

16.1 Passage of Information from Parents to Offspring

Question Paper

Course	CIEA Level Biology
Section	16. Inheritance
Topic	16.1 Passage of Information from Parents to Offspring
Difficulty	Easy

Time allowed: 30
Score: /23
Percentage: /100

Question 1a

Fig.1 below shows some chromosomes during meiosis.

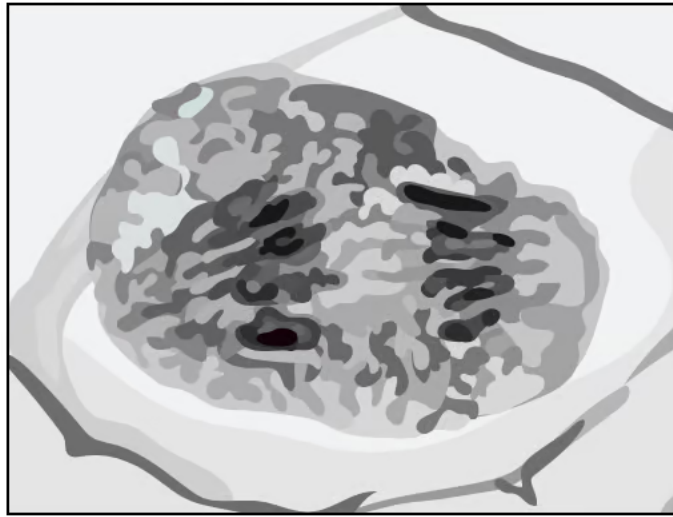


Fig. 1

(i)
Identify the stage of meiosis shown.

[1]

(ii)
Describe the behaviour of the chromosomes during this stage of meiosis.

[1]

[2 marks]

Question 1b

Fig. 2 shows two chromosomes.

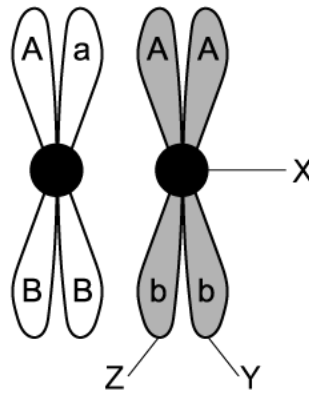


Fig. 2

(i)
Identify the structures labelled **X** and **Y**.

[2]

(ii)
Structures **Y** and **Z** are identical.

State why this is the case.

[1]

[3 marks]

Question 1c

The two chromosomes shown in part **(b)** can be described as homologous chromosomes.

Define the term *homologous chromosome*.

[2 marks]

Question 1d

During meiosis the homologous chromosomes shown in part (b) are separated.

Identify the stage of meiosis during which the homologous chromosomes are separated.

[1 mark]

Question 2a

Fig. 1 below shows a summary of the events during mitosis and meiosis.

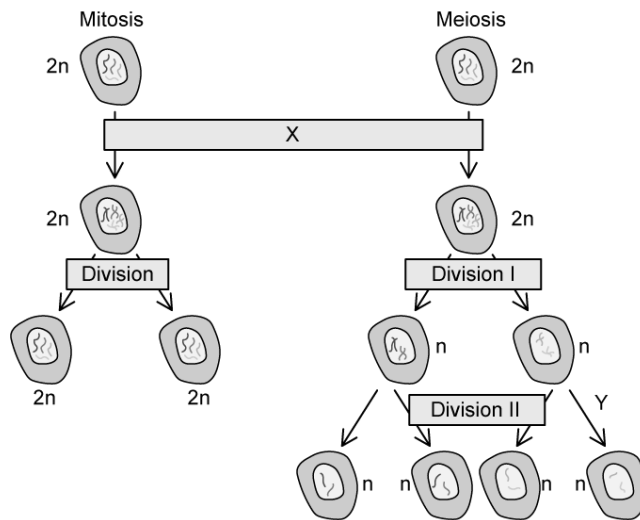


Fig.1

Identify the process taking place at the stage marked X.

[1 mark]

Question 2b

The stage marked Y on Fig. 1 in part (a) shows a change in the amount of genetic material in the cells.

Describe the events that take place in order for this change to occur.

[2 marks]

Question 2c

During division I shown in Fig. 1 in part **(a)** a process known as crossing over takes place.

Outline the events that take place during crossing over.

[2 marks]

Question 2d

Crossing over generates genetic variation.

Other than crossing over, identify **one** other process that generates genetic variation during sexual reproduction.

[1 mark]

Question 3a

Fig. 1 below shows a pair of chromosomes during meiosis. The letters represent the alleles at different loci on each chromosome.

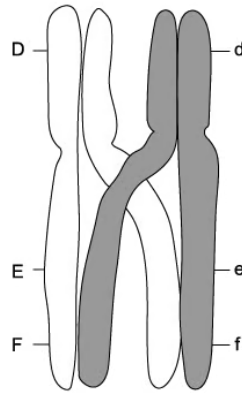


Fig. 1

(i)
Identify the process taking place in the image.

[1]

(ii)
Label the image with an **X** to show the location of the chiasmata.

[1]

[2 marks]

Question 3b

State the alleles that will be present on each of the **grey** shaded chromatids at the end of the process shown in part (a).

[2 marks]

Question 3c

There are many different possible combinations of chromosomes that can be found in the daughter cells produced during meiosis.

Use the formula 2^n to calculate the number of possible chromosome combinations that can be generated in domestic cat gametes. Note that the adult cells of domestic cats contain 38 chromosomes.

[2 marks]

Question 3d

Chromosomes behave in specific ways during the different stages of meiosis.

Sketch an annotated diagram of a cell in telophase. The chromosomes should be clearly visible in your diagram.

[3 marks]