Cell Division, Cell Diversity & Cellular Organisation

Question Paper 3

Level	A Level
Subject	Biology
Exam Board	OCR
Module	Foundations in Biology
Topic	Cell Division, Cell Diversity & Cellular Organisation
Booklet	Question Paper 3

Time allowed: **39 minutes**

Score: **/29**

Percentage: **/100**

Grade Boundaries:

A*	A	B	C	D	E
>69%	56%	50%	42%	34%	26%

Question 1

Which statement explains the significance of mitosis in the development of whole organisms?

A Mitosis can be controlled at certain points in development, which will change body plans.

B Sex cells are produced by mitosis, which allows new organisms to be produced.

C Mitosis limits the total number of cells in an organism, which will change its shape.

D Budding in yeast is an example of mitosis, producing new multicellular organisms.

[1]

Question 2

(a) Name the type of nuclear division that produces two genetically identical nuclei. **[1]**

(b) There are a number of stages during cell division.

The list, **J** to **N**, describes some processes that occur during the division of an animal cell.

J	the cell surface membrane is constricted
K	the nuclear envelope reforms
L	sister chromatids are pulled apart
M	the chromosomes condense
N	the chromosomes move to the equator

Match each letter, **J** to **N**, with a stage of cell division in the list below. **[4]**

The first one has been completed for you.

prophase .....M.....

metaphase .....

anaphase .....

telophase .....

cytokinesis .....

(c) During interphase the genetic material is copied.

State **two** other processes that occur during interphase. **[2]**

(d) Suggest **two** ways that cell division in plants differs from cell division in animals. **[2]**

[Total: 9]

Question 3

(a) Fig. 5.1, **on the insert**, shows some drawings of a cell during different stages of mitosis.

Place stages **P**, **Q**, **R**, **S** and **T** in the correct sequence. **[4]**

The first stage has been identified for you.

S

(b) Mitosis is part of the cell cycle.

Fig. 5.2 shows a diagram of the cell cycle.

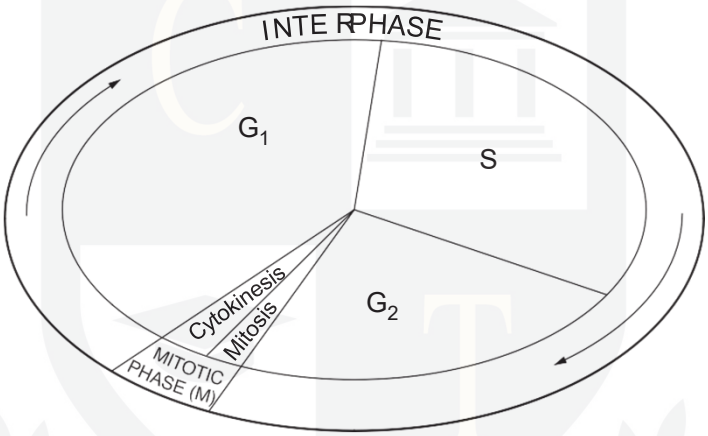

Fig. 5.2

(i) Name **one** process that occurs during stages G_1 and G_2. **[1]**

(ii) The genetic information is copied and checked during stage **S**.

Suggest what might happen if the genetic information is not checked. **[2]**

(c) A cell undergoes two divisions during **meiosis**.

Suggest how cells produced by meiosis may differ from those produced by mitosis. **[2]**

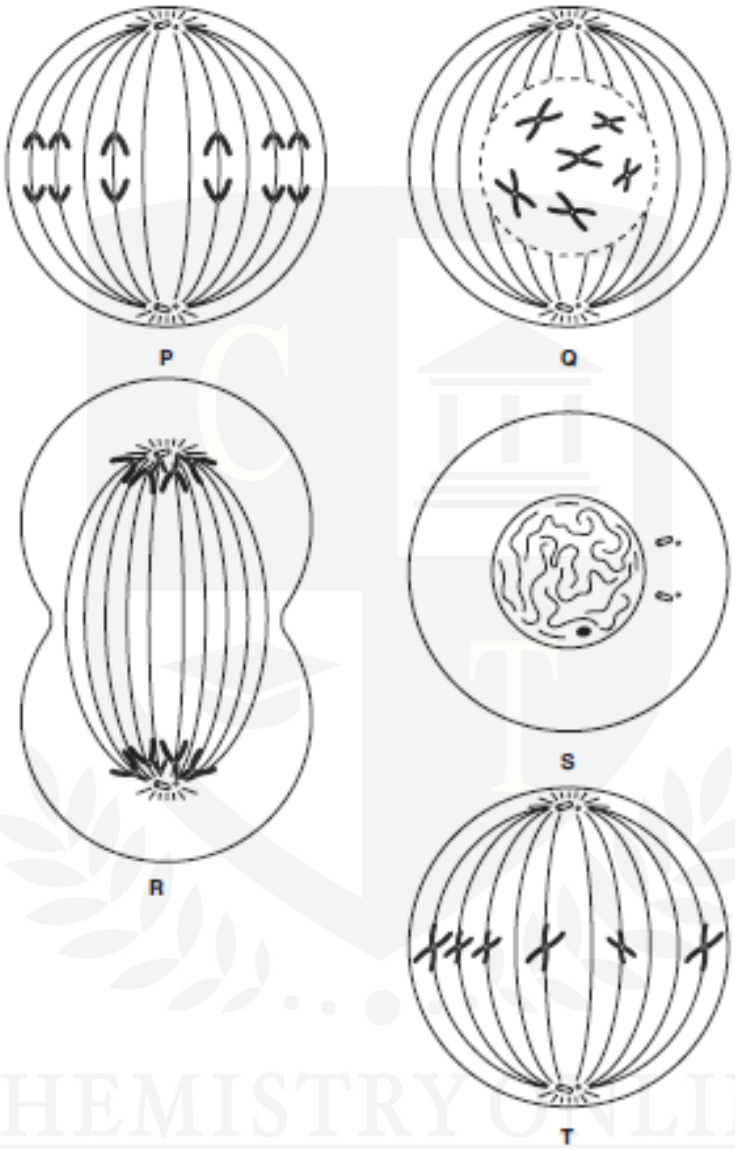

Fig. 5.1

[Total: 9]

Question 4

The division of stem cells by mitosis produces cells that are genetically identical.

(a) (i) State what is meant by the term *stem cell*. **[2]**

(ii) Name **one** tissue in **plants** that contains stem cells. **[1]**

(b) State **three** reasons why mitosis is important to organisms. **[3]**

(c) Traditionally, stem cells from bone marrow have been used to treat patients with leukaemia.

Recent studies have shown that stem cells taken from umbilical cord blood may be more effective in treating leukaemia than stem cells taken from bone marrow.

Table 3.1 shows the probability of a patient remaining leukaemia-free for five years after being treated with stem cells from different sources.

Table 3.1

An extract has been removed due to third-party copyright restrictions.

Source: Miami Herald, www.miamiherald.com

(i) Describe, using the information in Table 3.1, the evidence that **perfectly matched** umbilical cord blood stem cells are more effective than bone marrow stem cells in treating leukaemia.

[2]

(ii) Suggest **two** advantages, **other than an increased probability of survival**, of using umbilical cord blood stem cells instead of bone marrow stem cells in transplant procedures.

[2]

[Total: 10]