

1)

Large animals, such as mammals, need efficient transport systems.

(a) Fig. 3.1 shows a section through the mammalian heart.

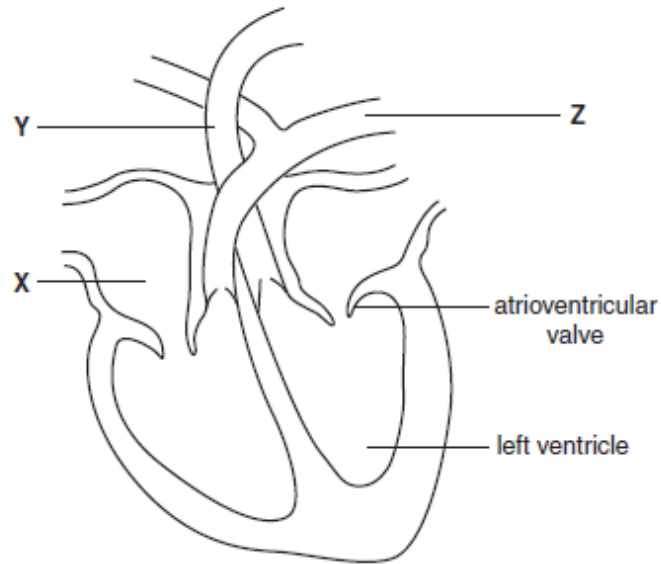


Fig. 3.1

(i) Name the parts labelled X, Y and Z.

X

Y

Z

[3]

(ii) Explain why the wall of the left ventricle is thicker than the wall of the left atrium.

[3]

.....

- (iii) Explain how pressure changes in the heart bring about the closure of the atrioventricular (bicuspid) valve.

..... [2]

- (b) The mammalian transport system is a double circulatory system.

An efficient circulatory system consists of a pump, a means of maintaining pressure, a transport medium and exchange surfaces.

State the component of the mammalian circulatory system that fulfils each of these roles.

The first one has been done for you.

- | | |
|-------------------------------|-------------------|
| pump | heart |
| means of maintaining pressure | |
| transport medium | |
| exchange surface | |

[3]

2)

Fig. 5.1 shows a spirometer, which is used to investigate lung function.

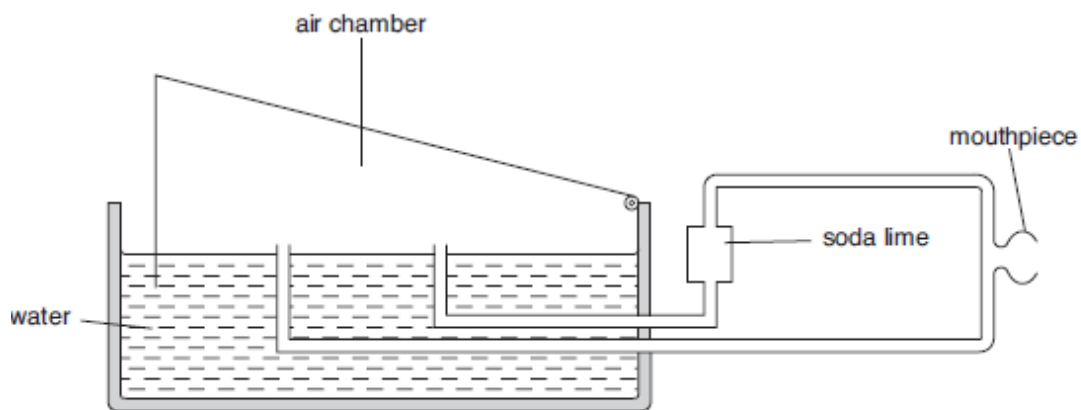


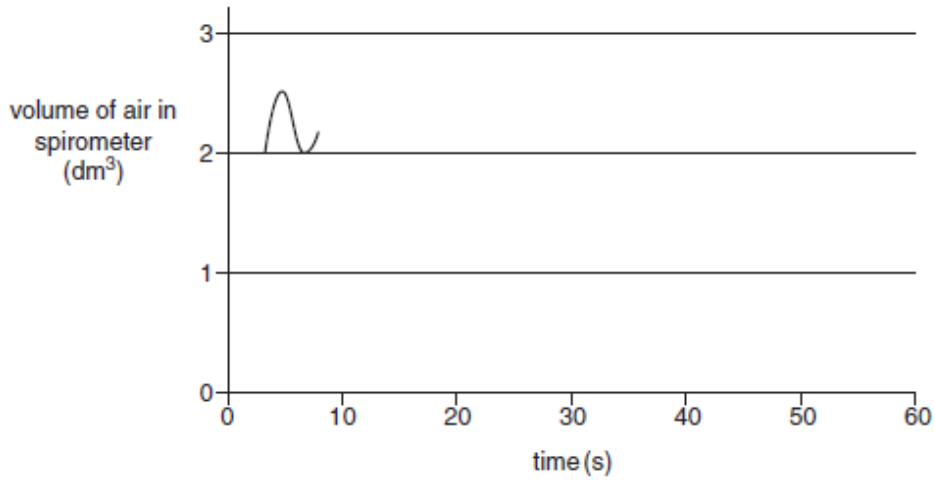
Fig. 5.1

- (a) (i) Describe how the spirometer would be used to measure tidal volume.

..... [3]

..

- (ii) Using the axes below, complete the spirometer trace that you expect to see recorded from a healthy sixteen year old over **ten further breaths**, while at rest.



[2]

- (iii) Describe how you could use a spirometer trace to measure the rate of oxygen uptake.

..... [3]

- (b) Suggest **two** factors that should be considered when carrying out a risk assessment for an experiment using a spirometer.

..... [2]

3)

The condition known as AIDS is widespread in some parts of the world.

- (a) (i) Identify the infective agent that causes AIDS.

..... [1]

- (ii) The government has introduced needle exchange programmes for drug users.

Explain how this may help reduce the transmission of AIDS. [2]

(b) Fig. 1.1 shows a simplified diagram of the structure of the infective agent that causes the condition known as AIDS.

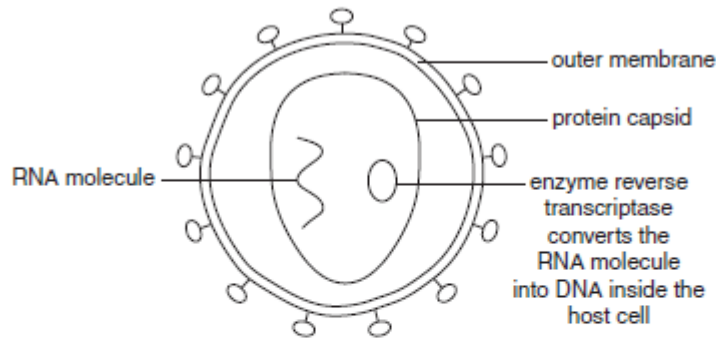


Fig. 1.1

(i) The proteins in the capsid and the RNA molecules are polymers. Polymers are made up of smaller monomer subunits.

Name the monomers that make up:

proteins

RNA [2]

(ii) The infective agent that causes AIDS takes control of the T lymphocytes of the host.

Using the information in Fig. 1.1, suggest why the infective agent is able to 'take control' once it has entered the T lymphocytes.

..... [2]

(c) People with AIDS frequently become ill following infection with opportunistic diseases such as tuberculosis (TB).

(i) State **three** factors that increase the chance of infection with TB.

1

2

3 [3]

(ii) When an infection occurs, some T lymphocytes produce cell signalling molecules called cytokines. These cytokines stimulate specific groups of B lymphocytes to divide.

Describe how cytokine molecules can stimulate specific groups of B lymphocytes to divide.

..... [3]

CHERRY HILL TUITION OCR BIOLOGY AS PAPER 11

Part of the Cairngorms National Park in the Scottish Highlands is at an altitude of approximately 1000 metres. It presently supports a range of plants and animals including some that are normally found in sub-arctic conditions.

Table 3.1 shows the breeding success of a number of bird species between 1970 and 2000. Specialist sub-arctic species are marked with an asterisk *.

Table 3.1

species	number of young raised per year			
	1970	1980	1990	2000
snow bunting *	78	69	36	2
Lapland bunting *	7	3	0	0
ptarmigan *	1280	1134	960	876
red grouse	890	920	933	962
wheatear	209	240	190	231
meadow pipit	23	45	48	82
ring ouzel	23	21	29	26
dotterel *	45	43	39	35

* = specialist sub-arctic species

- (a) (i) Using the data in Table 3.1, compare the breeding success of the sub-arctic species and the non sub-arctic species between 1970 and 2000.

[3]

.....

(ii) Suggest **two** reasons for the trends described.

..... [2]

(b) A study of insects was carried out in the same area of the Cairngorms National Park to determine species richness.

(i) What is meant by species richness?

..... [1]

(ii) The insects were sampled using a sweep net method. Fig. 3.1 shows a sweep net being used. With this method, a net is swept through the vegetation. Insects are removed, identified and counted.

(ii) The insects were sampled using a sweep net method. Fig. 3.1 shows a sweep net being used. With this method, a net is swept through the vegetation. Insects are removed, identified and counted.

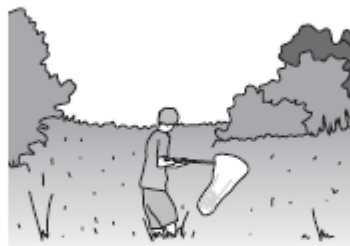


Fig. 3.1

Describe **three** ways in which the sampling procedure could be designed to try to make sure that a representative sample was obtained.

..... [3]

(iii) Species evenness also contributes to the measurement of biodiversity.

Explain the importance of species evenness in determining the biodiversity in a habitat.

..... [3]

5)

(a) The World Health Organisation has promoted the concept of health.

What is meant by the term *health*?

..... [2]

(b) The body has adaptations that provide it with a primary defence against the entry of pathogens and parasites.

State **two** features of the body that form part of the primary defence.

For each feature, explain how it **helps to prevent the entry** of pathogens and parasites into the body.

... [4]

13

(c) Fig. 4.1 shows the life cycle of the threadworm. This is a common parasite in young children.

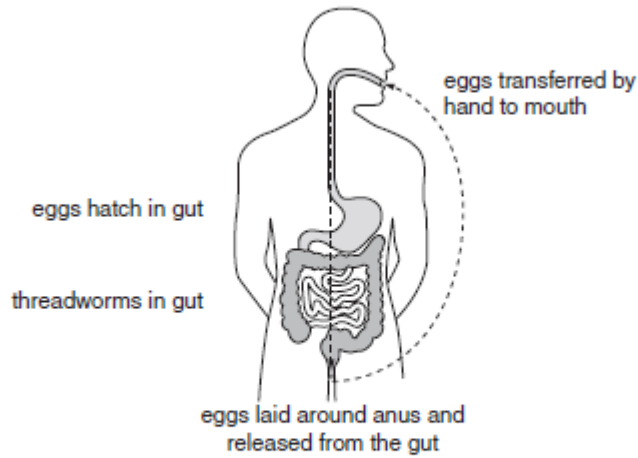


Fig. 4.1

(i) Define the term *parasite* and suggest how the threadworm benefits from this relationship.

..... [4]

(ii) Using the information in Fig. 4.1, suggest **two** ways in which the cycle of infection could be broken.

..... [2]

6)

DNA and RNA are nucleic acids.

(a) The table below contains a number of statements relating to nucleic acids.

Complete the table, using a letter **D**, **R** or **B**, to show whether each statement applies to:

- DNA only (**D**)
- RNA only (**R**)
- both DNA and RNA (**B**).

The first one has been done for you.

statement	DNA only (D) or RNA only (R) or both DNA and RNA (B)
contains thymine	D
contains ribose	
consists of two chains connected to each other with hydrogen bonds	
has a sugar-phosphate backbone	
has four different nitrogenous bases	
contains a pentose sugar	
is found in the nucleus and cytoplasm	

[6]

(b) It has been found that 98.4% of chimpanzee DNA is identical to that of a human.

(i) Suggest how the information obtained by DNA analysis can be useful to taxonomists.

..... [2]

(ii) State **two** types of evidence, other than biochemical evidence, that are used by taxonomists when classifying organisms.

..... [2]

- (c) Cytochrome C is a protein found in living organisms. The structure of cytochrome C varies between different organisms. However, closely related organisms have similar cytochrome C.

Fig. 5.1 shows a possible evolutionary tree for vertebrates. Common ancestors are indicated by the number 1 and various letters.

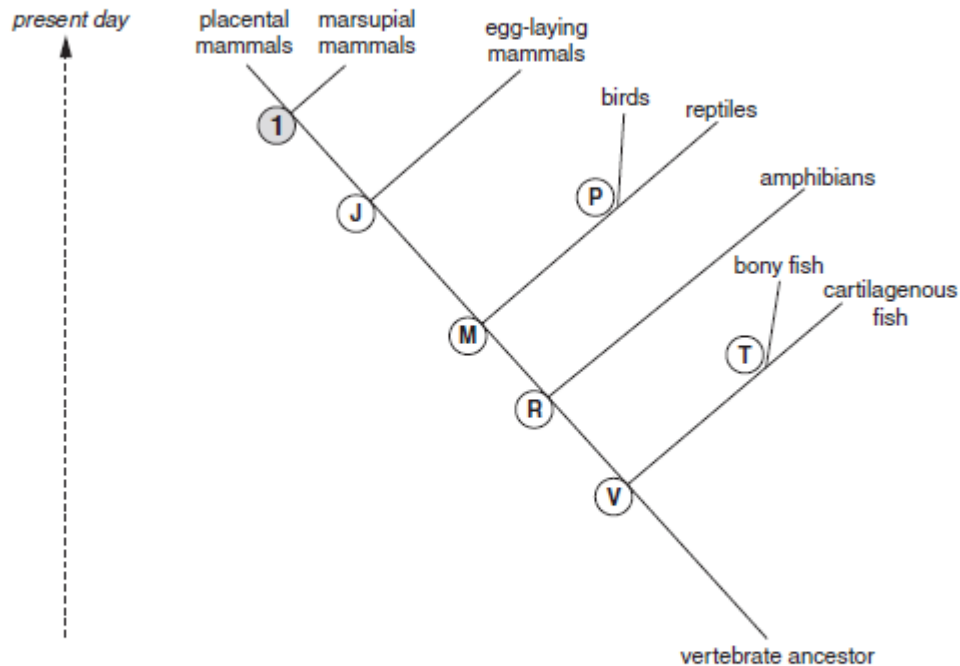


Fig. 5.1

State the **letter** of the common ancestor that has cytochrome C which will be:

most similar in structure to common ancestor 1

least similar in structure to common ancestor 1 [2]

- (d) The pine marten is a small mammal that is rare in the United Kingdom. Its numbers are particularly low in Wales and there have been few confirmed sightings of this animal in the past 50 years. There have been plans to introduce pine martens from other areas of the United Kingdom into Wales to increase the size of the population.

The DNA of museum specimens of Welsh pine martens in the National Museum of Wales was tested, the most recent specimens dating from 1948. The DNA analysis suggests that Welsh pine martens are genetically distinct from those found elsewhere in the United Kingdom.

- (i) The relevance of this analysis has been questioned by some scientists.

Suggest why the findings from the museum specimens may not relate closely to the current pine marten population of the United Kingdom.

..... [1]

- (ii) Suggest why some people are concerned about the plan to introduce pine martens from other areas into Wales.

..... [1]

7)

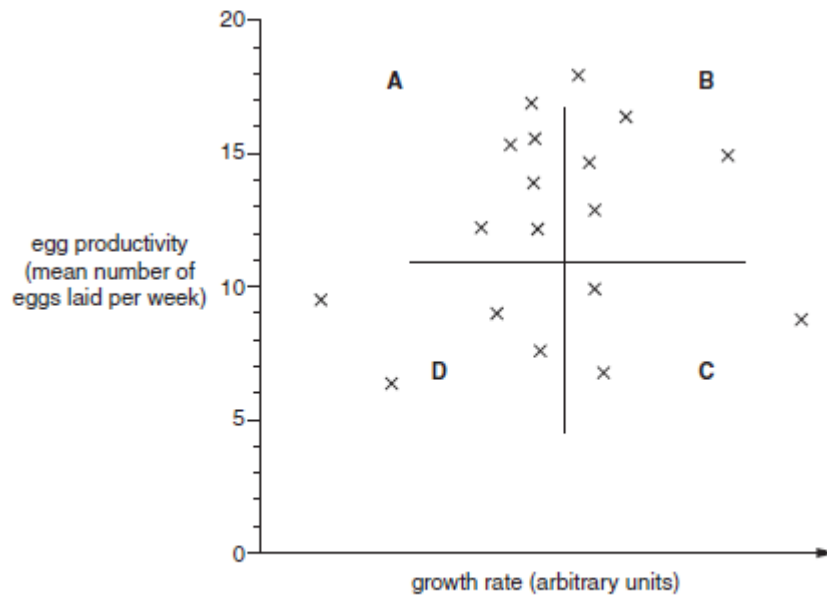
An important aspect of food production is maximising productivity. Maximum productivity can be achieved in a number of different ways.

(a) In selective breeding, humans look for variation between members of the same species and use this variation to improve productivity.

(i) State the **two** different causes of variation.

- 1
- 2 [2]

Fig. 6.1 is a scattergraph that shows the growth rate and egg productivity in a flock of chickens.



(ii) The growth rate of the chickens in Fig. 6.1 shows **continuous** variation.

Describe **three** characteristics of this type of variation.

..... [3]

(iii) A chicken breeder divides the flock into four groups, **A**, **B**, **C** and **D**, as shown in Fig. 6.1.

State which group of chickens, **A**, **B**, **C** or **D**, he should use to breed from in order to improve the growth and productivity of the flock.

..... [1]

(iv) Suggest **two undesirable** consequences of selective breeding in chickens.

..... [2]

(v) The wild ancestor of the domestic chicken is the red jungle fowl found in the rainforests of South East Asia.

Explain why it is important to preserve the population of the red jungle fowl. [2]

(b) In the past, domestic chickens were given antibiotics as a growth promoter.

(i) When antibiotic growth promoters were used, it was claimed that the meat was of better quality, with less fat and increased protein content.

Suggest **two further** benefits of using antibiotics.

..... [2]

(ii) The use of antibiotics as growth promoters in animal production was banned in the European Union in 2006.

Suggest a concern that led to this ban.

..... [1]