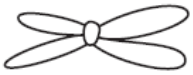
The mitotic cell cycle – AS 9700 November 2023

1. Nov/2023/Paper_ 9700/11/No.18

Which row is a representation of one chromosome at the beginning of prophase of mitosis and the number of DNA strands in the chromosome?

	appearance of one chromosome	number of DNA strands
A		2
B		4
C		1
D		2

2. Nov/2023/Paper_ 9700/11/No.19

Which events are part of mitosis?

1 interphase

2 telophase

3 cytokinesis

A 1, 2 and 3 **B** 1 and 3 only **C** 2 and 3 only **D** 2 only

3. Nov/2023/Paper_ 9700/11/No.20

The statements are about genes and proteins involved in breast cancer.

- The protein coded by the *BRAC1* gene inhibits the growth of breast cancer cells.
- The protein coded by the *p53* gene suppresses tumours.

Which combination of genes is **most likely** to result in breast cancer?

	BRAC1	*p53*
A	✗	✗
B	✗	✓
C	✓	✗
D	✓	✓

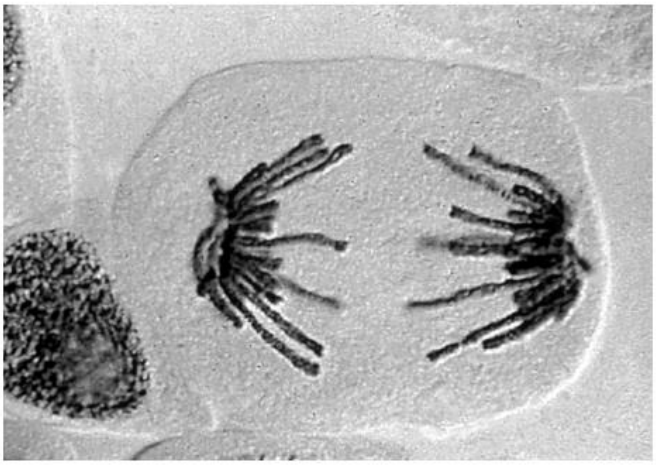
key

✓ = normal active gene

✗ = mutated gene

4. Nov/2023/Paper_ 9700/11/No.21

The photomicrograph shows a cell during mitosis.



What is happening in this cell?

1 Chromosomes are condensing.

2 Centromeres are moving to opposite poles.

3 Spindle microtubules are shortening.

A 1 and 2 **B** 1 and 3 **C** 2 and 3 **D** 3 only

5. Nov/2023/Paper_ 9700/12/No.18

A human embryo consists of 12 cells at the start of day 1. The cells divide by mitosis for 4 complete days at a rate of 1 division every 32 hours.

What is the maximum number of cells in the embryo at the end of day 4?

A 48 cells

B 96 cells

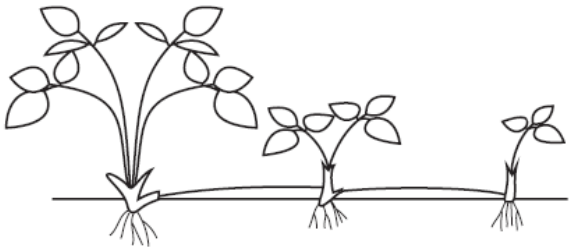
C 192 cells

D 384 cells

6. Nov/2023/Paper_ 9700/12/No.19

Which diagrams show roles of mitosis?

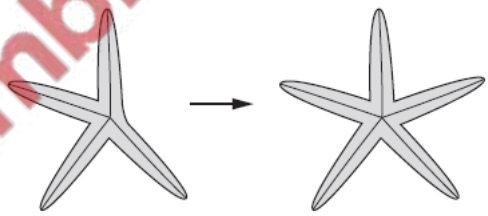
1



2

3

4



A 1, 2, 3 and 4

B 1, 2 and 3 only

C 1 and 2 only

D 3 and 4 only

7. Nov/2023/Paper_ 9700/12/No.20

Which events are part of the mitotic cell cycle?

1 interphase

2 anaphase

3 cytokinesis

A 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 only

8. Nov/2023/Paper_ 9700/13/No.20

Which statement about the behaviour of chromosomes during telophase is correct?

A Chromosomes attach to the spindle fibres at the equator.

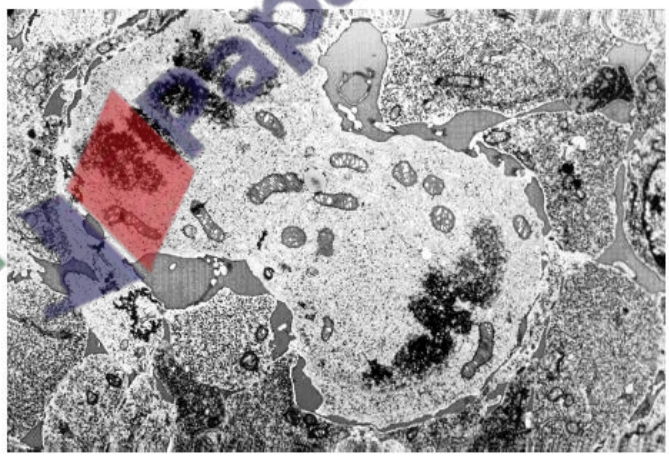
B Chromosomes start to uncoil inside the newly formed nucleus.

C Chromosomes move towards the opposite poles of the cell.

D Chromosomes condense into compact structures in the cytoplasm.

9. Nov/2023/Paper_ 9700/13/No.21

The transmission electron micrograph shows a cell in a stage of the mitotic cell cycle.



Which statement explains why it is difficult to identify the stage of the mitotic cell cycle shown?

A Chromosomes have supercoiled and are visible, but centrioles are not visible.

B Anaphase may be continuing, or telophase may be starting.

C It is unclear whether the electron micrograph shows two cells in metaphase.

D Some people may consider interphase to have started.