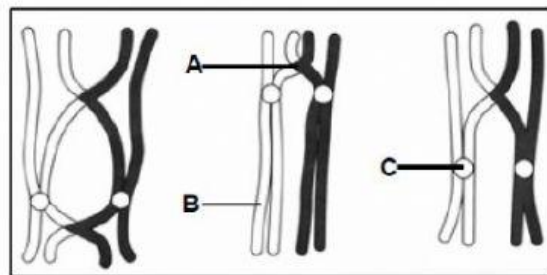


SECTION A

QUESTION 1

- 1.4 The diagram below represents ALL the chromosomes in a cell that is undergoing normal cell division.



- 1.4.1 Name the:

- (a) Type of cell division that is occurring in the cell in the diagram (1)
- (b) Phase of cell division during which the chromosomes behave as shown in the diagram (1)
- 1.4.2 Where in the human female body would the type of cell division named in QUESTION 1.4.1(a) take place? (1)

1.4.3 Give the **LETTER** and **NAME** of the structure that attaches to the spindle fibres. (2)

1.4.4 How many chromosomes will be found in each daughter cell at the end of this cell division? (1)
(6)

1.5 There is variation in the characteristics of fur colour and fur texture in cats.

The table below shows the alleles that control these two characteristics.

CHARACTERISTIC	ALLELE	PHENOTYPE
Fur colour	B	Black
	b	White
Fur texture	R	Rough
	r	Smooth

The Punnett square below shows the inheritance of these alleles in a genetic cross.

All possible gametes from female		All possible gametes from male			
↓		BR	Br	bR	br
	bR	BbRR	BbRr	X	bbRr

1.5.1 Name the: (1)

(a) Dominant phenotype for fur colour

(b) Recessive phenotype for fur texture (1)

1.5.2 Give the:

(a) Genotype of offspring X (1)

(b) Phenotype of the female parent (2)

(c) Genotype of the male parent (1)

1.5.3 State the phenotype that ALL the offspring of this genetic cross have in common. (1)
(7)

1.6 Scientists compare the number of differences in the amino acid sequence to see how closely related species are. Fewer differences in the amino acid sequence mean the species are more closely related.

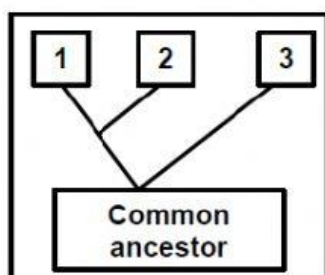
Cytochrome C is a protein that occurs in many species. The amino acid sequence of this protein differs between species.

The table below shows the number of differences in the amino acid sequences of three species, A, B and C.

	SPECIES B	SPECIES C
SPECIES A	11	3
SPECIES B		10

1.6.1 What type of evidence for evolution is being used in this table? (1)

- 1.6.2 Give the LETTER of the species, **A**, **B** and **C**, that should appear at positions 1, 2 and 3 in the diagram below.



(3)

(4)

TOTAL SECTION A: 50

SECTION B

QUESTION 2

- 2.1 Detectives were investigating a crime scene and found blood on a broken window. They suspected that the blood was that of the criminal. To identify the criminal, they analysed a DNA sample from the blood and compared it to that of four suspects.

The diagram below was produced:

DNA sample	Batho	David	Jennie	Nthabi
████	████	████	████	████
████	████	████	████	████
████	████	████	████	████
████	████	████	████	████
████	████	████	████	████
████	████	████	████	████
████	████	████	████	████
████	████	████	████	████
████	████	████	████	████

- 2.1.1 Name the technique that was used to identify the criminal.

(1)

2.1.2 Who is the possible criminal? (1)

2.1.3 Explain your answer to QUESTION 2.1.2. (2)

2.1.4 State ONE other use of the technique identified in QUESTION 2.1.1. (1)
(5)