technique. Natural talents should be respected for what they are Courage, strength, competitiveness, and other virtues demand moral admiration. Equipment, coaching, and nutrition contribute to success but don't induce the same appreciation. Takes away sport for the love of sport
SOURCE D	Prohibition forced banning of alcohol- didn't work Available illegally/ unsafe as unregulated Deaths increased and corruption increased (max 2 of these)	
SOURCE E	Training at altitude/ using hypoxic machines legal, but expensive, while EPO is cheap Genetics makes contestants different- doping will remove these differences	Genetics is natural

SOURCE F		Will pressure athletes into taking substances Risk of stroke/ heart attack using EPO Sports events determined by whose body responds best to chemicals Training is active Most ambitious person would be most reckless Effects of testosterone
SOURCE G	Athletes need supplements to perform in modern sport Technology already present to aid sportsmen	
SOURCE H	Top athletes caught doping- but still good	
OWN	Drugs only enhance physical attributes, athlete still relying on natural ability	Hormones can affect other non-target regions (have many different effects) Growth hormones- tumour forming How to distinguish between normal and raised levels of these hormones as they occur naturally in the body Creates unfair economic barriers- wealthy can afford technology/ supplements Poor rely on natural ability

Total Question 3: 40 marks