

Mark schemes

1.

(a) nucleus

1

(b) gene(s)

allow allele(s)

1

(c) copying of chromosomes

1

(d) mitochondria

1

(e) 60 – 45

or

120 – 105

1

15 (minutes)

1

an answer of 15 (minutes) scores 2 marks

(f) C

1

(g) 8

1

(h) to repair tissues

1

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2.

(a) **C**

1

(b) cytoplasm **and** cell membrane dividing

accept cytokinesis for 1 mark

1

to form two identical daughter cells

1

(c) stage 4

1

only one cell seen in this stage

1

(d) $(4 / 36) \times 16 \times 60$

1

107 / 106.7

1

110 (minutes)

allow 110 (minutes) with no working shown for 3 marks

1

(e) binary fission

do **not** accept mitosis

1

(f) shortage of nutrients / oxygen

1

so cells die

or

death rate = rate of cell division

1

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3.

(a) comparisons are **not** required but should be credited

accept a clear indication of the statement even if incomplete

can develop into most other types of cell

1

each cell divides every 30 minutes

1

low chance of rejection by the patient's immune system

1

(b) any **three** from:

- cheaper / only costs £1000

this **must** be comparative

ignore costs £1000

- can collect many (stem) cells

- adults give permission for their own bone marrow to be collected

comparisons are not required but should be credited

- safe

3

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4.

(a) 23

1

(b) chromosome nucleus gene cell
2 3 1 4

1

- (c) (i) any **one** from
(cells which are bigger) take up more space
(cells) have to get bigger **or** mature to divide

1

- (ii) chromosomes duplicate **or**
make exact copies of self
accept forms pairs of chromatids

1

nuclei divide
*accept chromatids **or**
chromosomes separate*

1

identical (daughter) cells formed
*accept for example, skin cells make
more skin cells **or** cells are clones*

1

- (d) any **two** from

Differentiation mark

babies need **or** are made of different types of cells **or** cells that have
different functions

*accept different cells are needed
for different organs*

Division or specialisation mark

as fertilised egg starts to divide each cell specialises to form a part of the body

*accept specialised cells make
different parts of the body*

Growth mark

specialised cells undergo mitosis to grow further cells

*accept cells divide **or** reproduce
to form identical cells*

2

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5.

- (a) nucleus labelled correctly

1

cell membrane labelled correctly

1

- (b) mitosis

1

- (c) electron (microscope)

1

(d) higher magnification

1

(e) 45 (mm)

1

45 / 250 **or** 0.18 (mm)

allow ecf

1

180 (μm)

1

allow 180 (μm) with no working shown for 3 marks

(f) 0.2 μm

1

[9]