



WORKSHEET

Full marks 34

1 Key words [4]

autosome chromosome double helix gene meiosis mitosis nucleotides ribose
thymine uracil

2 Multiple choice [5]

i. How many pairs of sex chromosomes does a human cell have? [1]

- a. 1 pair
b. 22 pairs
c. 23 pairs
d. 46 pairs
- What is a chromosome made of?
- a. DNA and RNA
b. DNA and carbohydrate
c. DNA and protein
d. RNA and protein
- Which statement is true of mitosis?
- a. Four cells are formed.
b. Haploid cells are formed.
c. Its main role is to form gametes.
d. It helps to repair tissue.

iv. Which statement is true? [1]

- An egg has only a Y chromosome, and a sperm has an X.
- An egg has only an X chromosome, and a sperm has a Y.
- An egg has only an X chromosome, and a sperm has either an X or a Y.
- Eggs and sperm both have X and Y chromosomes.

v. A technician in a radiotherapy laboratory had no children after many years of marriage. Tests showed that his fertility was reduced because he had worked for a long time with strong radiation. Which part of the cell was affected? [1]

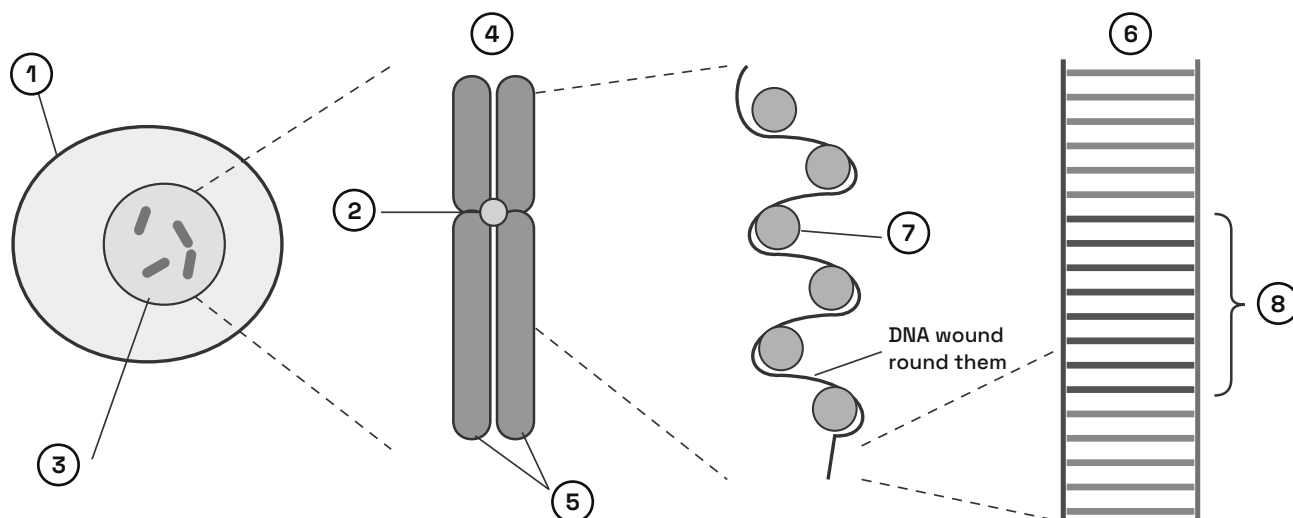
- a. DNA
b. RNA
c. cytoplasm
d. nucleus



3 Label the diagram

[4]

The diagram zooms in from a cell to a gene. Name the parts numbered 1 to 8. Each carries 0.5 mark.



1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

4 Very short answers

[3]

Write very short answers to the following questions.

a. What is a gene?

[1]

b. A human body cell has 46 chromosomes. How many chromosomes does a human sperm have?

[1]

c. Which base does RNA have in place of thymine?

[1]

5 Short answers

[8]

Write short answers to the following questions.

a. Write any two differences between mitosis and meiosis.

[2]



- b. Give a reason: the male has the main role in deciding the sex of a child. [2]**

- c. Give a reason: meiosis is also called reductional cell division. [2]

- d. What will happen if meiosis does not occur in the reproductive cells of an organism? [2]

6 Long answer **[4]**

Write a long answer to the following question.

How is sex determined in humans? Explain with a chart.

[illegible]

7 Numerical problem [4]

Answer the questions. Show your working.

A zygote divides again and again by mitosis: $1 \rightarrow 2 \rightarrow 4 \rightarrow 8$ cells, and so on.

- How many cells are there after 10 rounds of division? (1)
- A couple plans to have three children. What is the chance that their first child is a girl? (1)
- What is the chance that all three children are sons? (1)
- How many autosomes does a human egg cell have? (1)

Answer: _____

8 Think

[2]

Think, then answer.

Why are the faces and bodies of children of the same parents not exactly the same (unless they are identical twins)?

9 Activity: See DNA with your own eyes (at home)

(not marked)

With an adult, mash half a banana with warm water, a teaspoon of salt and a teaspoon of washing-up liquid; strain it into a glass and pour ice-cold spirit gently down the side so it floats on top. Wait a few minutes and fill in the table.

Fruit I used	What the strained liquid looked like	What appeared in the spirit	How long it took

Why can you see the DNA here, when a single DNA molecule is far too thin to see?

