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LIFE SCIENCES: PAPER II

Time: 2 hours

100 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. This question paper consists of 15 pages and a Source Material Booklet of 16 pages (i–xvi). Please check that your question paper is complete. Remove the Source Material Booklet from the middle of the question paper.
2. The question paper consists of three questions. Question 1 and Question 2 are case studies and Question 3 is an essay.
3. Read the sources provided in the Source Material Booklet and use this information and your own knowledge to answer all the questions.
4. Read the questions carefully.
5. **Answer ALL the questions on the question paper and hand it in at the end of the examination. Remember to write your examination number in the blocks above.**
6. Use the total marks that can be awarded for each question and the space provided as an indication of the detail required.
7. It is in your own interest to write legibly and to present your work neatly.
8. FOUR blank pages (pages 13-15) are included at the end of the paper. If you run out of space for a question, use these pages. Clearly indicate the number of your answer should you use this extra space.

FOR MARKERS TO ENTER MARKS

QUESTION 1	QUESTION 2	QUESTION 3	TOTAL
30	30	40	100

QUESTION 1

Refer to pages ii–vii of the Source Material Booklet. Use this information as well as your own knowledge to answer the questions which follow.

1.1 Why do the majority of proteas avoid flowering during autumn? (1)

Too little✓ pollinators, conditions✓ not conducive for nectar production (any 1)

1.2 Describe the special adaptation of proteas which ensures successful pollination. (2)

Style adapted as pollen presenter✓*, flower remains closed until visited✓ by pollinator the flower snaps✓ open to present style/pollen presenter✓ to rub pollen on pollinator (✓* + any other)

1.3 When do therophilous proteas open their flowers during the day? (1)

Late afternoon/dusk ✓

1.4 What is the advantage of proteas being protandrous? (2)

Since the can't self-pollinate✓, they are available for sexual reproduction which ensures more variability ✓

1.5 Does self-pollination constitute sexual or asexual reproduction? (1)

Sexual✓

1.6 Tabulate two differences between rodent pollinated and bird pollinated proteas. (4)

Table in pencil and done with ruler✓, table neat and closed✓ one mark for each difference e.g. dull vs bright flowers, flowers at bottom vs top of bush, must be from text. ✓✓

1.7 Which protea species did Namaqua rock rats visit most? Suggest a reason for this. (2)

Protea canaliculata✓, sweetest nectar/eat seeds/plant material insects ✓

1.8 Using evidence from the sources, is *Protea humiflora*, exclusively pollinated by rodents as indicated by source 3? (2)

No, birds actually visited the protea more often✓, 29 (rats) vs 44✓ visits by birds. (mention of numbers)

1.9 Provide an alternative reason for birds visiting proteas, apart from drinking nectar. (1)

To eat insects✓

1.10 Provide labels for A, B, C & E of the protea flowerhead (4)

A – stigma/pollen presenter✓

B-Style✓

C-Anther✓

E-(involucral) bracts✓ (-1 is in correct order but no letters referenced)

1.11 Suggest a two-month period in which Namaqua rock rats are likely to give birth. (1)

Two months mention between Jun-Sept✓ (no mark if more than two months or outside range)

1.12 Do Namaqua rock rats represent a K or r strategy approach? Motivate. (2)

K-strategy✓, survival rates are high✓

1.13 Describe two reproductive strategies of the Namaqua rock rat which aids its survival. (4)

Egg development✓: Viviparous✓

Birth condition✓: Altricial✓

Parental care✓: high✓ (nipple clinching)

1.14 Explain the “flower & fruiting” strategy of rodent pollinated proteas to ensure successful distribution of seeds. (3)

Flower/fruit all at once/in✓ short period of time✓

Overwhelm rats✓, don't have time to eat all fruit✓

Bury all✓, forget some✓, effectively planted/distributed them✓ (any 3).

(30)

QUESTION 2

Refer to pages viii–xi of the Source Material Booklet. Use this information as well as your own knowledge to answer the questions which follow.

2.1 Provide a synonym for the pituitary gland. (1)

Hypophysis/Master gland✓

2.2 If the pituitary gland of a human female was removed, name the two hormones (represented by green and yellow in source 2.2) which would be absent. (2)

3 – FSH✓ 4- LH✓ (-1 if no numbers or colours linked, unless previously penalised)

2.3 Name any other human endocrine gland, its secretion and suggest what effect its absence might have on the human body. (3)

Gland/Secretion/effect (any from curriculum) pancreas✓, insulin✓, diabetes✓

2.4 In gamete formation (source 2.3) the initial cells are the primary spermatocyte and oocyte, respectively:

2.4.1 Name the cells in the second row of the male process? (1)

Secondary spermatocytes✓

2.4.2 What is the first division in both diagrams called? (1)

Meiosis I ✓

2.4.3 Name the collective term for the organs in which these divisions take place? (1)

Gonads✓

2.4.4 Are the cells in the middle row haploid or diploid? (1)

Haploid✓

2.4.5 What are the smaller female cells in the last row called? (1)

Polar bodies✓

2.5 Write a brief paragraph (2-3 sentences) in which you use all the following terms, to illustrate that you know their meaning.

- Sperm
- Semen
- Ejaculation
- Erection

(4)

When a male is sexually aroused he will get an erection✓, sperm✓ (from testicles) will mix with other fluids to form semen✓ and be released through erect penis, this is called ejaculation✓

2.6 What is the difference between fertilisation and pollination?

(2)

Fertilisation is the fusion of gametes✓, where pollination is the moment pollen lands on the stigma✓

2.7 Explain how the “Hogben test” made it possible to indicate pregnancy.

(4)

Urine✓ (with hCG) is injected under frogs skin
hCG✓(must) in the urine stimulate the
Ovaries✓ of the frog/Ovulation✓ to take place and
Eggs are laid✓ with in 5-12 hours✓
Indicating pregnancy (any other 3)

2.8 Are frogs viviparous or oviparous?

(1)

Oviparous✓

2.9 Provide a line from the text, that indicates that the Hogben tests were reliable.

(1)

”. The results were reliable. ✓

One researcher reported that after injecting 150 frogs, he never got any false positives✓

“Thank you for your report on the pregnancy test on Mrs. X. You may be interested to know that of one GP of many years’ standing, one specialist gynaecologist and one frog, only the frog was correct.” ✓

2.10 Evaluate the use of frogs over mice and rabbits for the use of pregnancy tests.

(5)

Frogs are faster, don't have to kill them (+)✓ but they do spread disease (-)✓ Rabbits need to be dissected/killed (-) ✓ but they do not carry diseases (+)✓ Despite this “better” to use Frogs (decision) ✓

- 2.11 Suggest why some could argue that the use of Xenopus, for pregnancy tests, could be considered ethical, but the staged performance by Eben Kirksey later on, is not. (2)

During the pregnancy testing (prior to 1960) there were no alternatives✓ , but no Eben is doing it for entertainment value and the killing of the frogs for this purpose is not justified. ✓

(30)

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SECTION B

Refer to pages xii–xvi of the Source Material Booklet.

QUESTION 3

Consider the following statement:

Oral contraceptive pill has had a positive impact on modern society.

Using the source material provided as well as your own knowledge, discuss your opinion on this statement in the form of an essay of 2½–3 pages.

In your response you are expected to:

- Read the source material carefully.
- Take a definite stand on the statement.
- Plan your essay before you start writing. Your planning will be marked.
- Present a debated argument. Use relevant information from sources A–H as well as your own knowledge of Life Sciences to support your point of view.
- Arrange the information to best develop your argument.
- Write in a scientifically appropriate way.
- **In your essay, ensure that you have discussed at least nine different facts from the sources.**

40 marks

Total: 100 marks

PILL HAS HAD POSITIVE IMPACT PILL HAS NOT HAD POSITIVE IMPACT

A

Most popular form of birth control – It is an instant hit; 100% effective

- **1965** Five years after the FDA approval, 6,5 million American women are on pill, making it the most popular form of birth control in the U.S.A.
- Not just a contraceptive any more – pill treatment for acne.
- cost effective
- health benefits
- prevent premature deaths from complications of multiple pregnancies
- health insurance

A – Religious opposition to the pill as an unnatural form of contraception.

- 2010 Health problems – Fifty years after the FDA approval, problems remain: there are currently 1,100 lawsuits pending regarding blood clots, heart attacks and strokes allegedly caused by the popular pills Yaz, Yazmin and the generic Ocella. (max2)

B Cultural shifts began well before the advent of the Pill

- long term contraception
- sexual revolution

B Pill blamed for — a rise in single motherhood, unmarried couples living together or in communes, open marriage and wife swapping, women's liberation, and increased visibility of sex in the media.

C C still many abortions

- stigma leads to abortions

D women can still have a career D Home-making neglected

- sociological issues around child rearing, etc.

E – Large numbers of college women could embark on careers that involved long-term, up-front time commitments

- in education and training as physicians, lawyers, veterinarians, managers, and academics, among others.
- Women could still get married after professional training.
- Contribute to economy

E Many harmful side effects.

- the divorce rate still soars
- does not prevent the transmission of sexually transmitted diseases; accordingly,
- the STD rate is epidemic.
- runoff of the oestrogen into local waters and disruption of fish populations.
- carcinogenic

F more educated women have fewer children later in life,

- can provide better for family

G G The powerful hormones could upset the reproductive system for months – or even years – after women stop taking it.

Lead to increase in infertility

OWN INFO: – demographic changes; increased healthcare, etc. (F) – quality of life improved – leads to educated work force; therefore increase in economic success of a country – women can control fertility instead of being left with consequences	OWN INFO: – increased oestrogen – male infertility (E) – 'latch-key' children, increase in problems with children as less parental guidance; also fast food epidemic and obesity – false security; need condoms to prevent STIs – prevent unwanted families – many women incapable of raising children of unplanned pregnancies
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ADDITIONAL SPACE (ALL QUESTIONS)

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