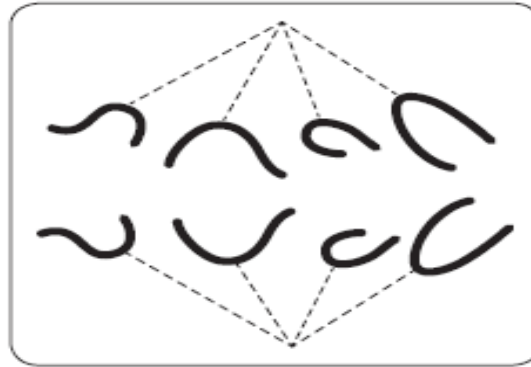


Unit 2 Multicellular Organisms

Key Area 1 Producing New Cells

1. The diagram below shows one of the stages of mitosis in the root tip of a plant.

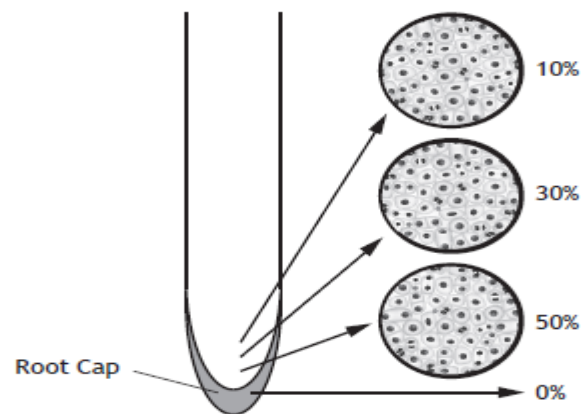


Which of the following statements describes the stage shown?

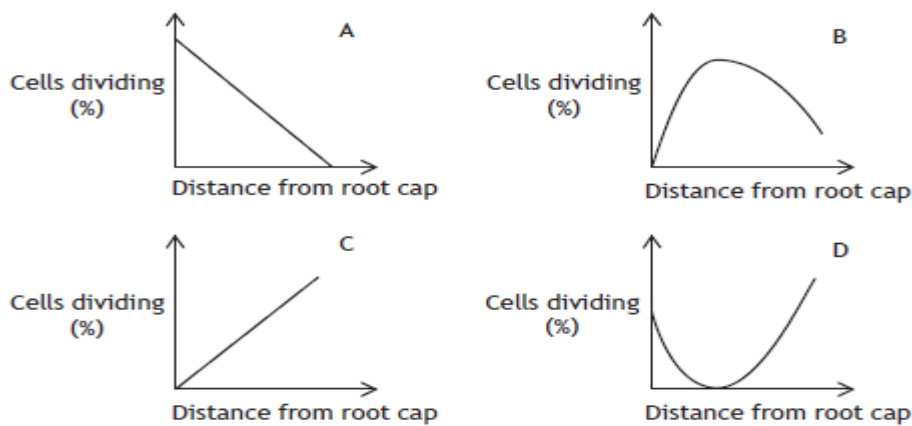
- A Chromosomes line up at the equator of the cell
 - B Daughter chromosomes gather at the ends of the cell
 - C Chromosomes become visible as pairs of identical chromatids
 - D Spindle fibres pull chromatids to opposite poles of the cell
2. Which of the following pairs of human cells have the same number of chromosomes?
- A Liver cell and sperm cell
 - B Kidney cell and sperm cell
 - C Kidney cell and liver cell
 - D Liver cell and egg cell
3. Which row in the grid gives correct information about stem cells?

A	Found in embryos	Specialised cells	Cannot self-renew
B	Found in tissues	Specialised cells	Can self-renew
C	Found in embryos	Unspecialised cells	Can self-renew
D	Found in tissues	Unspecialised cells	Cannot self-renew

4. The diagram below shows the percentage of cells dividing in four areas of an onion root.



Which graph represents the number of cells dividing in this root?



5. Which of the following shows terms listed in order of increasing level of organisation in a multicellular organism?

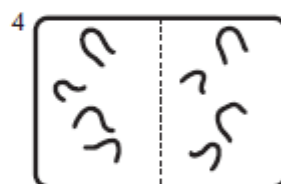
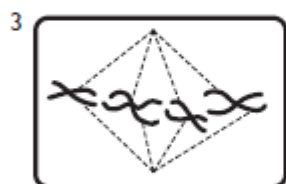
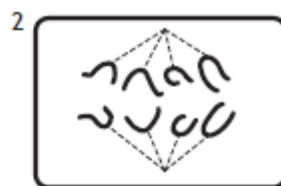
- A organ → tissue → system
- B organ → system → tissue
- C tissue → system → organ
- D tissue → organ → system

6. Stem cells are

- A specialised cells which can divide to produce new stem cells
- B specialised cells which are unable to divide to produce new stem cells
- C non-specialised cells which can divide to produce new stem cells
- D non-specialised cells which are unable to divide to produce new stem cells.

7.

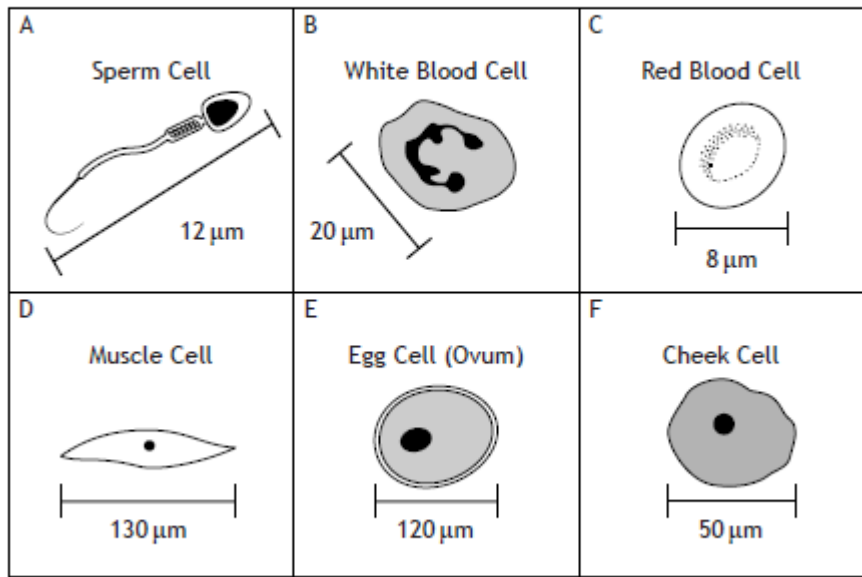
The following diagrams show a cell at four different stages of mitosis.



The correct order of the stages of mitosis is

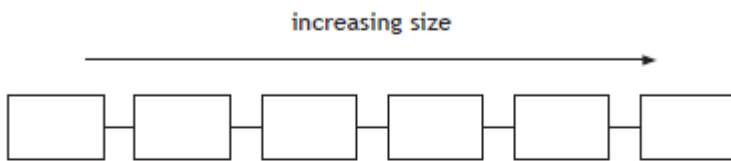
- A 1,3,2,4
- B 2,3,4,1
- C 3,2,1,4
- D 4,1,2,3.

8. The diagrams below show examples of some types of specialised cells from the human body.



The cells are not drawn to the same scale.
 (μm = micrometre)

(a) Put letters in the boxes below to arrange the cells in order of size. 1



(b) Choose one of the following cell types by circling it.

sperm cell egg cell red blood cell

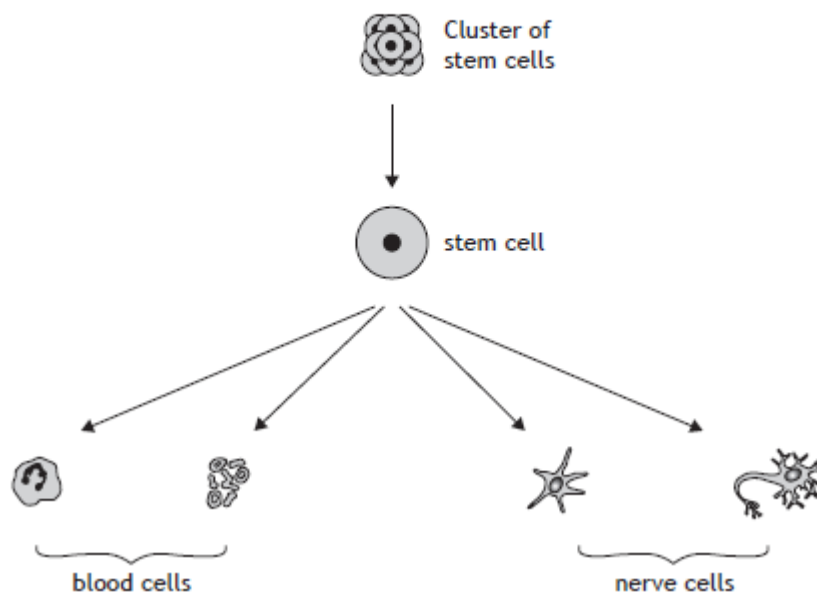
Describe the function of the chosen cell and explain how its specialisation allows it to carry out that function. 2

Function _____

Explanation _____

(continued)

- (c) The diagram below shows some stages in the development of blood cells and nerve cells.



Describe the feature of stem cells which gives them the potential to develop into many different types of cells, such as blood and nerve cells. 1

- (d) Which of the following statements refer to processes involving stem cells? 1

Tick (✓) the correct box(es).

Growth of new skin

Transmission of nerve impulses

Muscle contraction

Repair of broken bones

Production of insulin

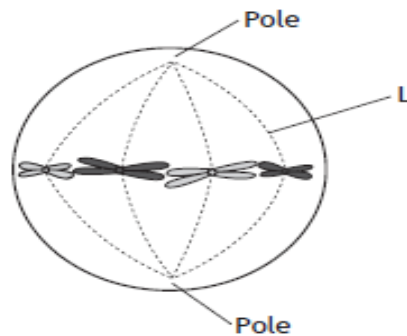
Total marks 5

9. (a) (i) The table describes some stages which occur during cell division, but not in the correct order.
The first stage has been given.
Identify the third stage by writing the number 3 beside its description.

1

Stage	Description
	cytoplasm divides
	nuclear membranes form
1	chromosomes shorten and thicken
	chromosomes move to the equator of the cell
	pairs of chromatids are pulled apart

- (ii) The diagram represents a cell during one of the stages of mitosis.



Name the part labelled L in the diagram.

1

- (b) During mitosis a pair of chromatids was pulled apart, each moving away from the equator, towards opposite poles, at a rate of 1 micrometre per second.

Calculate the distance between them after 20 seconds.

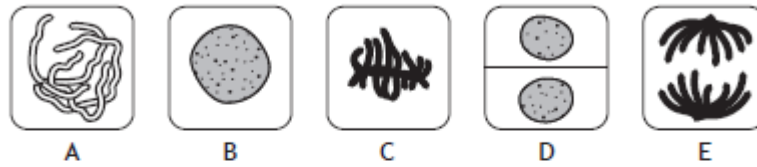
1

Space for calculation

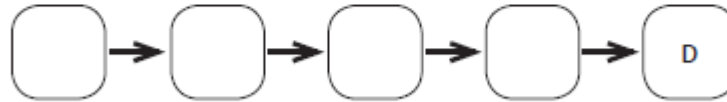
_____micrometres

10.

The diagrams show a cell in different stages of mitosis.



- (a) Use letters from the diagrams to complete the correct order of the stages. 1



- (b) Describe what is happening in stage C. 1

- (c) Explain why it is important for the new cells produced to be identical to the original cell. 1

- (d) Calculate the number of times the original cell would have to divide to form 128 cells in total. 1

Space for calculation

_____ times

