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CORNWALL HILL COLLEGE

Life Sciences EXAMINATIONS - 2024

Prelim Paper II

Grade: 12

Time: 2 hours

Marks: 100

Examiner: Mrs. W. Prigge
Moderator: Mrs. G. Morrison

MEMORANDUM

INSTRUCTIONS

1. This question paper and Source Booklet consists of **8** pages. Please check that your question paper is complete.
2. There is a separate Source Material Booklet of **11** pages.
3. Read the questions carefully.
4. The question paper consists of 3 questions. Question 1 and Question 2 are case studies and Question 3 is an essay.
5. **Answer all questions on this paper.**
6. Use the mark allocations as an indication of the detail required in your answers.
7. It is in your own interest to write legibly and present your work neatly.

QUESTION 1 [25]

1.1 Use the information from the source on page 2 of the Source Material Booklet as well as your own knowledge to answer the questions that follow:

1.1.1 Name the hormone that is lacking in people suffering from proportionate dwarfism. (1)

Growth hormone/ GH ✓

1.1.2 Describe **TWO** secondary sexual characteristics that will be absent in teenage males who have delayed puberty due to dwarfism. (2)

Lack of pubic hair/beard ✓
Voice does not deepen/ break ✓
Muscles/sex organs do not develop ✓

Any 2 described

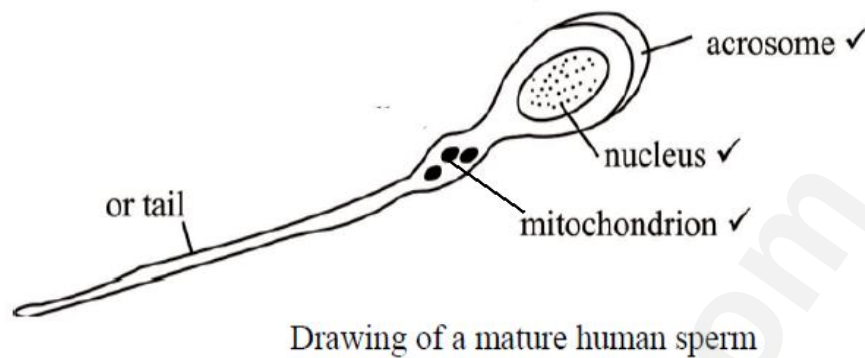
1.1.3 Some people suggest that a female dwarf should be sterilised before puberty in the best interests of her health. Do you agree or disagree with this statement? Justify your answer clearly. (3)

Yes ✓ pregnancy problems/ not enough space for the foetus to grow/
chromosome mutation passed on (in case of disproportionate dwarfism)

No ✓ since they do have the ability to have children, this should not be denied to them/ nothing wrong with intelligence or lifespan (lead a normal life, just stature which is different)/

As TWO types are mentioned in the article, the pupil must be clear as to which dwarfism they are referring to in their answer – yes or no (1 mark), to viable reasons (2 marks)

- 1.1.4 Draw a diagram of a mature human sperm cell. Label any **THREE** structures. (4)



✓ heading
 ✓ accuracy of drawing (drawn a sperm cell with solid lines)
 ✓✓ 3 labels

- 1.2 Refer to page 3 until the top of page 5 of the Source Material booklet. Use this information as well as your own knowledge to answer the questions that follow:

- 1.2.1 Provide a word from the sources that means the same as the following statements: (3)

(a) Structure containing the embryonic plant.

Seed ✓

(b) Reproductive structures made by anthers that germinate on the stigma.

Pollen ✓

(c) Chemical messenger in plants.

Auxins/ hormones ✓

- 1.2.2 Briefly describe how fertilisation occurs in flowering plants (2)

Sperm from the pollen tube ✓ fuses with the ovum (in the ovule) ✓

- 1.2.3 What is the reason for placing the bag over the tomato flowers as seen in **figure 2 on page 4** of the Source Material Booklet? (1)

It prevents further/ unknown pollen from other plants in the area landing on the stigma/ pollinating flower (cross pollination) ✓ OR controls crossing of desired features ✓

1.2.4 What is the importance of seed banks for ensuring food security? (2)

- Important for storing seeds/ re-establish crop plants ✓
- In case of a natural disaster ✓
- To store seeds from wild plants
- To reintroduce genetic variation ✓ into cultivated plants ✓
- Prevent the extinction of endangered plant species ✓

Any 2

1.2.5 Consider the drawing of the tomato flower in figure 1, on page 3 of the Source material booklet.

Provide the functions of the following:

(a) Stamen (1)

Male reproductive parts of the flower / contains anther and pollen ✓

(b) Petals

Attracts pollinators to flower ✓ (1)

1.2.6 Examine the male and female reproductive parts of the flower and suggest why self-pollination may easily occur in tomatoes. (2)

The stamens wrap (encircles/ surrounds/close contact) around the stigma/ form a tube around the stigma ✓ making it easier for the pollen to reach/fall on the stigma which is below the anthers ✓

OR

Pollen from other flowers ✓ cannot reach the stigma easily ✓

(any 1 explained reason)

1.2.7 Israeli scientists have discovered polyploidy tomatoes. Name **ONE** advantage in growing polyploidy tomatoes. (1)

They produce larger fruit/ more flavour/ seedless therefor more flesh/ more vigour/ more nutritious/ disease resistant/ more juice ✓ high yield ✓

1.2.8 Explain the role auxins play in asexual reproduction to produce many polyploidy plants. (2)

Auxins cause cells to undergo mitosis ✓ Auxins differentiate to produce root, stem and leaf cells (produce new plants and organs) ✓

QUESTION 2 [35]

2.1 Use the information from the source on page 6 and top of 7 of the Source Material Booklet as well as your own knowledge to answer the questions that follow:

2.1.1 Match the terms in Column 1 in the following table with the correct description in Column 2.

Write only the **letters** of the descriptions from Column 2 in the space provided in-between column 1 and 2, which match the terms in Column 1.

Column 1		Ans	Column 2	
1	Courtship	C	A	Young seahorses that are born from a seahorse pouch.
2	Prehensile	D	B	Microscopic algae that provide food for aquatic organisms.
3	Fry	A	C	Male and female seahorses swimming together and intertwining tails.
4	Fertilisation	E	D	A structure that can be used for grasping/holding.
			E	Fusion of sperm and egg cells.

(4)

2.1.2 Can a seahorse be described as oviparous, ovoviviparous or viviparous? Explain your answer.

(3)

Ovoviviparous ✓ eggs laid and fertilised in pouch ✓ expelled alive from pouch ✓

2.1.3 In the space below, calculate the percentage survival rate for each litter of seahorses to adulthood. Show all working.

(2)

$5/1000 \times 100/1 \checkmark = 0,5\% \checkmark$

2.1.4 Why is it difficult to study seahorses in captivity? (2)

the infant sea horses are so small they cannot eat most of the plankton that are fed to the adults/ babies are tiny so its hard to keep them alive ✓ special food has to be grown so that the fry don't starve ✓

2.1.5 Using information from the text, describe the parental care strategy of seahorses. (3)

Prenatal care – the father cares for the young as that grow, regulating the water salinity in the pouch to prepare them for life at sea ✓

Postnatal care – no protection or care after they are born, more susceptible to death ✓

✓ both prenatal and postnatal care mentioned

2.2 Use the information from the source on page 7 of the Source Material Booklet as well as your own knowledge to answer the questions that follow:

2.2.1 In what organ is the endometrium normally found (**Label B**)? (1)

uterus✓

2.2.2 The corpus luteum maintains the thick endometrium for about two weeks in every menstrual cycle. Describe these changes to the endometrium and explain how the corpus luteum does this. (3)

Corpus luteum secretes the hormone progesterone and a little oestrogen✓ these stimulate the continued thickening of the endometrium ✓ as it becomes more glandular and vascular ✓

2.2.3 Describe **TWO** functions of the amniotic fluid. (2)

It supports the developing foetus and allows for free movement ✓/ cushions and protects from external injury ✓ / provides a medium in which to practice breathing and swallowing ✓ / protects against temperature change/ dehydration ✓

Any 2 described

- 2.2.4 Explain how the structure of placenta is suited to its function. (4)

Placenta is a (disc shaped) organ consisting of tissue richly supplied foetal and maternal blood vessels ✓ / foetal and maternal blood do not mix ✓ / Vessels (capillaries) have thin walls ✓ / surface area of villi are large ✓ / exchange of substances between mother and embryo/ foetus ✓

Any 4 points explained ✓

- 2.2.5 In your opinion, would a couple be justified aborting a foetus if the test was positive for a serious genetic disease e.g. cystic fibrosis or Down's Syndrome? Give a clearly explained reason for your opinion. (2)

Any logical answer that supports the stated opinion.

Marks can be awarded for TWO logical facts regarding abortion and viable reasons provided.

- 2.2.6 Refer to the Source on **page 7** of the Source Material Booklet. Describe **TWO** changes which would occur in the structures labelled **A** and **B** in the diagram, once labour commenced and the birthing process started. (2)

A – cervix dilates (10 cm) and mucus plug is shed ✓

B – uterine wall contracts forcing amnion and foetus towards the cervix ✓

- 2.2.7 Explain the data on **page 8** of the Source Material Booklet for the number of pregnancies where the contraceptive pill was used correctly. (2)

There are no pregnancies since the hormones in it prevent ovulation/ development of ovum ✓/ changes the endometrium so implantation cannot occur ✓/ stops the production of various hormones ✓

Any 2 explained

- 2.2.8 Give **TWO** reasons why condom use is encouraged by the South African Health Department. (2)

They help prevent the spread of sexually transmitted infections ✓/ reduce the chance of pregnancy ✓/ inexpensive ✓

Any 2 points

- 2.2.9 Based on the information in the article on **page 8** of the Source Material Booklet about STI's, as well as your own knowledge, give your opinion about the increase in STI's and the affect it may have in near future. (3)

Any logical answer that supports the stated opinion.

Marks can be awarded for Three logical facts from the article and own knowledge regarding STI's and viable reasons provided.

QUESTION 3 – Essay [40]

Testosterone is a hormone that can be manufactured by pharmaceutical companies. It has been used in the medical field and sporting world. Its use is often controversial.

Do you think the use of testosterone by teenage boys should be condoned?

<u>I do think/ yes</u>	<u>I do NOT think/ no</u>
• Hypogonadism assisted by use of TRT (B) • Boosts body ability to make muscle and prevent breakdown (F) • Improve sporting ability (F) • "Stacking" (F) • Role in behaviour is a myth (G) • TRT improve osteoporosis (G) • Essential for development of male growth and masculine characteristics – TRT approved to treat delayed male puberty and low testosterone (G) • Too much naturally occurring testosterone is not common – more like low levels (G) • Klinefelters syndrome and hemochromatosis – affects hormone levels – TRT (G) • TRT does not increase the risk of prostate cancer (G) • Benefits of HRT outweigh risks (G)	• Hypogonadism (low levels) must be confirmed with a blood test (B) • Negative side effect TRT (B) • Teenage father becomes 'hands on' father – men focus more on family if levels are low (A) – credible (study done 400 men) • Anti-steroid warnings (D) • Illegal, questionable behaviour by Greg (C) • Natural approach (E and F) • Need prescription – illegal (F) • Pressures of performance (F) • Little proof of enhancement (F) • Dangerous - reasons (F) • Side effects – impotence, small testicles, physiological (aggression, paranoia, delusions) (G) • Inject drugs – HIV and hepatitis (F) • No scientific evidence that stacking works (F) • Addictive (F)

• Equipoise – slow, suppress hormone, natural Hormone drop	• Stopping – withdrawal symptoms (F) • Problems associated with artificially high testosterone (G) • High levels may stimulate prostate gland and prostate cancer grow (prostate cancer cells) – doctors leery with prescriptions (G)
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