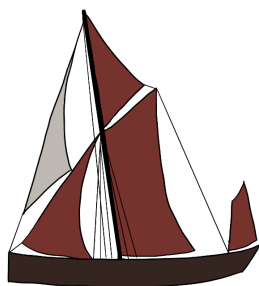

CELL DIVISION MARK SCHEME

Science Exams Sorted



2021

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Cell Division Mark Scheme

1. In 2012, two scientists were awarded the Nobel prize for their research on stem cells.
They showed that adult cells could be reprogrammed to become cells with the properties of embryonic stem cells.

- a. Describe the possible benefits of this research.

Any three from:	
Have the potential to produce any cell type.	(1)
No need to use embryonic stem cells. <i>Accept embryos do not need to be killed.</i>	(1)
Less chance of patient rejecting their own cells.	(1)
Used to treat conditions which are currently incurable / used for cell transplants /used to replace faulty cells. <i>Accept named conditions e.g. Parkinson's / diabetes.</i>	(1)
	Total: 3 marks

The figure below shows four stages of mitosis, labelled P, Q, R and S.

- b. Which is the correct order for these stages?

B – is the only correct answer.	(1)
	Total: 1 mark

- c. The stage of mitosis labelled S in the figure above is?

A – is the only correct answer.	(1)
	Total: 1 mark

- d. Interphase is part of the cell cycle.

Describe what happens during interphase.

Any two from:	
DNA is replicated. <i>Accept DNA duplicates /chromosomes duplicate.</i>	(1)
Production of cell components /proteins / organelles.	(1)
Metabolic activities / cell reactions occur / cell growth.	(1)
	Total: 2 marks

Edexcel 2018 Higher Paper 1 Q6 a & b

Cell Division Mark Scheme

2. A fertilised ovum (egg cell) divides by mitosis to form an embryo.

Describe how some cells in an embryo become specialised cells.

A description to include any two from the following:	
Stem / meristematic cells.	(1)
Differentiate.	(1)
By changing shape / size/ metabolic ability.	(1)
Becomes a named cell e.g. root hair cell muscle cell / neurone.	(1)
	Total: 2 marks

Edexcel 2016 Higher Paper 2 Q4 d

3. Mitosis occurs in plant cells during growth.

Describe the division of a cell by mitosis.

Marking guidance		
Level	Marks	Descriptor
Level 1	1 - 2	A correct description of at least one stage of mitosis.
Level 2	3 - 4	A correct description of at least two stages of mitosis. Gives a reference of the products.
Level 3	5 - 6	A correct description of at least stages of mitosis. Gives a detailed description of the products.

A description including the following:	
Prophase The nuclear membrane breaks down. The chromatin condenses into chromosomes. The centrioles begin to move to opposite poles of the cell. Metaphase The chromosomes line up along the equator of the cell. The spindle fibres attach to the chromosomes at a point in the middle of the chromosomes called the centromere.	

Cell Division Mark Scheme

Anaphase The spindle fibres shorten, this pulls one copy of each chromosome to either pole of the cell. Telophase The nuclear membrane reforms. The spindle fibres breakdown. The cells split into two in a process called cleavage. Products Two, genetically identical, diploid daughter cells.	
	Total: 6 marks

Edexcel 2014 Higher Paper 2 Q5 b

4. The figure below shows mitosis occurring in some plant cells.
- a. The cells in the figure above were taken from a rapidly growing part of a plant. Which part of a plant has rapidly dividing cells?

C – meristem.	(1)
	Total: 1 mark

- b. Which stage of mitosis is shown in cell R?

B – metaphase.	(1)
	Total: 1 mark

- c. Describe two genetic similarities of the new cells that would be produced by cell Q in the figure above.

Same genes/ DNA/ chromosomes/ alleles.	(1)
Accept they are (genetically) identical.	
Diploid.	(1)
	Total: 2 marks

Edexcel 2018 Foundation Paper 1 Q6 b i, ii & iii

Cell Division Mark Scheme

5. A fertilised egg cell divides many times to form an embryo.

a. Name this type of cell division.

Mitosis	(1)
	Total: 1 mark

After a baby is born, stem cells may be collected from the umbilical cord. These can be frozen and stored for possible use in the future.

b. What are stem cells?

Any two from:	
Cells that are able to divide.	(1)
Undifferentiated cells / not specialised.	(1)
Can become other types of cells / tissues or become specialised /differentiated.	(1)
	Total: 2 marks

c. Suggest why it is ethically more acceptable to take stem cells from an umbilical cord instead of using stem cells from a 4-day-old embryo produced by In Vitro Fertilisation (IVF).

4-day embryo is a (potential) human life or destroying/damaging (potential) human life.	
	Total: 1 mark

d. Stem cells taken from a child's umbilical cord could be used to treat a condition later in that child's life.

Give one advantage of using the child's own umbilical cord stem cells instead of using stem cells donated from another person.

Perfect tissue match or hard to find suitable donors.	(1)
Allow same/matching antigens.	
Allow no danger of rejection.	
Allow no need to take immunosuppressant drugs (for life).	
	Total: 1 mark

Cell Division Mark Scheme

6. When a cell divides by mitosis the new cells are genetically identical.

What causes the cells to be genetically identical?

The DNA / chromosomes / genes are replicated / copied / multiplied / doubled / duplicated.	(1)
	Total: 1 mark

AQA 2015 Higher Paper 2 Q3 a ii