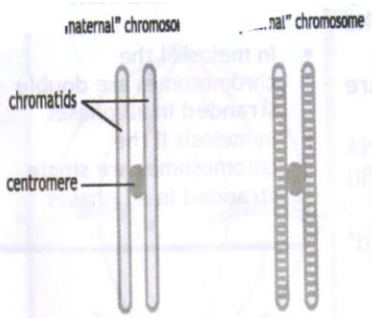


Fig. 2.8 A homologous pair of chromosomes before crossing-over

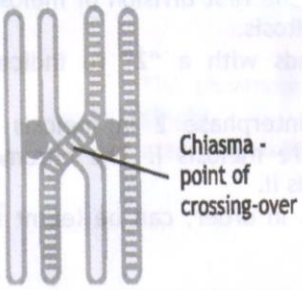
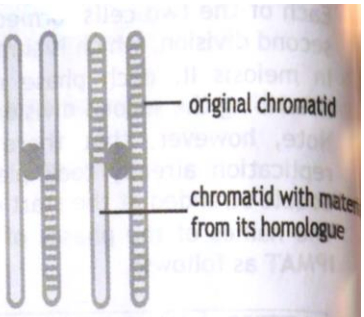


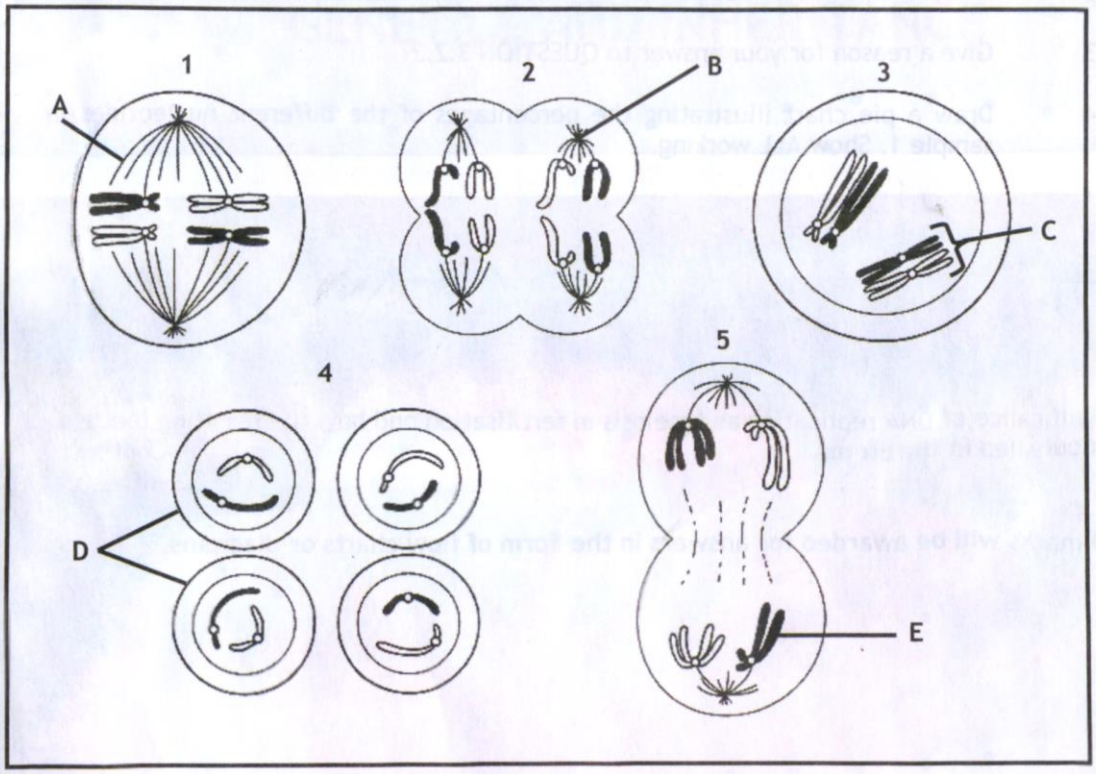
Fig. 2.9 Chromatids intertwining



Fig, 2.10 A pair of homologous chromosomes after crossing-over

° It takes place in Prophase 1 of meiosis. ° Homologous chromosomes come to lie close together. ° Homologous chromosomes (consisting of 4 chromatids in total) involved in crossing over is referred to as a **bivalent.**	° One chromatid of each chromosome overlaps with a chromatid of its homologue (or homologous partner). ° The points of crossing-over are called **chiasmata** (singular **chiasma**).	° The chromosomes separate in such a way that each has one original chromatid and one chromatid with some genetic material from its homologous partner.

The diagrams below show cells dividing during meiosis.



3.1.1 Give the names of the parts labelled **A** to **C** respectively.

3.1.2 Identify the phase represented in:

(a) Diagram 1
(b) Diagram 2

Meiosis and Abnormal Meiosis

1. The diagram alongside represents an animal cell in a phase of meiosis.

   1.1 State whether the phase of meiosis shown above is meiosis I or meiosis II. (1)
   1.2 Give ONE visible reason for your answer in Question 1.1. (1)
   1.3 Identify the parts labelled A and B. (2)
   1.4 How many chromosomes:

   1.4.1 Were present in the parent cell before meiosis began? (1)
   1.4.2 Will be present in each cell at the end of meiosis? (1)

   1.5 State ONE place in a human female where meiosis would take place. (1)
   1.6 Could the cell represented in the diagram be that of a human? (1)
   1.7 Explain your answer to Question 1.6. (2)
   1.8 Give TWO reasons why meiosis is biologically important. (2)
   1.9 Give the term for the situation when some of the chromosomes do not separate correctly during the phase shown in the diagram. (1)
   (13)

2. State the significance of meiosis in the life cycle of:

   2.1 A human
   2.2 The alga *Spirogyra* or the fungus *Rhizopus*
   2.3 The moss or the fern 3x2 **(6)**

3. The diagrams below represent cells from the same organism. One diagram represents a stage in mitosis while the other shows a stage in meiosis.

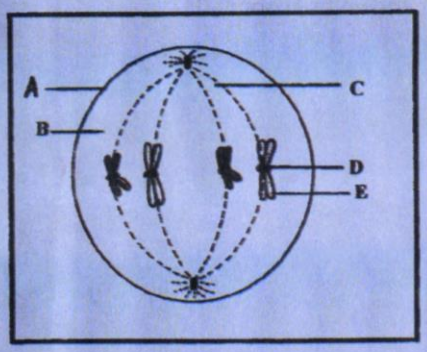


Diagram I

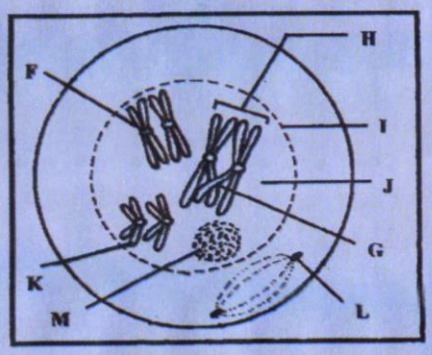
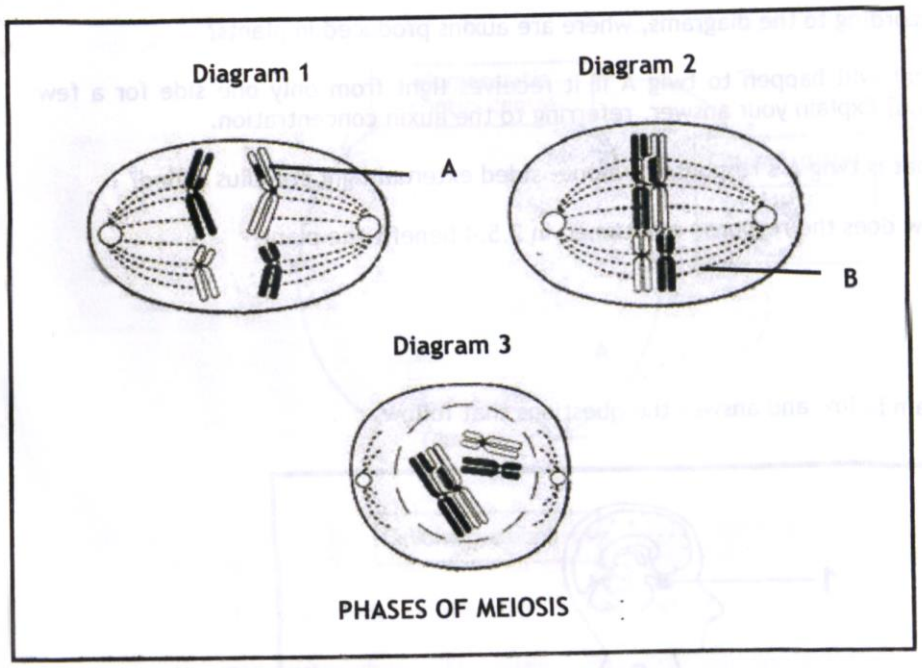


Diagram II

   3.1 Are these diagrams representative of a plant or an animal cell? (1)
   3.2 Give ONE observable reasons for your answer. (1)
   3.3 Provide labels for the parts indicated by letters A, B. C. F, G, I, L and M. (8)
   3.4 Which diagram (I or II) represents mitosis? Give a reason for your answer. (2)
   3.5 Which diagram (I or II) represents meiosis? Give a reason for your answer. (2)
   3.6 Explain the significance of the nuclear division represented by:
   3.6.1 Diagram I (2)
   3.6.2 Diagram II (2)
   (18)

Study the diagrams below which illustrate some phases of meiosis I.



3.2.1 Label parts **A** and **B** respectively. (2)

3.2.2 The diagrams above are not placed in the correct sequence. Use the diagram numbers to write down the correct sequence in which part of the process of meiosis I takes place. (2)

3.2.3 Give TWO observable reasons why the phases in the diagram are part of meiosis I. (2)
(6)