

5.1 Replication & Division of Nuclei & Cells

Question Paper

Course	CIEA Level Biology
Section	5. The Mitotic Cell Cycle
Topic	5.1 Replication & Division of Nuclei & Cells
Difficulty	Medium

Time allowed: 20
Score: /10
Percentage: /100

Question 1

Mitosis is required in which of the following processes?

- 1 cloning plasma cells
- 2 replacing damaged cells
- 3 producing gametes

- A. 1 only
B. 2 only
C. 1 and 2 only
D. 1, 2 and 3

[1 mark]

Question 2

What processes during mitosis ensure that the genetic constitution of the cell is maintained?

- 1 dividing of centromeres longitudinally
- 2 chromatids being pulled apart to opposite poles
- 3 parent cells replicate their DNA before mitosis begins
- 4 positioning the chromosomes on the equator of the spindle

- A. 1, 2 and 3 only
B. 1, 2 and 4 only
C. 2, 3 and 4 only
D. 1, 2, 3 and 4

[1 mark]

Question 3

Tumors are formed from uncontrolled cell division of cancer cells.

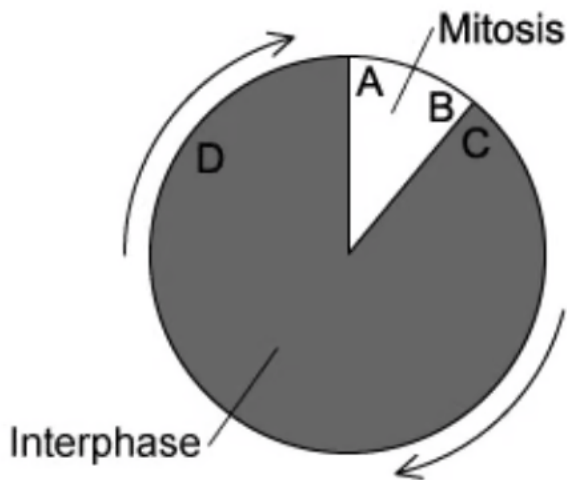
Which statement describes the difference between a normal cell and a cancer cell?

- A. only cancer cells have mutated DNA
- B. cancer cells do not undergo cytokinesis
- C. cancer cells have a shorter interphase
- D. cancer cells do not have metaphase

[1 mark]

Question 4

The cell cycle is shown in the diagram below.



If dividing cells, cells are supplied with radioactive nucleotides, at which point will the nucleotides be incorporated into the chromosomes?

- A.

[1 mark]

Question 5

What properties does a human cell have just before it enters prophase?

	nuclear envelope present	spindle present	number of chromatids	number of molecules of DNA in nucleus
A	no	yes	46	46
B	yes	no	92	92
C	yes	yes	46	92
D	yes	no	92	46

[1 mark]

Question 6

The statements below are about two genes involved in breast cancer.

- the *BRAC1* gene codes for a protein that stops the growth of breast cancer cells
- the *p53* gene codes for a protein that suppresses tumours

Which genetic combination is most likely to result in breast cancer?

	gene	
	BRAC1	p53
A	✓	✓
B	✓	X
C	X	✓
D	X	X

Key:

✓ = normal active gene

x = mutated gene

[1 mark]

Question 7

DNA replication is promoted by chromosome telomeres and are not completely replaced during mitosis.

However, substance **X** is known to completely replace telomeres during mitosis.

What will be the effect of growing a cell culture with and without substance **X**?

	with substance X	without substance X
A	cell division stops immediately	cells continuously divide
B	cells continuously divide	cell division eventually slows and stops
C	cell division eventually slows and stops	cell division stops immediately
D	cells divide quicker	cells continuously divide

[1 mark]

Question 8

Radioactive thymine is supplied to mammalian skin cells in tissue culture.

At which stage in the cell cycle will the thymine be used in the nuclei?

- A. interphase
- B. metaphase
- C. prophase
- D. anaphase

[1 mark]

Question 9

The risk of developing a cancerous tumour is increased by exposure to which of the following?

	ultraviolet light	viruses	carbon monoxide	X-rays
A	✓	✓	x	✓
B	✓	x	✓	✓
C	x	✓	✓	x
D	✓	x	✓	x

key

✓ increases risk

x does not increase risk

[1 mark]

Question 10

Mice in laboratories had their p53 genes switched off. These mice went on to develop tumours.

When their p53 genes were switched on again, the tumour cells stopped dividing and died within a few days. Healthy cells in the mice were unaffected.

What do these observations suggest?

- A. the p53 gene acts as a tumour suppressor gene
- B. p53 protein causes all cells to die
- C. the p53 gene encourages the growth of tumours
- D. p53 protein speeds up the mitotic cell cycle the p53

[1 mark]