

Cell Division

Mark Scheme

Level	GCSE (9-1)
Subject	Combined Science: Trilogy - Biology
Exam Board	AQA
Topic	4.1 Cell Biology
Sub-Topic	Cell Division
Difficulty Level	Bronze Level
Booklet	Mark Scheme

Time Allowed: 52 minutes

Score: /51

Percentage: /100

Grade Boundaries:

M1.(a) mitosis

extra box ticked negates mark

1

(b) cell division is uncontrolled

extra box ticked negates mark

1

(c) any **one** from:

- smoking / tar
- alcohol
- carcinogens

allow named chemical

- viruses (living in cells)
- (ionising) radiation

accept UV / X-rays / gamma waves

1

(d) bar plotted at 78%

ignore width of bar

1

(e) testicular

extra box ticked negates mark

1

(f) prostate

extra box ticked negates mark

1

(g) any **two** from:

- improved treatment / drugs
- earlier diagnosis

- more cancer screening
- improved patient knowledge (of risk factors)
allow improved patient diet / lifestyle

2

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M2.(a) **A** = nucleus

allow phonetic spelling

1

B = (cell) membrane

1

- (b) for repair / growth **or** to replace cells
ignore new cells / skin

1

- (c) (i) embryos

1

- (ii) paralysis

1

[5]

M3.(a) (i) fertilisation

1

- (ii) in sequence:

accept 1 next to gene, 2 next to chromosome and 3 next to nucleus in box

- 1 gene
- 2 chromosome
- 3 nucleus

*allow 1 mark for smallest **or** largest in correct position*

2

- (iii) DNA

1

(b) (i) On diagram:

tick drawn next to **X** and / or **Y** from Parent 1
tick(s) must be totally outside grid squares
allow ticks around “parent”
extra ticks elsewhere cancel

1

(ii) 0.5 / $\frac{1}{2}$ / 50% / 1:1 / 50:50 / 1 in 2
allow 2/4 / 2 in 4 / 2 out of 4 / ‘even(s)’ / ‘fifty – fifty’
*do **not** allow 1:2 or ‘50 / 50’ or ‘50 – 50’*

1

2 (out of 4) boxes are **XX**

or

half of the sperm contain an **X**-chromosome
*allow **XY** is male and 2 (out of 4) boxes are **XY***

1

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M4.(a) (i)

Feature	Mitosis only	Meiosis only
Produces new cells during growth and repair	✓	
Produces gametes (sex cells)		✓
Produces genetically identical cells	✓	

All 3 correct = **2** marks

2 correct = **1** mark

0 or 1 correct = **0** marks

2

(ii) (a man) testis / testes
accept *testicle(s)*

1

(a woman) ovary / ovaries
do **not** accept 'ova' / ovule

1

(b) (i) XY / YX **or** X and Y

1

(ii) XX **or** X and X or 2 X's
accept X

1

(c) $\frac{1}{2}$ / 0.5 / 50% / 1:1 / 1 in 2
do **not** accept 1:2 / 50/50
allow 50:50
allow 2 in 4

1

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M5. (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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M6. (a) asexual

1

(b) mitosis

1

(c) genes

1

[3]

M7. (a) 2 and 3

1

(b) cell **P** has an X chromosome; cell **R** has a Y chromosome

1

- (c) any **two** from:
- (formed from) different egg / 2 eggs
 - (formed from) different sperm / 2 sperm
 - have different genes / alleles / chromosomes / DNA
allow genetics
- 2
- (d) (i) stem cells
- 1
- (ii) the cells divide
- 1
- the cells differentiate
- 1
- (iii) (medical) research / named eg growing organs
or
medical / patient treatment
allow (embryo) cloning
*do **not** allow designer babies / more babies*
- 1
- (iv) any **one** from:
- ethical / moral / religious objections
ignore cruel / not natural / playing God
 - potential harm to embryo
allow deformed
ignore harm to mother
- 1

[9]

M8. (a) chromosomes

1

- (b) diagram showing four separate chromosomes two long and two short (as in diagram 1)

*allow each chromosome shown as two joined chromatids
do **not** allow if chromosomes touching each other*

1

- (c) (i) any **two** from:

- can grow into any type of tissue / named tissue
- used in medical research
- used to treat human diseases
- large numbers can be grown

2

- (ii) any **two** from:

- expensive
- grow out of control / ref cancers
- may be rejected
- need for drugs (for rest of life)

2

[6]