

LIFE SCIENCES: PAPER I

EXAMINATION NUMBER

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ANSWER BOOKLET

There are ten (x) pages in this Answer Booklet.

QUESTION 1

- 1.1 Select the term in Column B that best matches a description in Column A. Write the letter of the term in the corresponding space provided between the brackets. Each letter may be used only once.

COLUMN A

- [] Crossing over occurs.
- [] Cytoplasm splits to form 2 cells.
- [] Double-threaded chromosomes move to poles.
- [] Bivalents line up at equator.
- [] Ploidy of cells at end of meiosis I.
- [] Centromeres split.
- [] Human cell with 23 chromosomes.
- [] Chromosomes line up at equator in single file.
- [] The point at which genetic material is exchanged between homologous pairs.
- [] Organelle which forms the spindle in animal cells.

COLUMN B

- A Diploid
- B Chiasma
- C Anaphase I
- D Metaphase II
- E Cytokinesis
- F Gamete
- G Prophase I
- H Centrosome
- I Metaphase I
- J Anaphase II
- K Interphase
- L Haploid

(10)

- 1.2 Seven multiple-choice questions are given below. Choose the most correct option for each question and write the letter of your choice in the space provided in the table below.

Question	1.2.1	1.2.2	1.2.3	1.2.4	1.2.5	1.2.6	1.2.7
Answer							

1.2.1 The human foetus is nourished by ...

- A the placenta.
- B the amnion.
- C the uterine vein.
- D the umbilical artery.

(1)

1.2.2 The site of meiosis in a human male is ...

- A seminal vesicle.
- B scrotum.
- C seminiferous tubules.
- D vas deferens.

(1)

1.2.3 Asexual and sexual reproduction have the following features in common:

	Produces new individuals	Involves mitosis	Involves meiosis
A	✓	✓	x
B	x	✓	✓
C	✓	x	✓
D	✓	✓	✓

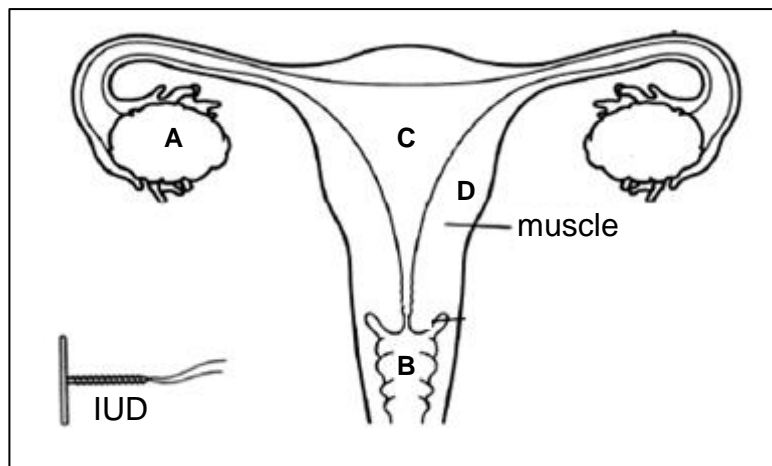
(2)

1.2.4 The development of a human female reproductive follicle is as follows:

- A Graafian follicle → embryo → foetus
- B corpus luteum → ovum → embryo
- C secondary follicle → primary follicle → Graafian follicle
- D primary follicle → Graafian follicle → corpus luteum

(2)

1.2.5 An intra-uterine contraceptive device will be positioned in:



(1)

1.2.6 The contraction of the uterus during labour is initiated by the following hormone:

- A Prolactin
- B FSH
- C Oxytocin
- D LH

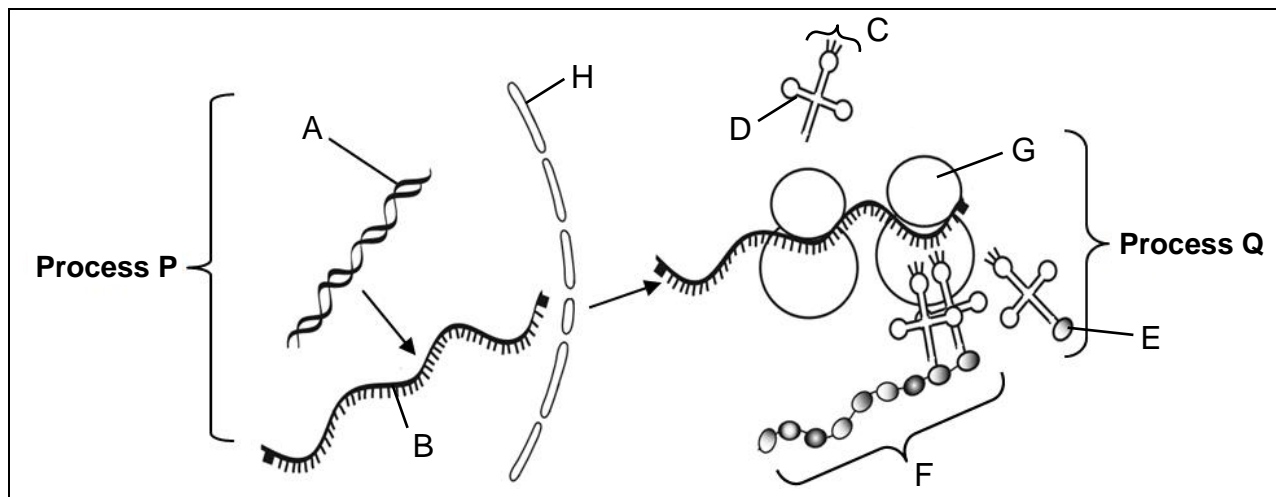
(1)

1.2.7 During a human female menstrual cycle, the sequence of events that occurs following the onset of menstruation is:

- A Increase in LH → increase in progesterone → increase in FSH
- B Increase in progesterone → increase in FSH → increase in LH
- C Increase in oestrogen → increase in FSH → increase in LH
- D Increase in FSH → increase in oestrogen → increase in progesterone

(2)

1.3 Study the diagrams below and answer the questions that follow:



[Adapted from: DBE Life Sciences Paper 2 2015 SCE (June)]

1.3.1 Provide a heading for the above diagram.

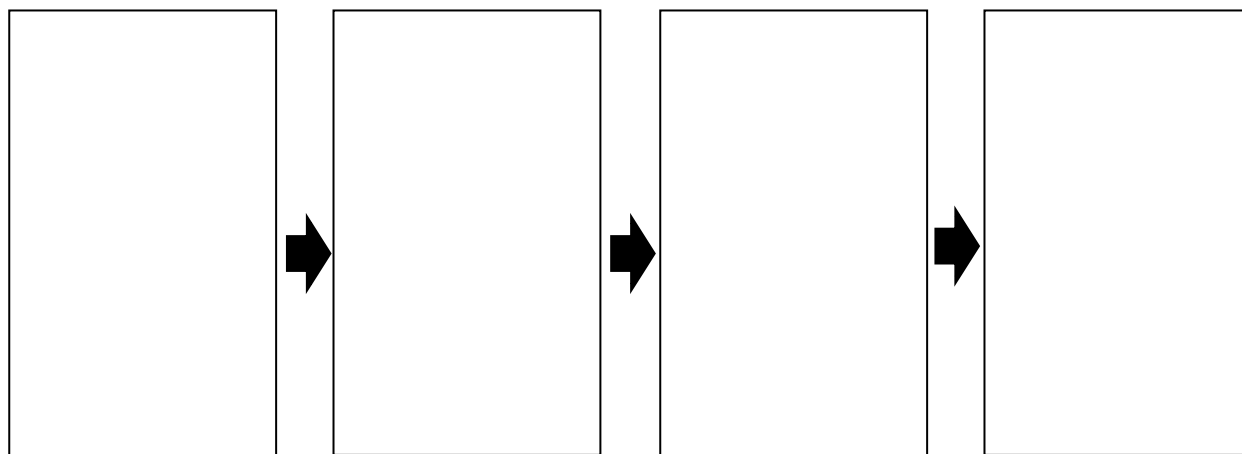
_____ (1)

1.3.2 Identify structures A–H.

A _____
 B _____
 C _____
 D _____
 E _____
 F _____
 G _____
 H _____

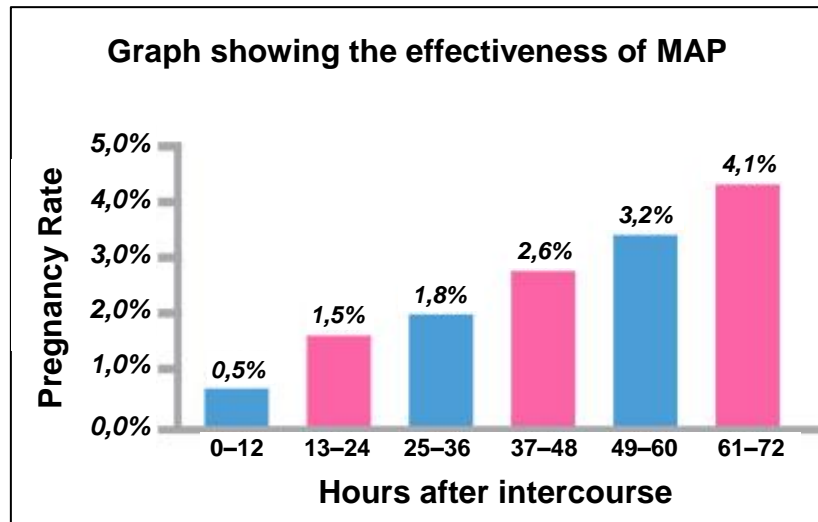
(8)

1.3.3 By means of a flow diagram with 4 steps, summarise the process illustrated by Process P in the diagram above. Only write in the spaces provided below.



(5)

- 1.4 The "Morning After Pill" (MAP) is an emergency form of contraception used by women who have had unprotected sexual intercourse and want to prevent pregnancy. Emergency contraceptives are more effective if taken soon after the unprotected sex. The World Health Organization (WHO) recommends that women be prepared for the unexpected and have emergency contraceptive medicine on hand. A study was done to determine the effectiveness of the MAP when taken up to 72 hours after intercourse. The results are shown in the graph below.



[Source: Piaggio, von Hertzen, Grimes and Van Look 1999]

- 1.4.1 In the study above, identify the following:

- (a) independent variable _____ (2)
- (b) dependent variable _____ (2)

- 1.4.2 According to the data in the graph, if 200 women only took the MAP twenty hours after unprotected sex, how many of them would fall pregnant? Show your working.

(3)

1.4.3 The five statements in the table below refer to the graph above. For each statement, decide whether:

- A the statement is supported by the information in the graph.
 B the statement is contradicted by the information in the graph.
 C the statement is neither supported nor contradicted by the information in the graph.

	Statement	A, B or C
(a)	Taking MAP within 12 hours of unprotected sex guarantees no pregnancy.	
(b)	The longer you wait to take the MAP after unprotected sex, the less effective it becomes.	
(c)	MAP is not recommended as a method of contraception.	
(d)	95,9% of women who take the MAP 72 hours after unprotected sex will not fall pregnant.	
(e)	MAP should only be dispensed if a doctor prescribes it.	

(5)

1.4.4 Read the following extract and answer the question that follows:

South Africa is one of the many countries around the world where Emergency Contraception (MAP) is available without a doctor's prescription. Legally any child from the age of 12 can request medical treatment without the consent of their parent or guardian.

[Adapted from: <<https://www.frontshop.co.za>>]

Do you agree with the law as it relates to MAP? Give TWO reasons to justify your answer.

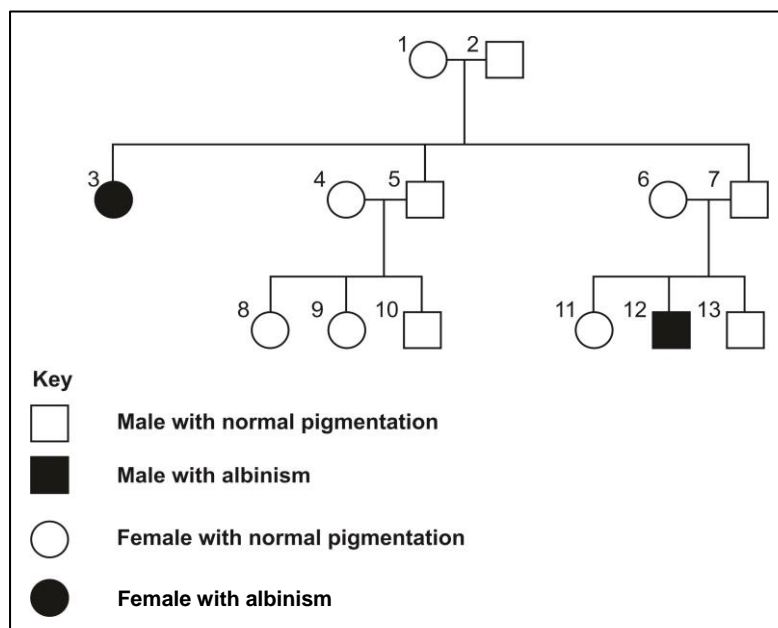
(4)

1.5

Albino animals are rare. They have all the characteristics of others of their species but they have an autosomal mutation in the gene that codes for melanin. Melanin creates the normal pigmentation and colouring in an animal's skin, fur or scales. This lack of melanin generally results in the animal looking bleached all over, appearing white or pink.

[Adapted from: <<http://www.factzoo.com/albino-animals.html>>]

Study the following family pedigree which shows inheritance of albinism in chimps:



[Source: <<http://www.factzoo.com/Albino-animals.html>>]

[Adapted from: <<http://projects.cbe.ab.ca>>]

1.5.1 Which characteristic, albinism or normal pigmentation, is the dominant trait? Explain your reasoning.

(3)

1.5.2 Using a key, state the genotype of the following chimps: 1, 6, 12.

Key: _____

Individual	Genotype
1	
6	
12	

(4)

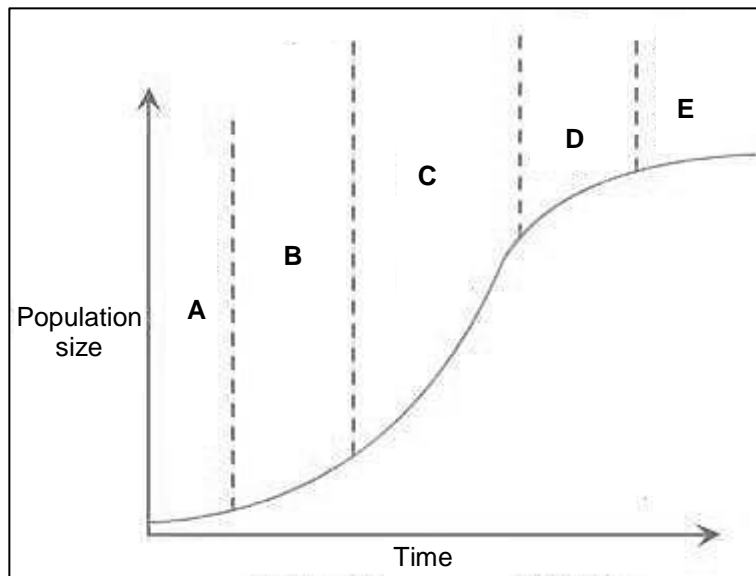
1.5.3 In the space below, draw a genetic diagram to show the probability that two heterozygous adults will produce an offspring with albinism. Use the key chosen in Question 1.5.2 above.

Include the following in your answer:

- parental genotypes,
- a genetic cross or Punnett diagram,
- the ratio of the possible genotypes and phenotypes of the offspring.

(6)

1.6 The graph below shows the growth of a population of impala over time.



[Adapted from: <<http://www.tutorvista.com/>>]

1.6.1 For each of the following phases of population growth indicated on the graph above, complete the table below:

Phase	Positive or negative growth?	Slow or fast growth rate?	Reason for speed of growth.
A			
C			
D			

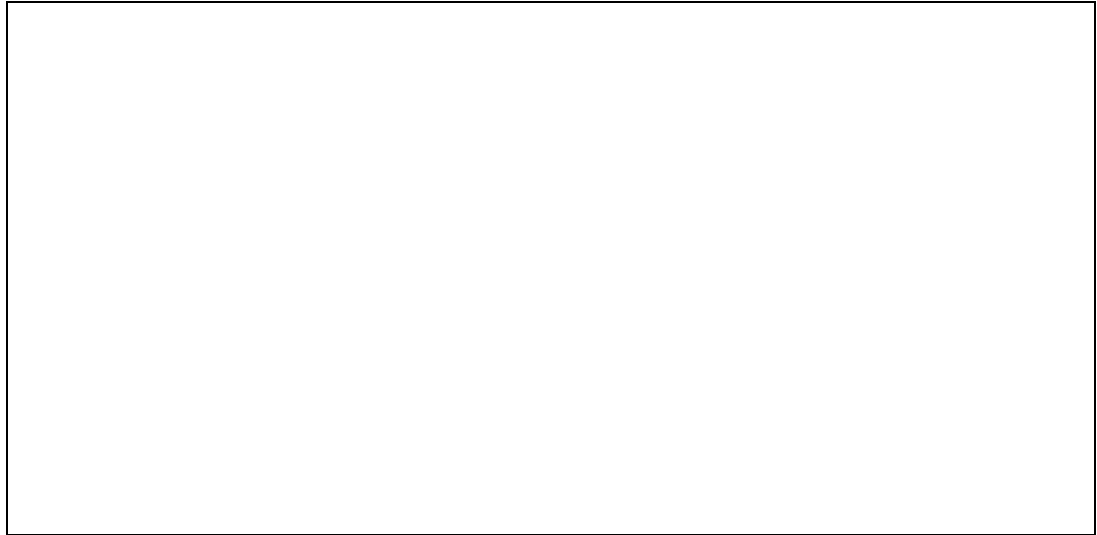
(9)

1.6.2 Is the population of impala at phase E stable or unstable? Explain.

(2)

1.6.3 The data used to plot the graph was obtained using a sampling method of population estimation known as the Mark-Recapture Method. On one occasion, 530 impala were caught, tagged and released in the park. A few days later, a second capture was done and 480 impala were caught of which 80 had tags.

- (a) In the block below, calculate an estimate of the population of impala at this time. (Show your working.)



(3)

- (b) List THREE precautions that the rangers take when doing this population estimate in order to make the estimate scientifically valid.

(3)
[80]