



LIFE SCIENCES: PAPER I

EXAMINATION NUMBER

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ANSWER BOOKLET

There are (vi) pages in this Answer Booklet.

QUESTION 1

Answer all questions in the spaces provided in this Answer Booklet. Place this yellow Answer Booklet inside the Answer Book in which you answer the rest of the examination paper.

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

Column A

- [] Chromosomes cross over at these points
- [] Awarded the Nobel Prize for working out the structure of DNA
- [] A picture of chromosomes arranged in homologous pairs, to see chromosomal abnormalities
- [] Type of inheritance where both alleles are equally expressed in the body
- [] All the genes that make up an individual
- [] Affects the movement of chromosomes during cell division
- [] A 'ring' of DNA found in bacteria and useful in genetic engineering
- [] Process in which DNA makes a copy of itself

Column B

- A Watson and Crick
- B Co-dominance
- C Centromeres
- D Plasmid
- E Chromatids
- F Karyotype
- G Franklin and Wilkins
- H Chiasmata
- I Spindle
- J Genome
- K Replication

(8)

1.2 Six multiple choice questions are given below. Choose the most correct option in each question and write its letter in the space provided in the table.

1.2.1	1.2.2	1.2.3	1.2.4	1.2.5	1.2.6

1.2.1 Which of the following is a part of **all** nucleotides?

- A deoxyribose
- B a sugar
- C uracil
- D thymine

1.2.2 The nucleotide sequence **TGA** is found on one side of a DNA molecule. What is the sequence on the complementary side?

- A TGA
- B ACU
- C CAG
- D ACT

1.2.3 Which of these is **not** a use of DNA fingerprinting?

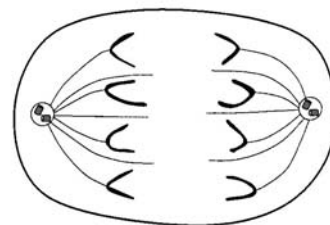
- A to see how individuals are related
- B to study inherited diseases
- C to make mRNA
- D to provide evidence in criminal cases

1.2.4 When does DNA replication occur?

- A at the end of interphase
- B immediately before translation
- C during protein synthesis
- D just before Prophase I and Prophase II

1.2.5 The phase of meiosis shown in this diagram is ...

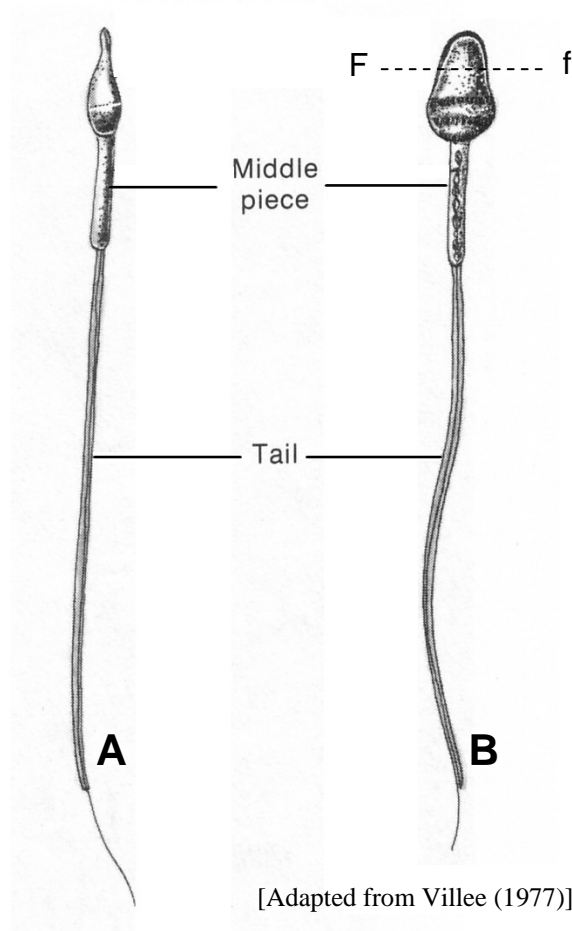
- A metaphase I.
- B anaphase II.
- C interphase.
- D none of the above.



1.2.6 Which of the following could be used to prepare a microscope slide of cells undergoing meiosis?

- A locust testis
- B pea plant root tip
- C tissue from mammary gland
- D sunflower petals

1.3 Drawings A and B show two views of the same human cell. Drawing A shows a 'front' view of the cell, and drawing B shows a 'side' view.



1.3.1 Name the gamete drawn above. _____ (1)

1.3.2 True or false? This cell contains a Y chromosome. _____ (1)

1.3.3 A section indicated by dashed line Ff is made through drawing B as shown.

(a) Name this type of section. _____ (1)

(b) In the space below, draw the **outline** of the section through Ff to show its shape. Use information from drawings A and B. The size of your diagram is unimportant.

(2)

1.4 Gregor Mendel discovered the laws of heredity in a number of experiments using pea plants. In one experiment he bred plants pure-breeding for smooth peas (SS) with plants pure-breeding for wrinkled peas (ss) to form the F₁ generation. When the F₁ individuals were inbred they produced F₂ plants with both smooth and wrinkled peas.

1.4.1 Sentences (a) to (d) are completed using three terms in the blocks. **Underline** the term or terms in each block that can be used to correctly complete each sentence.

(a) 'Smooth' and 'wrinkled' are both examples of ...

phenotypes genotypes dominance

(b) SS peas are **best** described as being ...

homozygous recessive heterozygous homozygous dominant

(c) 'S' and 's' are symbols for ...

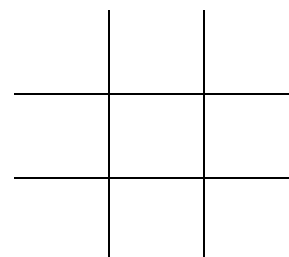
alleles chromosomes genes

(d) The genotype of the F₁ individuals was ...

smooth Ss homozygous

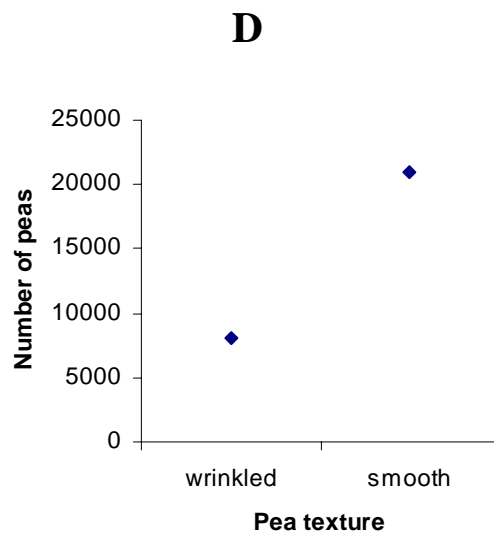
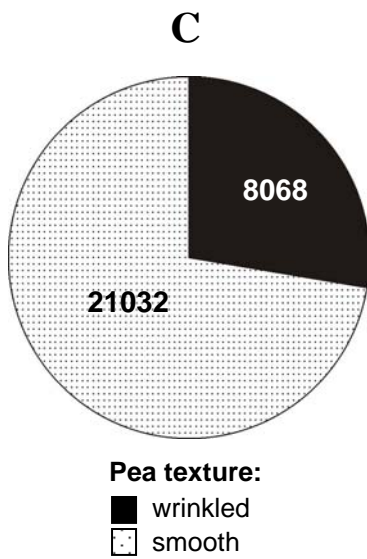
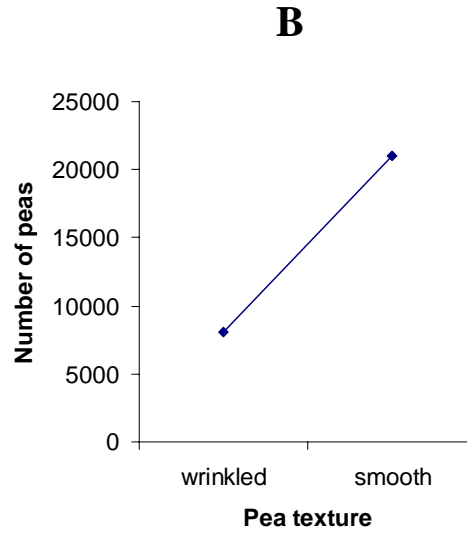
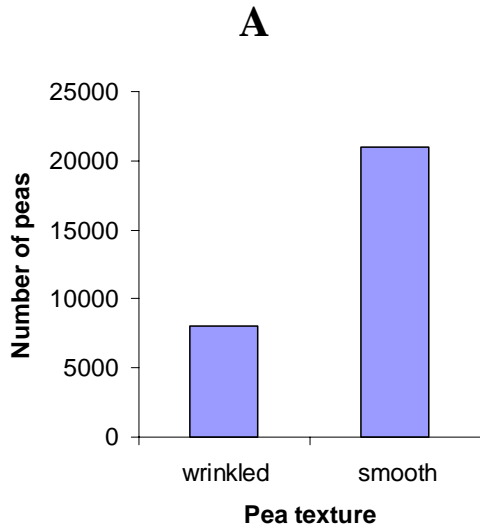
(5)

1.4.2 Make a diagram to show how the F₂ generation was formed from the F₁ generation. Use S and s as the letters for the genes. Put a **circle** around any gamete in the diagram. You may use the grid below.



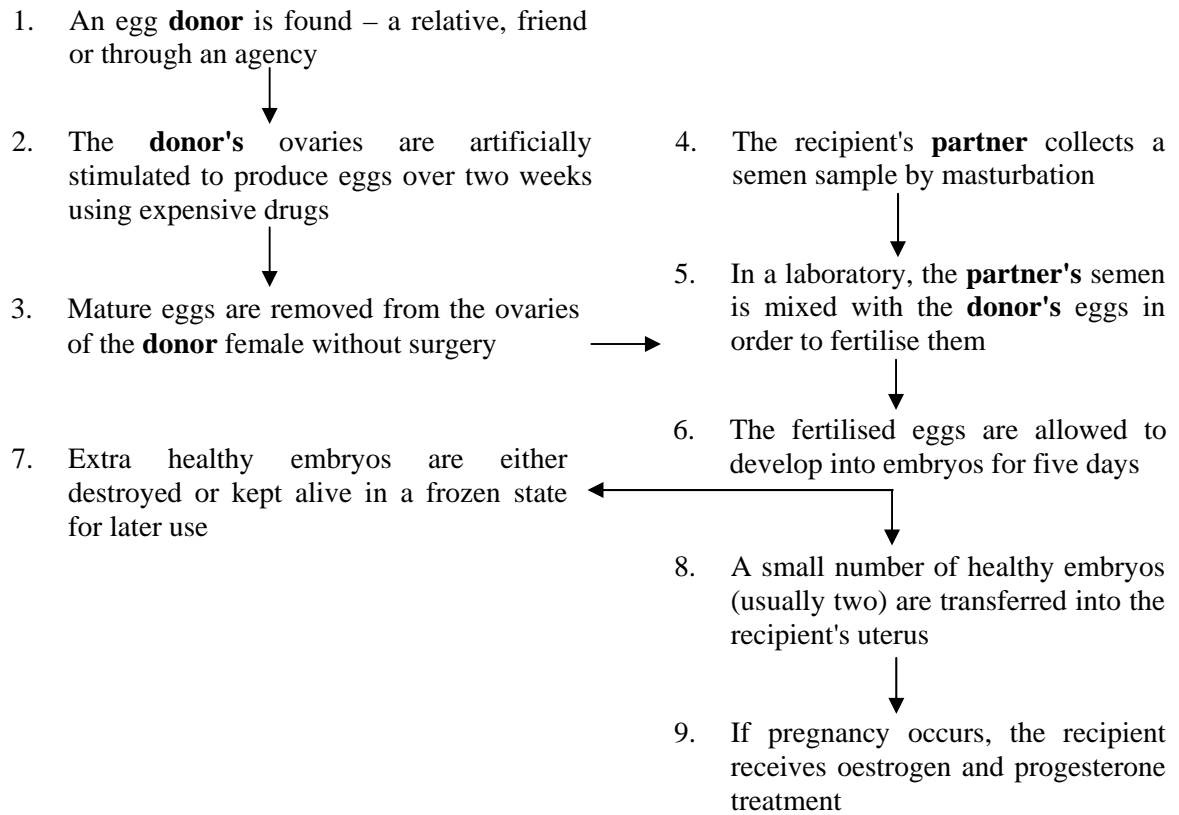
(4)

1.4.3 Suppose Mendel counted 29 100 F₂ peas, and found 21 032 to be smooth and 8 068 to be wrinkled. Which of the following graphs A to D are suited to this data? **Circle** the letter(s) of your choice.



(2)

1.5 Human Oocyte (Egg) Donation is a procedure to help couples where the female cannot or should not for genetic reasons fall pregnant with her own eggs. In such cases the female, called a **recipient** female, and her male **partner**, receive healthy eggs from a **donor** female. The procedure is outlined in the flow diagram below.



Four couples are considering Oocyte Donation as a way of having a child. They each make statements based on **their** beliefs/attitudes/values. They are 100% committed to these and will not break them. They will undergo the procedure as long as it does not go against any of their beliefs. What decision will each couple make in response to the procedure given above?

Write 'Yes' if they would undergo the procedure, or 'No' if they wouldn't.

Note: Do **not** let your **own** beliefs influence your answer.

- Couple 1: 'Masturbation leads to impure thoughts. It is **always** wrong.'
- Couple 2: 'We cannot afford to waste money. If a pregnancy is **certain** then we will go ahead, otherwise not.'
- Couple 3: 'We believe that destroying a new life is murder. If we or someone else **has** to kill a new life we will not go ahead.'
- Couple 4: 'A pregnant mother should only receive hormones or chemicals that are similar to those found in a normal pregnancy.'

(4)

40 marks