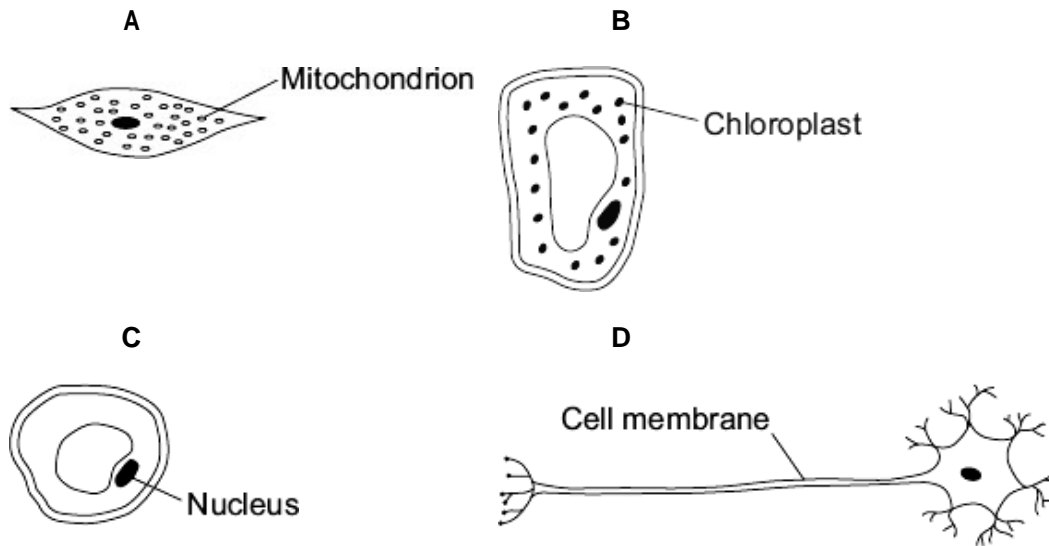


Q1. The diagrams show four cells, **A**, **B**, **C** and **D**.



Use letters **A**, **B**, **C** or **D** to answer these questions.

(a) Which cell can photosynthesise?

(1)

(b) Which cell is adapted for receiving and sending information?

(1)

(c) Which cell is adapted to respire quickly?

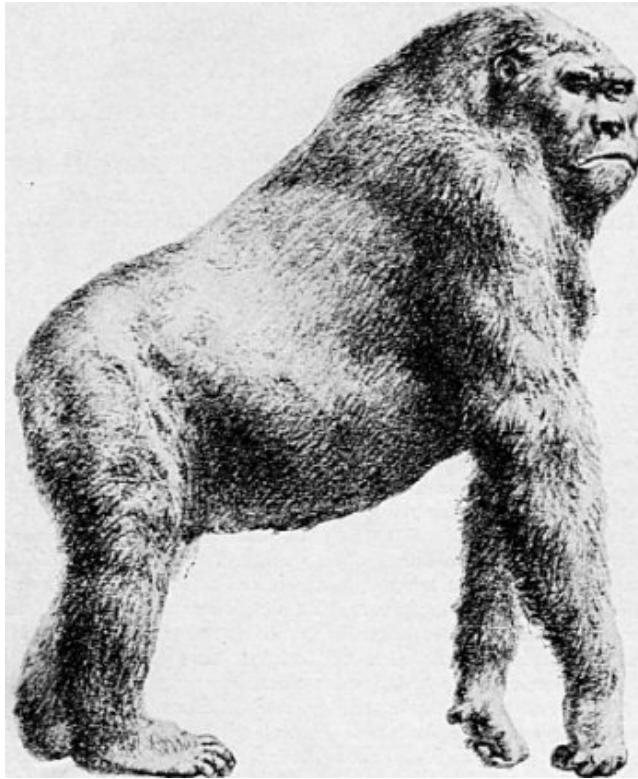
(1)

(Total 3 marks)

##

Read the article from a recent newspaper.

'King Kong' with inch-wide teeth who walked alongside early man.



Gigantopithecus blackii, R F Zallinger

The largest ape that walked on Earth was a prehistoric animal that weighed up to 540 kg. It was 3 metres tall and had inch-wide teeth. This giant ape roamed bamboo forests until 100 000 years ago. It is quite likely that the giant ape lived at the same time as early humans.

(a) What evidence might scientists have that the great ape existed?

.....
.....

(1)

(b) The drawing is an artist's impression of what the giant ape might have looked like. Why do scientists not know exactly what the animal looked like?

.....
.....

(1)

(c) Scientists do not know why this giant ape became extinct.

Suggest **two** reasons why this giant ape became extinct.

1

.....

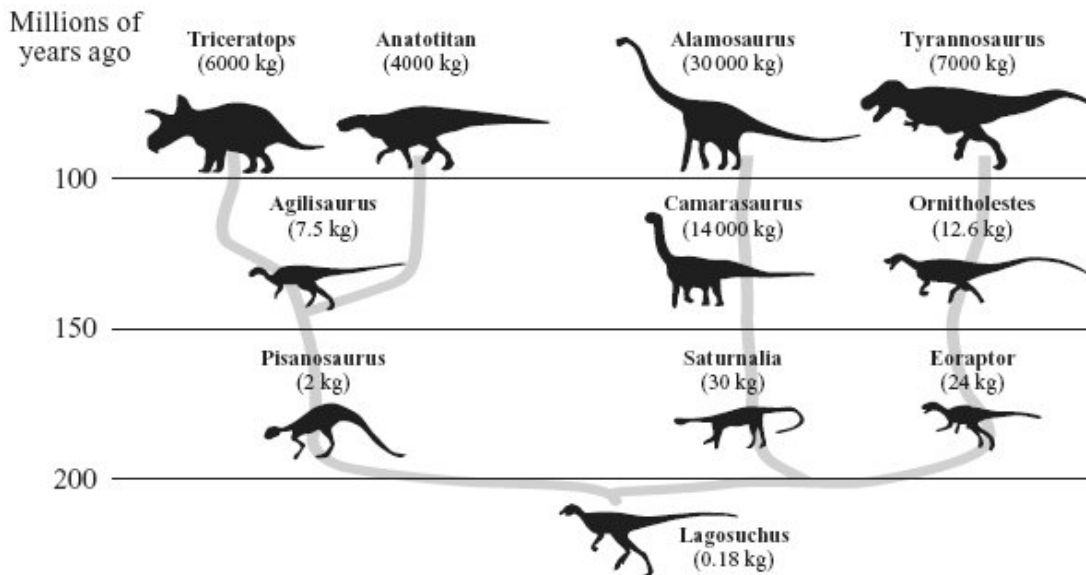
2

.....

(2)
(Total 4 marks)

Q3. The diagram shows a timeline for the evolution of some dinosaurs.

The mass of each dinosaur is shown in the brackets by its name.



(a) Name **one** dinosaur which lived between 100 and 150 million years ago.

.....

(1)

(b) Which dinosaur did Ornitholestes evolve from?

.....

(1)

(c) Apart from body size and mass, give **one other** difference between Lagosuchus and Alamosaurus.

.....

.....

(1)

(d) (i) Which dinosaur had the largest mass?

.....

(1)

(ii) What happened to the mass of dinosaurs during evolution?

.....

.....

(1)

(e) We know about dinosaurs from their fossils.

Describe **one** way in which fossils are formed

.....

.....

(1)

(f) Complete the sentence by using the correct words from the box.

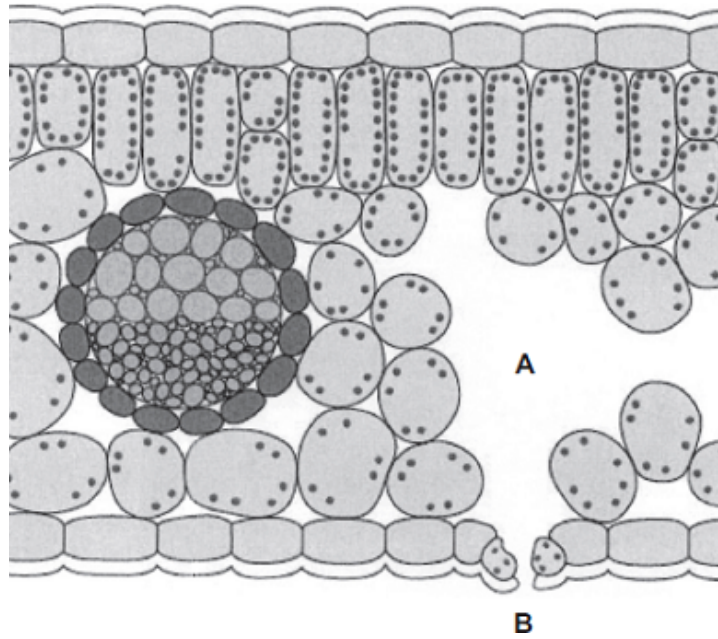
billion	complex	large	million	simple	thousand
----------------	----------------	--------------	----------------	---------------	-----------------

The theory of evolution states that all species of living things have evolved from life forms which first developed more than three years ago.

(2)

(Total 8 marks)

Q4. The diagram shows a section through a plant leaf.



(a) Use words from the box to name **two** tissues in the leaf that transport substances around the plant.

epidermis	mesophyll	phloem	xylem
-----------	-----------	--------	-------

..... and

(1)

(b) Gases *diffuse* between the leaf and the surrounding air.

(i) What is *diffusion*?

.....

(2)

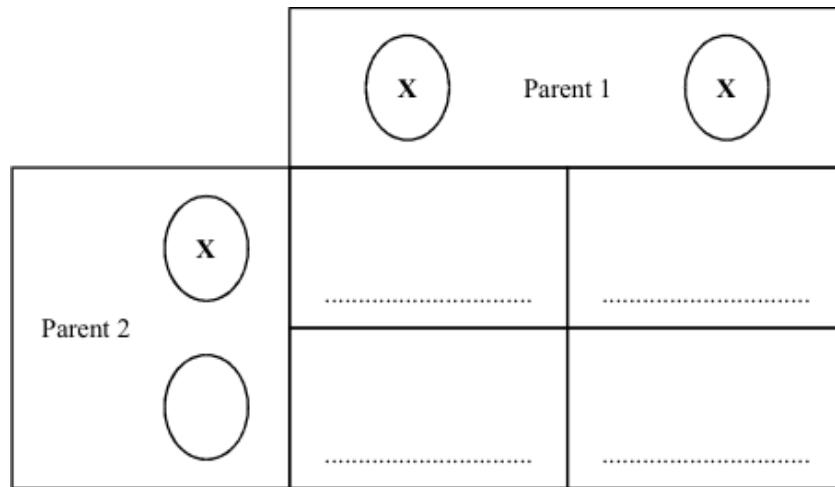
(ii) Name **one** gas that will diffuse from point **A** to point **B** on the diagram on a sunny day.

.....

(1)

(Total 4 marks)

Q5. The chromosomes for determining the gender or sex of a person are labelled **X** and **Y**.



(a) Complete the Punnett Square to show the genotype of parent 2 and of the four offspring.

(3)

(b) Which parent is the mother?

.....

(1)

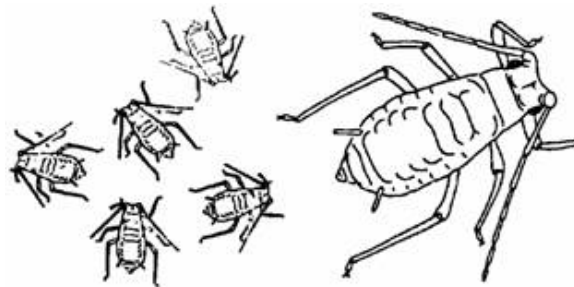
(c) What are the chances of getting a baby boy?

.....

(1)

(Total 5 marks)

Q6. The bean aphid is a type of black-fly which lives on broad bean plants in summer. In the autumn, males and females mate and produce eggs.



(a) Name the type of reproduction which produces the eggs.

.....

(1)

(b) In spring these eggs hatch. The young aphids are all female. Explain why they are all similar but not identical to each other.

.....

(1)

(c) These females are then able to produce offspring without needing any males.

(i) Name the type of reproduction where females do **not** need males to produce offspring.

.....

(1)

(ii) How will the offspring from one of these females:

A compare with each other

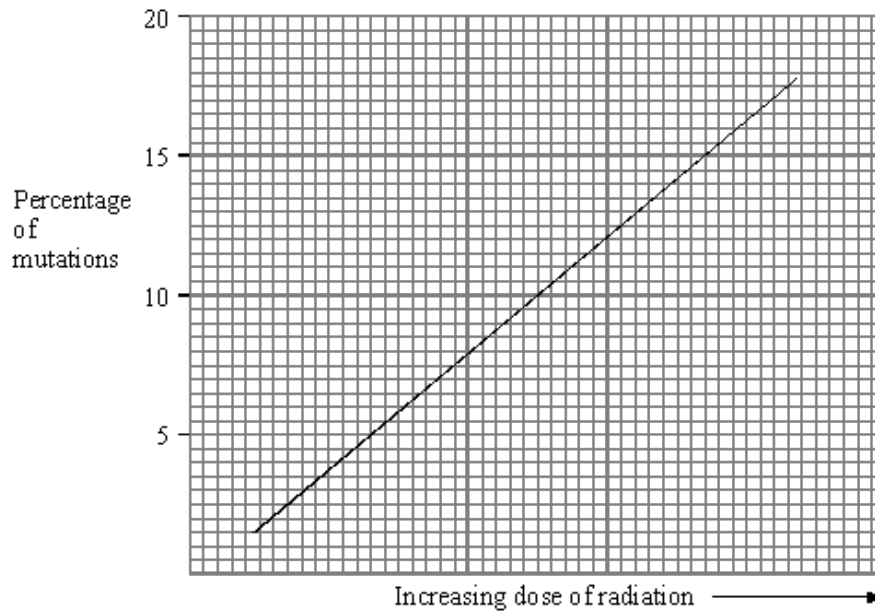
.....

B compare with the offspring from other females?

.....

(2)

(d) Some scientists investigated mutations in these aphids. They exposed the aphids to X-rays. They plotted their results.



(i) What was the connection between the dose of X-rays and the percentage of mutations?

.....

(1)

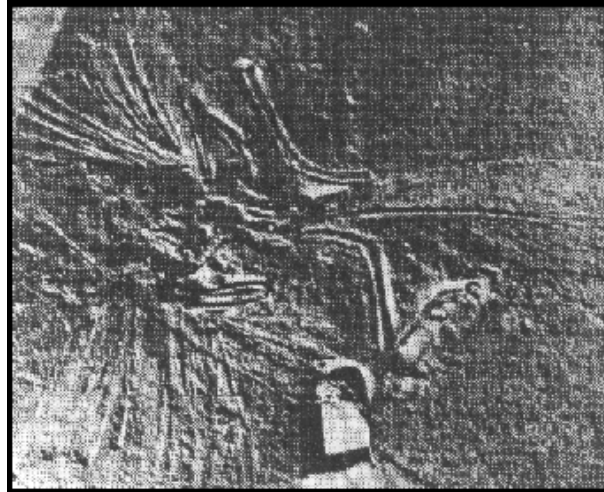
(ii) Name **one** other possible cause of mutations.

.....

(1)

(Total 7 marks)

Q7. The picture shows a fossil.



(a) (i) What is a fossil?

.....
.....
.....

(3)

(ii) Describe **one** way in which fossils are formed.

.....
.....
.....

(2)

(b) We only know about extinct animals and plants because they have left fossils.
What does the word “extinct” mean?

.....
.....

(1)

(Total 6 marks)

Q8. (a) Use words from the list to complete the sentences.

alleles chromosomes gametes genes mutations

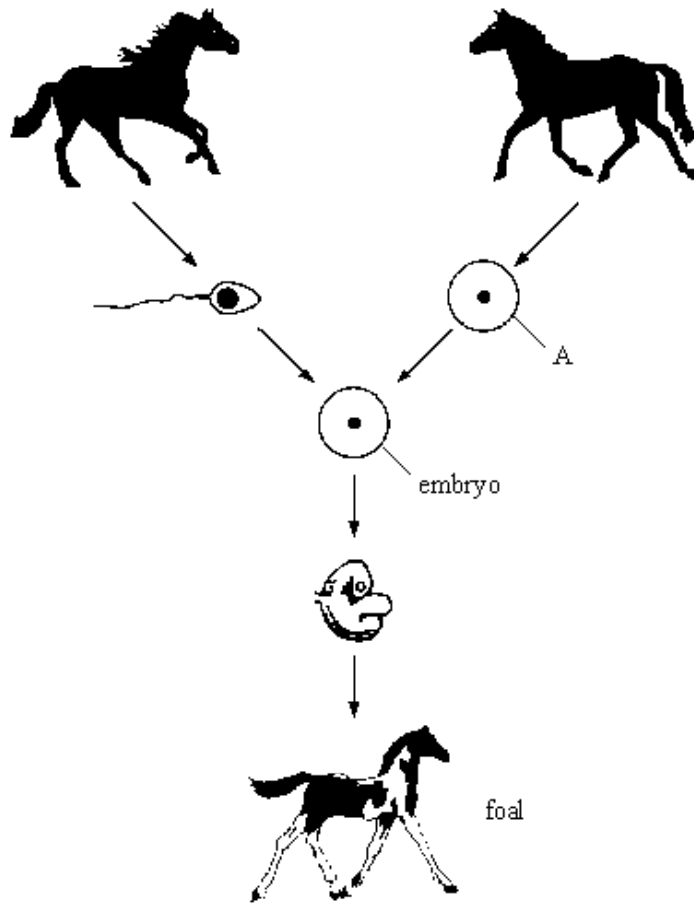
The nucleus of a cell contains thread-like structures called

The characteristics of a person are controlled by

which may exist in different forms called

(3)

(b) The drawing shows some of the stages of reproduction in horses.



(i) Name this type of reproduction

(1)

(ii) Name the type of cell labelled A

(1)

(c) When the foal grows up it will look similar to its parents but it will **not** be identical to either parent.

(i) Explain why it will look similar to its parents.

.....
.....

(1)

(ii) Explain why it will **not** be identical to either of its parents.

.....

.....

.....

.....

(2)
(Total 8 marks)

Q9. Cystic fibrosis is an inherited disorder that can seriously affect health.

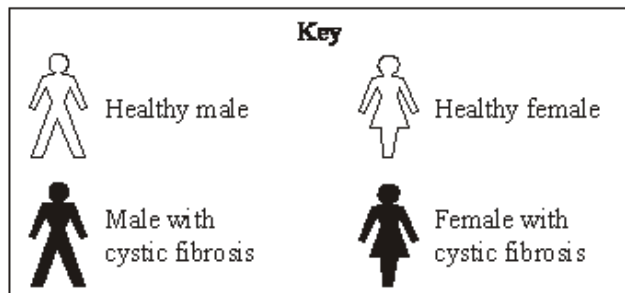
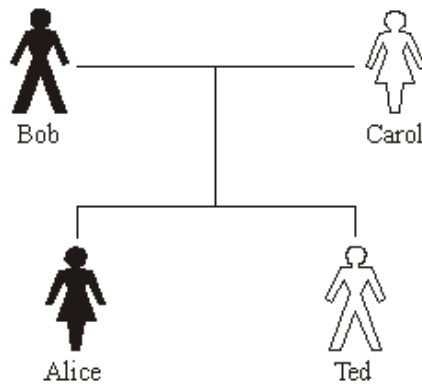
(a) Which **one** of these is affected by cystic fibrosis?

Draw a ring around your answer.

blood cell membranes kidneys nervous system

(1)

(b) The diagram shows the inheritance of cystic fibrosis in a family. The allele that produces cystic fibrosis is recessive.



(i) Explain why Alice inherited cystic fibrosis.

.....
.....
.....
.....

(2)

(ii) Explain why Ted did **not** inherit cystic fibrosis.

.....
.....
.....
.....

(2)

(c) Bob and Carol know that there is a risk that their next baby will have cystic fibrosis.

Embryos can be screened for the allele that produces cystic fibrosis.

Many people support the screening of embryos, but others do not.

(i) Suggest **one** reason why many people support the screening of embryos for the cystic fibrosis allele.

.....
.....
.....

(1)

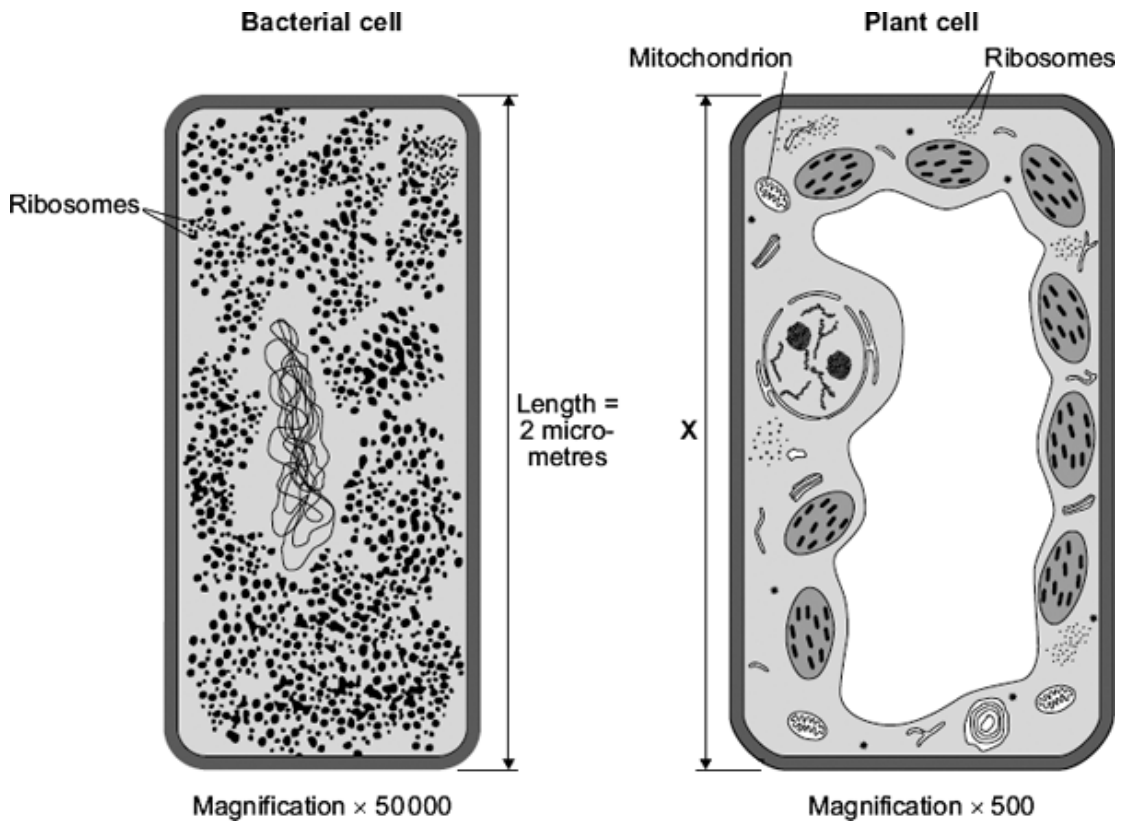
(ii) Suggest **one** reason why many people are against the screening of embryos for the cystic fibrosis allele.

.....
.....
.....

(1)

(Total 7 marks)

Q10. The diagram shows two cells, a bacterial cell and a plant cell.



(a) (i) Both the bacterial cell and the plant cell contain ribosomes.

What is the function of a ribosome?

.....

(1)

(ii) The plant cell contains mitochondria but the bacterial cell does **not** contain mitochondria.

Give **one** other way in which the plant cell is different from the bacterial cell.

.....

(1)

- (b) (i) Both cells are drawn the same length, but the magnification of each cell is different.

The real length of the bacterial cell is 2 micrometres.

Calculate the real length, **X**, of the plant cell. Give your answer in micrometres.

Show clearly how you work out your answer.

.....
.....
.....

X = micrometres

(2)

- (ii) Most mitochondria are about 3 micrometres in length.

The plant cell contains mitochondria but the bacterial cell does **not** contain mitochondria.

Use your answer to part (b)(i) and the information in the diagram to suggest why.

.....
.....

(1)

(Total 5 marks)

M1. (a) B 1

(b) D 1

(c) A 1

[3]

M2. (a) fossils / teeth / bones / skeleton / foot prints
allow cave drawings
*do **not** accept scientists have seen them* 1

(b) only (some) bones remain / soft parts have decayed
accept 'no-one has ever seen one'
allow no photos, no pictures, no drawings 1

(c) any **two** from:

- hunted by human
- (new) predator
allow more predators
- (new) competitor
- (new) disease
- environment changed / named environmental change
allow natural disaster
- prey extinct / loss of food supply
ignore not enough food

2

[4]

M3. (a) agilisaurus / camarasaurus / ornitholestes 1

(b) eorapter
allow lagosuchus 1

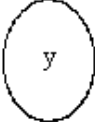
- (c) lagusuchus (it) walks on hind limbs / two limbs / alamosaurus has longer neck / lagusuchus has back legs longer than front but alamosaurus has the reverse 1
- (d) (i) alamosaurus 1
- (ii) increased 1
- (e) from hard parts / bones / imprints
e.g. footprints / parts replaced by other materials / conditions for decay absent or example
buried is neutral 1
- (f) simple 1
- billion 1

[8]

- M4.** (a) xylem **and** phloem
either order
allow words ringed in box
allow mis-spelling if unambiguous 1
- (b) (i) movement / spreading out of particles / molecules / ions / atoms
ignore names of substances / 'gases' 1
- from high to low concentration
accept down concentration gradient
ignore 'along' / 'across' gradient
ignore 'with' gradient 1
- (ii) oxygen / water (vapour)
allow O₂ / O2
ignore O² / O
allow H₂O / H2O
ignore H²O 1

[4]

M5.

(a)  clearly labelled 'y'

1

mark the offspring in two horizontal rows

1 mark for each fully correct row

allow transferred error if parent 2 is incorrect

XX XX

1

XY XY

accept YX

1

(b) parent 1

accept XX

1

(c) 50:50

or

equal **or** even

or

1:1 **or** 50%

accept 1/2 **or** 2/4

1

[5]

M6.

(a) sexual / sex

for 1 mark

1

(b) *idea that*

sexual reproduction brings about a mixture of genes
or similar / different genes / parents / gametes / DNA /
characteristics / chromosomes (*not* features)

for 1 mark

1

- (c) (i) asexual / cloning (*allow vegetative*)
for 1 mark 1
- (ii) (A) *idea that* (they are exactly the same). *Do not allow similar or just one named feature.*
for 1 mark 2
- (b) different (*allow similar but do not allow same*).
Allow any one named difference
for 1 mark
- (d) (i) greater the X-ray dose, greater the % of mutations
or % of mutations increases steadily / in proportion to X-ray dose
for 1 mark 1
- (ii) ionising radiations / ultra-violet light / alpha particles / beta particles
/ gamma rays / radio activity / chemicals / drugs / smoking / natural
in meiosis / spontaneous / cell replication / toxic waste / pollution
1
- Accept radioactivity but not radiations alone.*
for 1 mark

[7]

- M7.** (a) (i) *ideas that*
- remains of animal/plant of specific organism
 - (from) many years ago/thousands or millions of years
 - found in rocks/covered by sediments
- for 1 mark each*
Mark (a) as a whole to a total of 5 marks. 3
- (ii) *ideas that*
- hard parts/bones/shells/skeletons
link required
 - don't decay
- or**
- no decay
link required
 - conditions needed absent/no oxygen/no water

or

- parts replaced by rock mineral chemicals;
Do not accept 'materials' or 'substances'.
- as they decay
Accept 'hard' or 'soft' parts for 1 mark each

2

(b) *idea*

died out/none left/died off

*Do not accept 'died' alone
for 1 mark*

1

[6]

M8. (a) chromosomes
genes (reject alleles)
alleles
for 1 mark each

3

(b) (i) sexual / sex
for one mark

1

(ii) egg / gamete / sex cell / ovum (reject ovule)
for one mark

1

(c) (i) information / genes / DNA passed from parents (reject chromosomes)
for one mark

1

(ii) genes / genetic information / chromosomes from two parents
alleles may be different
environmental effect / named may have been mutation
any two for 1 mark each

2

[8]

M9. (a) cell membranes

1

(b) (i) two recessive / cystic fibrosis / faulty / diseased / the allele(s) / genes
two can be implied by second marking point
ignore chromosomes 1

from Bob **and** Carol / both parents / the parents
if no other marks awarded 'Carol is a carrier' gains 1 mark 1

(ii) (inherited) dominant / normal allele / gene 1

from Carol / mother
ignore references to recessive allele / gene from father / Bob
if no other marks awarded he has just / only one recessive allele
gains 1 mark 1

(c) (i) reduce number of people with cystic fibrosis (in population)

or

reduce health-care costs

or

expensive to have baby with cystic fibrosis

accept to allow decision / emotional argument qualified
eg allows abortion

or

allows people to make choices about termination

or

help to prepare financially / emotionally etc 1

(ii) any **one** from:

- possible damage / risk to embryo / fetus / baby
allow possible harm / risk to mother
- screening / it is expensive
- (may) have to make ethical / moral / religious decisions
ignore not natural / playing God / unethical / immoral / religious unqualified
- right to life

1

[7]

M10. (a) (i) makes / produces / synthesises protein / enzyme

1

- (ii) plant cell has nucleus / vacuole / chloroplasts / chlorophyll
or plant cell is much larger

'It' = plant cell

allow correct reference to DNA or chromosomes

allow plant cell has fewer ribosomes

allow cellulose (cell wall)

1

- (b) (i) 200

correct answer with or without working gains 2 marks

*if answer incorrect, allow 1 mark for $\frac{2 \times 50,000}{500}$ or $\frac{100,000}{500}$
or 100*

2

- (ii) bacterial cell is too small / bacterial cell about same size as a
mitochondrion / 'no room'

ignore references to respiration

1

[5]

