

MARK SCHEME

GCSE

BIOLOGY

AQA - TRIPLE SCIENCE

B6 - TEST 2

GENETICS

Beginner

Mark schemes

1.	(a) DNA	1	
	(b) X and Y	1	
	(c) (i) 46 chromosomes	1	
	(ii) half the number	1	
	(d) meiosis	1	
			[5]
2.	(a) (i) 23	1	
	(ii) nucleus / 'the head' <i>allow phonetic spelling</i>	1	
	(b) (i) X and X	1	
	(ii) X and Y	1	
	(c) 150 million / 150,000,000 / half (of them) / 50% / 1 in 2	1	
			[5]
3.	(a) 1 egg	1	
	2 embryo	1	
	3 nucleus	1	
	4 skin cell	1	
	(b) the child created by cloning would not have been able to give permission <i>extra boxes ticked cancels the mark</i>	1	
			[5]

4.

- (a) (organism) soft-bodied
allow lack hard parts / skeleton / shell
allow (organism) eaten / decayed

or

- (fossil) destroyed
allow buried (very) deep
allow they are (very) small

1

- (b) any **two** from:
- the fish (dies) buried in sediment / sand / mud
allow other examples of sediments
*do **not** accept rock(s)*
 - (only) the soft parts decayed / eaten **or** the hard parts / bones did not decay or were not eaten
 - mineralisation occurred
allow description of mineralisation e.g. bones turned to stone
allow imprinted (in the sediment)

2

- (c) any **two** from:
- ignore pollution*
 - drought
 - ice age / global warming
 - volcanic activity
allow earthquakes / tsunami
 - asteroid / meteor collision
 - (new) predators
allow hunters / poachers
allow eaten
 - (new) disease / named pathogen
 - competition for food
allow lack of food
 - competition for mates
allow isolation or lack of mates
 - lack of habitat or habitat change
if no other marks awarded allow natural disaster / climate change / weather change / catastrophic event / environmental change for 1 mark

2

- (d) a change in a gene

1

(e) there is variation (between members of a species)

allow mutation

1

better adapted survive

allow 'survival of the fittest'

1

(reproduce and) pass on (favourable) allele(s) / gene(s) / mutation(s) / DNA / genetic material

ignore pass on characteristic(s)

1

allow in terms of an example

[9]

5.

(a) (i) gamete(s)

ignore reproductive cells

1

(ii) womb / uterus

allow phonetic spellings

1

(b) (i) are formed from the same original embryo

1

(ii) embryo transplantation

1

(iii) any **one** from:

- (calves will have some) genes / DNA from bull / sperm

allow not all genes from the cow

- idea that sexual reproduction produces variation

allow may be male

allow idea that gene for low fat milk may not be passed on

1

[5]

6.

(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 / ½ / 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

[7]

7.

(a) sexual reproduction

1

(b) (i) genes

1

(ii) gametes

1

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

answers must be comparative

- more meat (per cow)

ignore bigger unqualified

- more milk each day

- can be milked for more time after giving birth / greater proportion of time

accept '(produce) more milk', for 1 mark, if neither more milk each day nor can be milked for more time after giving birth are given

2

(ii) (milk contains) more protein

answers must be comparative

1

less time before having a calf when no milk produced

1

- (d) (i) genes from one organism are transferred to a different organism 1
- (ii) (possible) harm to babies' long term health
allow don't know long-term / side effects (on baby)
accept idea that there may be other things in (genetically engineered) cow's milk that might harm babies' health e.g. bacteria
ignore ethical / religious arguments 1

[9]

- 8.** (a) (i) gametes
apply list principle 1
- (ii) chromosomes
apply list principle 1
- (b) (i) The allele is recessive
no mark if more than one box is ticked 1
- (ii) two
apply list principle 1
- (c) (i) **A**
apply list principle 1
- (ii) **B**
apply list principle 1

[6]

9.

(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) 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

[7]

10.

(a) (i) 1

fertilisation / fusion

allow sexual reproduction

allow fertilise / fuse

ignore joining

1

1

- (b) (i) **Dd** 1
- (ii) **dd** 1
- (c) (i) 1 in 2 1
- (ii) 0 1

[6]

11.

- (a) (i) any **one** from:
 • A
 • C 1
- (ii) any **one** from:
 • B
 • D 1
- (b) (i) pig A 1
- (ii) a gamete 1
- (c) XY **or** YX 1
- X Y 1
- XY **or** YX
in this order only 1

[7]