

Cell Division, Cell Diversity & Cellular Organisation

Question Paper 2

Level	A Level
Subject	Biology
Exam Board	OCR
Module	Foundations in Biology
Topic	Cell Division, Cell Diversity & Cellular Organisation
Booklet	Question Paper 2

Time allowed: 45 minutes

Score: /33

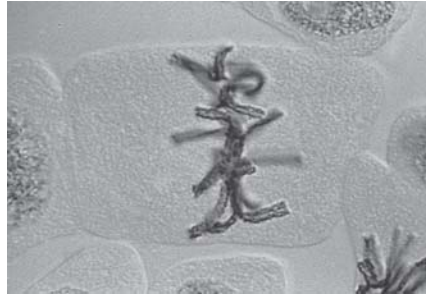
Percentage: /100

Grade Boundaries:

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

Question 1

The image shows a stage in mitosis.



Which of the following options, **A** to **D**, is the stage of mitosis shown above?

- A** anaphase
- B** metaphase
- C** prophase
- D** telophase

[1]

Question 2

There are two types of nuclear division, mitosis and meiosis. Meiosis incorporates two divisions of the nucleus.

Which table shows the correct results of nuclear division?

A

	Genetic variation	Reduction division
Mitosis	✗	✗
Meiosis 1	✓	✓
Meiosis 2	✗	✗

C

	Genetic variation	Reduction division
Mitosis	✗	✓
Meiosis 1	✓	✗
Meiosis 2	✓	✓

B

	Genetic variation	Reduction division
Mitosis	✗	✗
Meiosis 1	✓	✓
Meiosis 2	✓	✗

D

	Genetic variation	Reduction division
Mitosis	✗	✗
Meiosis 1	✓	✓
Meiosis 2	✗	✓

[1]

Question 3

(a) Fig. 2.1, **on the insert**, shows a yeast cell with scars resulting from its reproductive process.

(i) Name the process of asexual reproduction in yeast. [1]

(ii) Outline the process of asexual reproduction in yeast. [2]

(b) (i) A yeast cell can continue producing new cells until its surface is covered by scars.

The surface area of a sphere is given by the formula $4\pi r^2$, where $\pi = 3.14$.

The area of a circle is given by the formula πr^2 .

Assuming that the cell in Fig. 2.1 contained no scars, calculate how many potential new cells could be produced by this cell.

Show your working. [2]

(ii) Even when the environmental conditions are perfect, one yeast cell rarely produces the calculated number of potential new cells.

Suggest why the reproductive potential of the yeast cell is not reached. [1]

(c) Yeast cells separate after cell division. In a multicellular organism, the cells do not separate but become organised to form the body structure.

Describe how the cells in a multicellular organism are organised. [5]



In your answer you should use appropriate technical terms, spelled correctly.

[Total: 11]

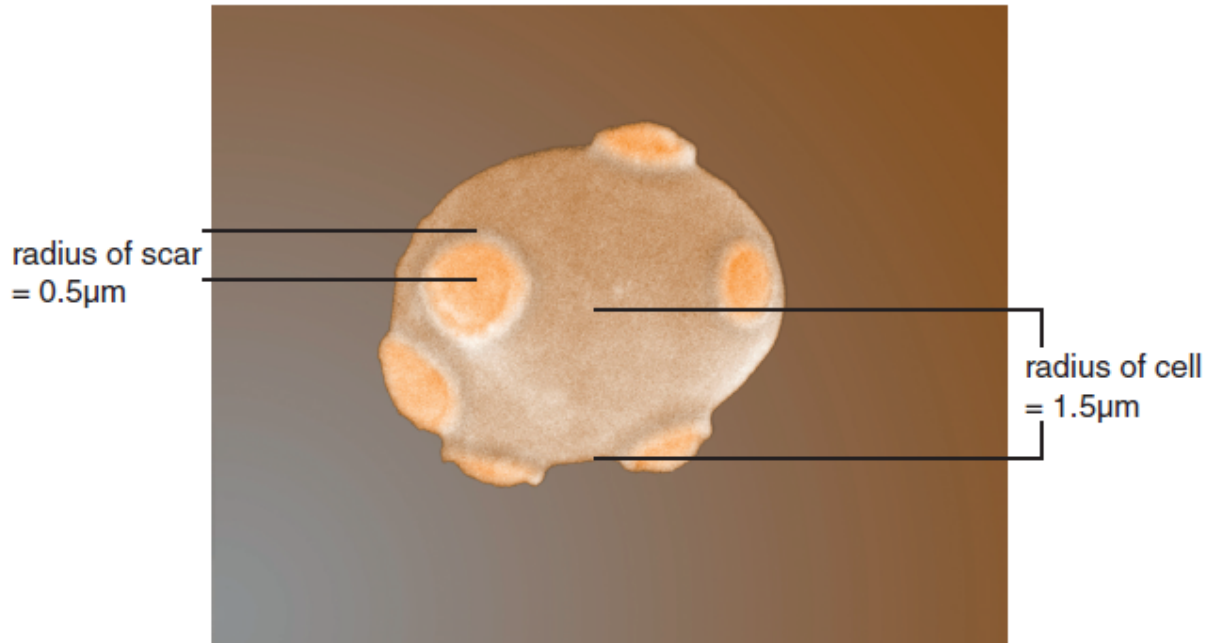


Fig. 2.1

Question 4

(a) Yeast reproduces asexually by a process called budding. During this process, cell division occurs.

(i) Name the type of cell division that occurs in asexual reproduction. **[1]**

(ii) Before the division of the nucleus of a cell, the genetic material must replicate.

Explain why this is essential. **[2]**

(b) Unlike yeast, the nuclei of most eukaryotic organisms contain homologous pairs of chromosomes.

Explain what is meant by a *homologous pair of chromosomes*. **[3]**

(c) In most multicellular organisms, the cells produced by cell division are organised into tissues.

(i) State what is meant by the term *tissue*. [2]

(ii) Complete Table 1.1 below comparing two types of epithelium, squamous epithelium and ciliated epithelium.

For each type of epithelium, state **one** function of the tissue and **one** specific location in the human body where it is found.

Table 1.1

[4]

type of epithelium	function of tissue	specific location in the human body
squamous		
ciliated		

[Total: 12]

Question 5

In plants, dividing cells can be found in meristematic tissue.

(a) Name **two** parts of a plant where meristematic tissue can be found. [2]

(b) In an investigation, a student observed the cells in a stained section of meristematic tissue. The student counted how many cells could be seen in each stage of the cell cycle.

Table 4.1 shows the results.

Table 4.1

stage of cell cycle	percentage cells in stage (%)
interphase	82.00
prophase	4.34
metaphase	3.23
anaphase	3.23
telophase	7.20

(i) Explain why the meristematic tissue needed to be stained for this investigation. [2]

(ii) Name the type of nuclear division that occurs in a plant meristem. [1]

(c) Using the results shown in Table 4.1, calculate the percentage of the cell cycle taken up by nuclear division. [2]

Show your working.

(d) State **one** way in which the products of **meiosis** are different from the products of nuclear division in meristematic tissue. [1]

[Total: 8]