

Replication and division of nuclei and cells

Question Paper 4

Level	International A Level
Subject	Biology
Exam Board	CIE
Topic	The Mitotic Cell Cycle
Sub Topic	Replication and division of nuclei and cells
Booklet	Theory
Paper Type	Question Paper 4

Time Allowed : 77 minutes

Score : / 64

Percentage : /100

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	'77.5%	70%	62.5%	57.5%	45%	<45%

(b) The magnification of Fig. 3.1 is $\times 5000$.

Calculate the diameter of the nucleus of cell **B** between lines **P** and **Q**.

Show your working and give your answer to the nearest micrometre (μm).

answer μm [2]

(c) State the advantages of light microscopy, rather than electron microscopy, for studies of the cell cycle.

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..... [3]

[Total: 11]

- 2 Bone marrow contains stem cells that divide by mitosis to form blood cells. Each time a stem cell divides it forms a replacement stem cell and a cell that develops into a blood cell.

Fig. 3.1 shows changes in the mass of DNA in a human stem cell from the bone marrow during three cell cycles.

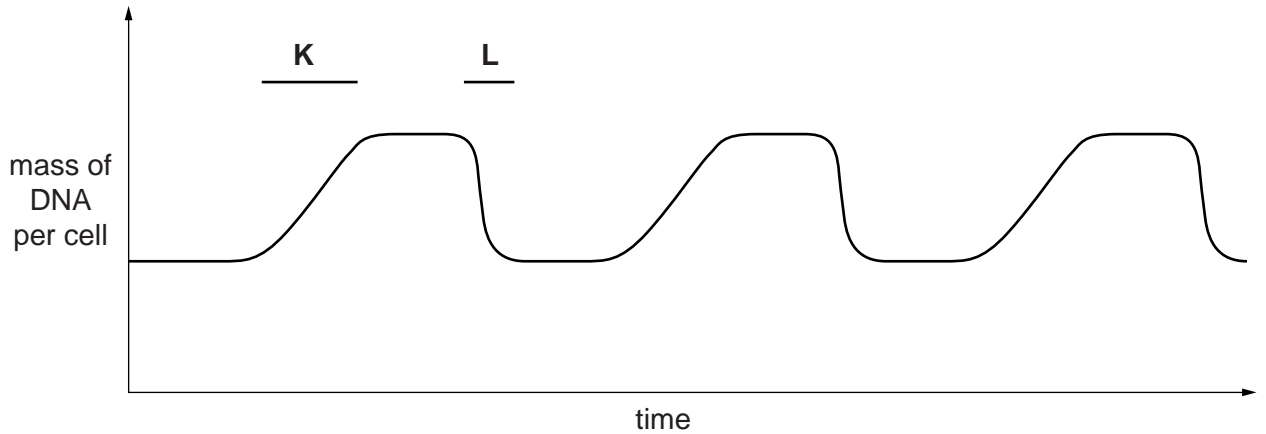


Fig. 3.1

(a) With reference to Fig. 3.1, state:

- (i) what happens to bring about the changes in the mass of DNA per cell at **K** and at **L**

K

.....

L

..... [2]

- (ii) how many blood cells are formed from the stem cell in the time shown

..... [1]

- (iii) what happens to the number of chromosomes in the stem cell.

..... [1]

Stem cells in bone marrow give rise to phagocytes, B-lymphocytes and T-lymphocytes.

(b) Describe how a red blood cell develops from a stem cell.

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..... [3]

(c) During an immune response, cells divide by mitosis.

Describe how mitosis is involved in an immune response.

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..... [3]

(d) Describe the modes of action of T-lymphocytes during an immune response.

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..... [3]

[Total: 13]

4 (a) (i) Name two factors that increase the chances that cancer will develop.

1.

2. [2]

(ii) State why lung cancer is categorised as a non-infectious disease.

.....

..... [1]

The effectiveness of anti-cancer drugs may be determined by growing different tumours in culture.

The effectiveness of two drugs on two human tumours (**A** and **B**) from different tissues was assessed. The two drugs, T138067 and vinblastine, were added to the tumours in culture on days 5, 12 and 19. The volumes of the tumours were compared with the volumes of tumours that were not treated with any drugs.

The results are shown in Fig. 4.1.

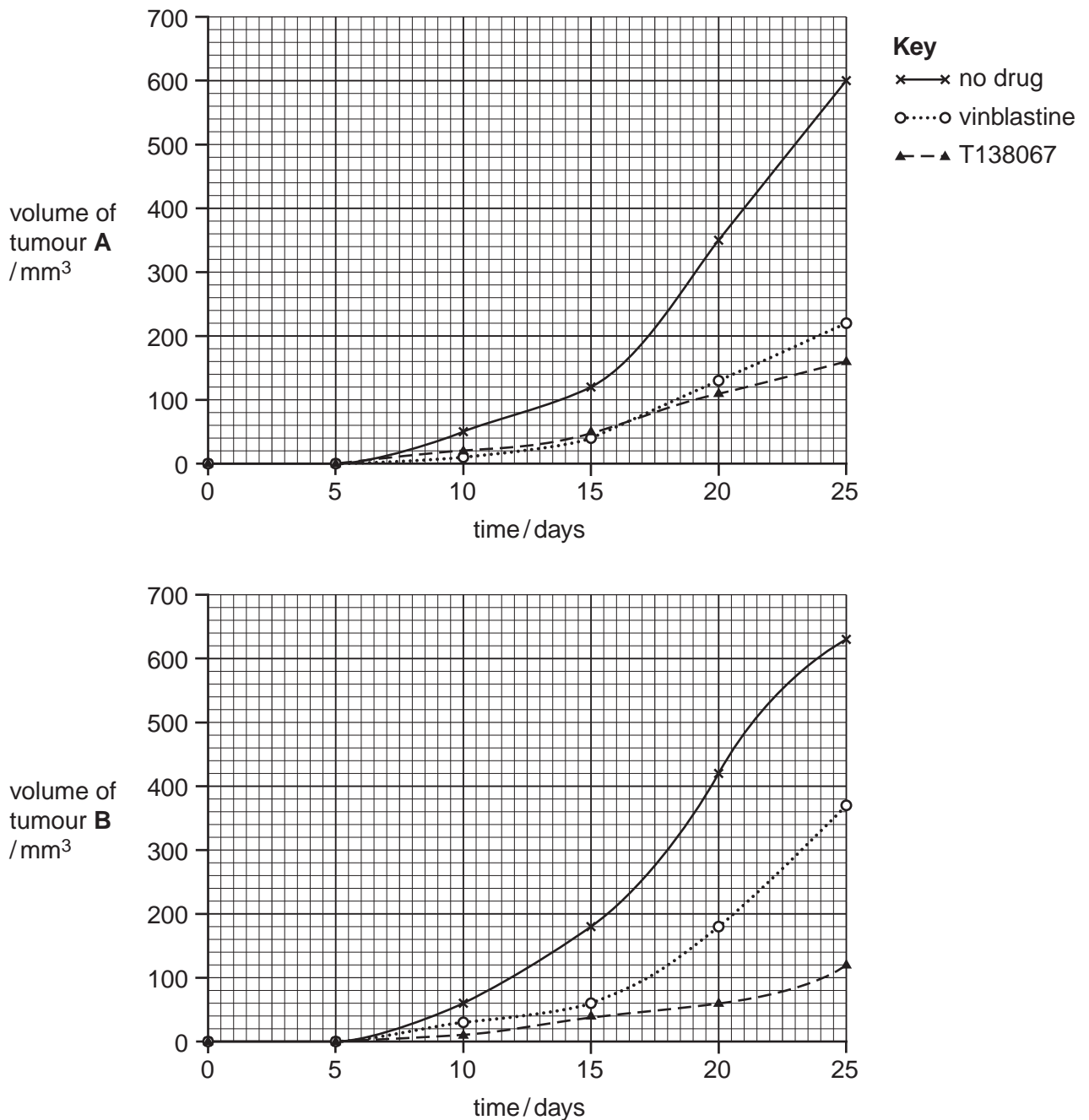


Fig. 4.1

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