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**Cambridge International Examinations**

Cambridge International General Certificate of Secondary Education

**BIOLOGY 0610/21**

Paper 2 Multiple Choice (Extended) **October/November 2017**

**45 minutes**

Additional Materials: Multiple Choice Answer Sheet

Soft clean eraser

Soft pencil (type B or HB is recommended)

**1** Which term is defined as all the chemical reactions that occur in cells?

**A** photosynthesis

**B** protein synthesis

**C** respiration

**D** metabolism

**2** The diagram shows a section of DNA from a chimpanzee.

A G C T A C A G A G

Which diagram shows a section of DNA from the organism that is most closely related to the chimpanzee?

**A** A G C T A C A G A T

**B** A G C T A C A G T T

**C** A T C A A C A G T T

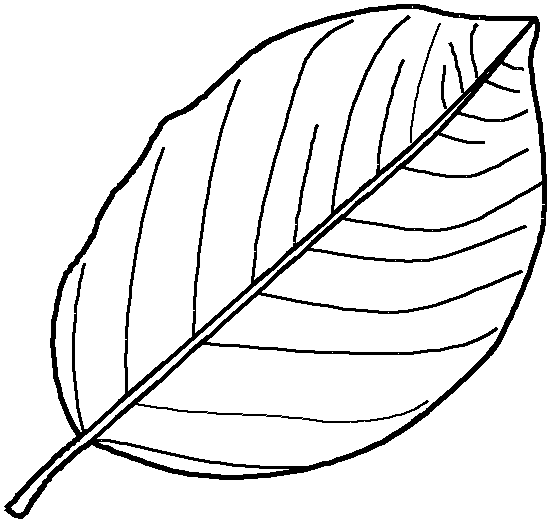
**D** A T C T A C A G T T

**3**

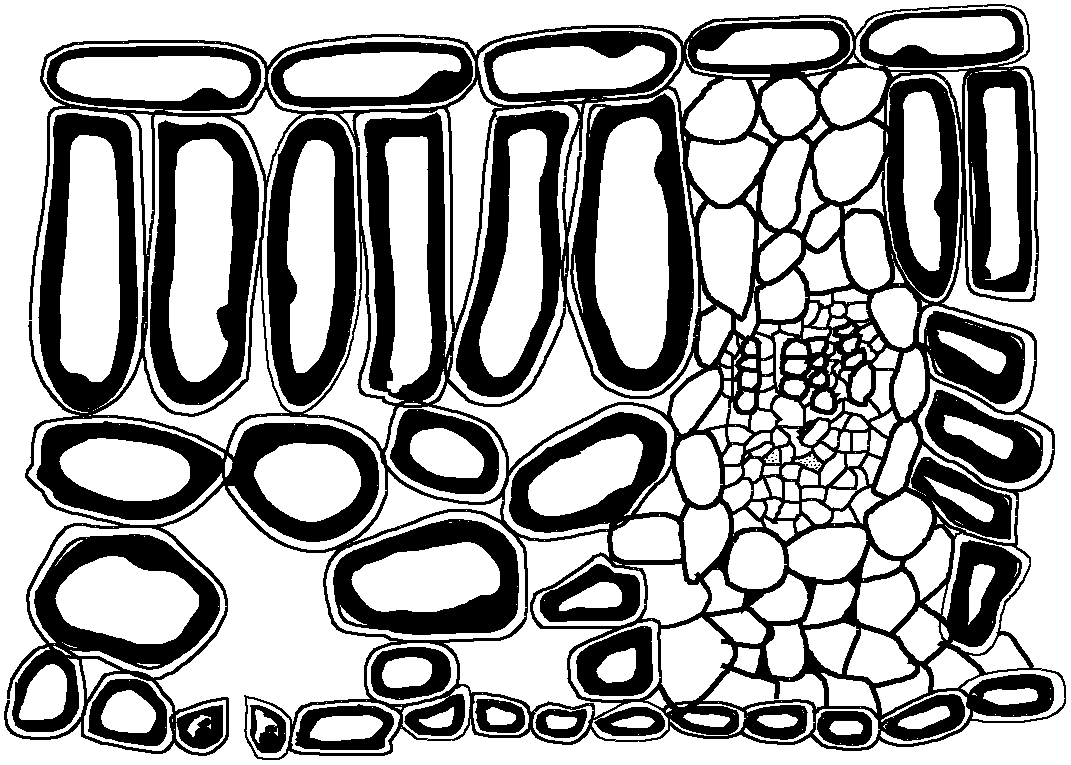
**4** The diagrams show a leaf and its internal structure.

2

1



3



What are the levels of organisation of the labelled structures?

1 2 3

**A** cell tissue organ system

**B** organ cell tissue

**C** organ system tissue cell

**D** tissue cell organ

**5** Different factors affect the rate of diffusion of molecules across a membrane.

Which row represents changes to factors that will increase the rate of diffusion?

concentration gradient across a membrane

thickness

of membrane

surface area

of membrane temperature

**A** decrease decrease increase increase **B** decrease increase increase decrease **C** increase decrease increase increase **D** increase increase decrease decrease

**6**

**7** The diagram shows a protease molecule catalysing the break down of a protein molecule.

P

Q

R

S

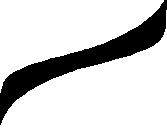
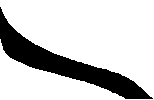
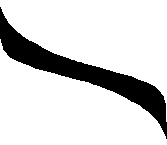
What are the parts labelled P, Q, R and S?

enzyme product substrate active site

**A** P Q R S **B** R S P Q **C** S P Q R **D** S R Q P

**8** The diagram shows the structure of part of a DNA molecule.

X



What does X represent?

**A** amino acid

**B** base

**C** carbon

**D** protein

**9** Which statement about enzymes is correct?

**A** Enzymes become part of the product.

**B** Lowering the pH always slows down the reaction rate.

**C** Raising the temperature always increases the reaction rate.

**D** The specificity of an enzyme depends on the shape of its active site.

**10**

**11** Which structure would be found in large numbers in cells that have a high energy requirement?

**A** chloroplast

**B** endoplasmic reticulum

**C** large vacuole

**D** mitochondrion

**12** What must be increased in the diet of a person suffering from constipation?

**A** fats **B** fibre **C** iron

**D** protein

**13** Which disease can be caused by a deficiency of iron in the diet?

**A** anaemia

**B** kwashiorkor

**C** marasmus

**D** rickets

**14** The diagram shows the human alimentary canal, with a string marked in metres beside it.

0 oesophagus

1

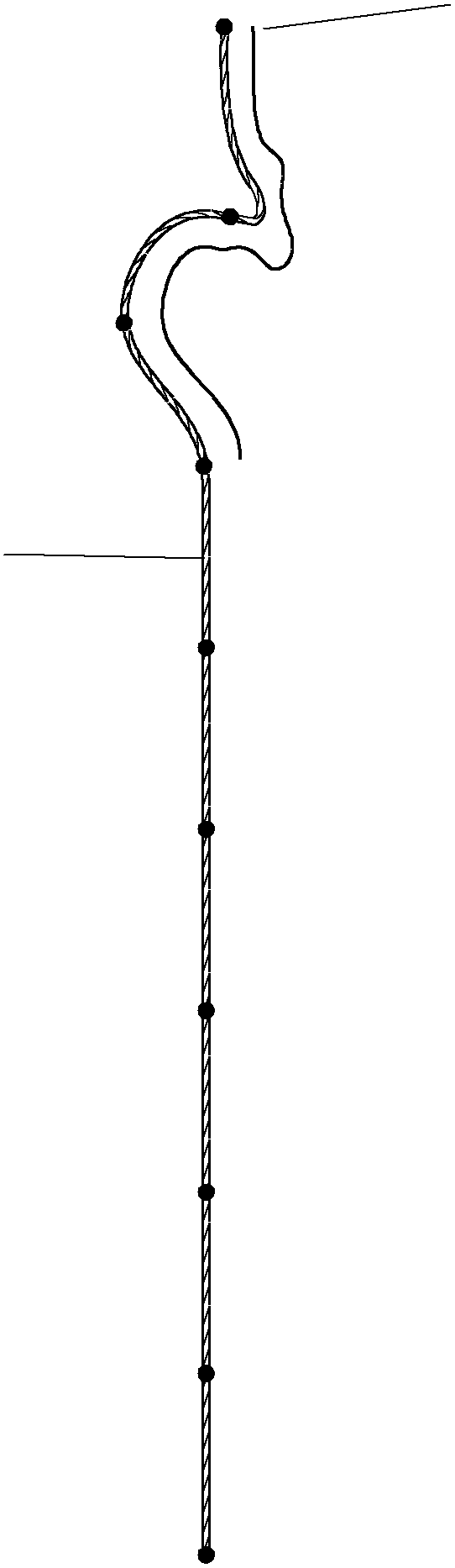
2

3

string marked in metres

4

5



6

7

8

9

How long is the small intestine?

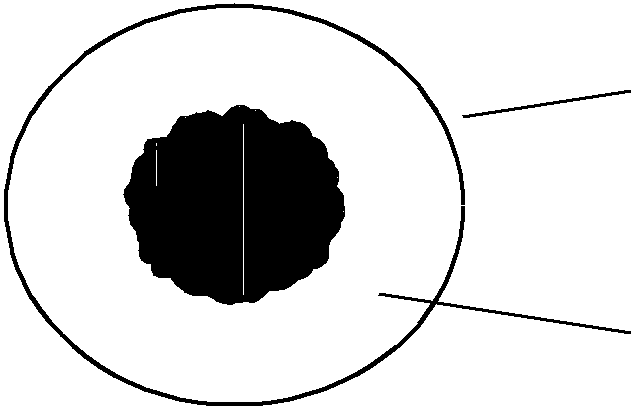
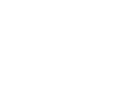
anus

**A** 2 m **B** 6 m **C** 8 m **D** 9 m

**18** The diagram shows a cross-section through a human blood vessel.

elastic and fibrous connective tissue

muscle layer



Which type of blood vessel does the diagram show?

**A** an artery

**B** a capillary

**C** a vein

**D** a ventricle

**19** Which are both chemical barriers to the transmission of pathogens?

**A** mucus and stomach acid

**B** mucus and white blood cells

**C** skin and hairs in the nose

**D** skin and stomach acid

**20** The table shows some of the changes that occur during breathing.

from contracted to relaxed

from relaxed to contracted

diaphragm P X

external intercostals Q Y

internal intercostals R Z

Which changes occur to cause inspiration?

**A** P, Q and Z **B** X, Q and R **C** X, Y and R **D** X, Y and Z

**23** What is the most important function of sweating?

**A** to remove excess heat from the body

**B** to remove excess salts from the body

**C** to remove excess urea from the body

**D** to remove excess water from the body

**24** Four effects of a specific hormone are listed.

● increased blood pressure

● increased blood glucose concentration

● increased rate of respiration

● reduced blood flow to the gut

What is this hormone?

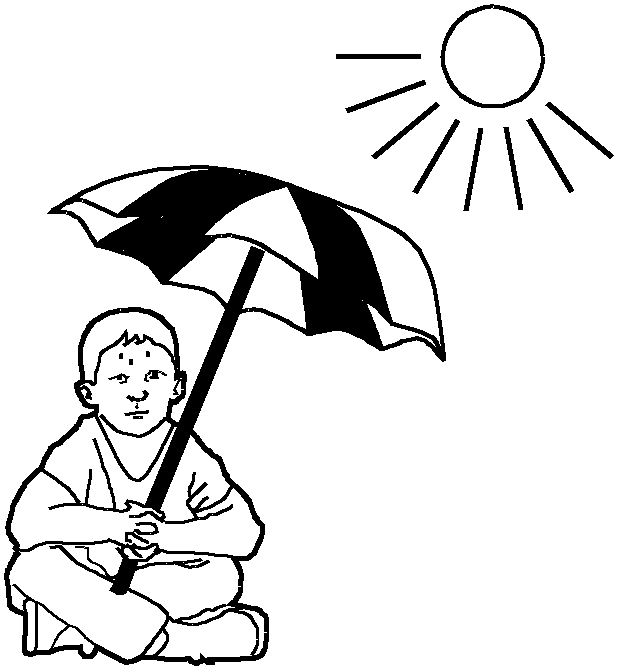
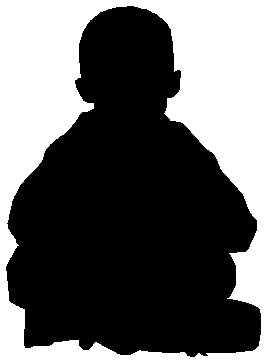
**A** adrenaline

**B** glucagon

**C** insulin

**D** testosterone

**25** The diagram shows a person sweating in hot weather.



What part is played by sweat glands during the process of sweating?

**A** effector

**B** receptor

**C** sense organ

**D** stimulus

**27** The immune system recognises pathogens and attacks them.

Which feature of pathogens triggers this response?

**A** antibodies **B** antibiotics **C** antigens

**D** memory cells

**28** Which environmental factor is **not** always a requirement for seed germination?

**A** light

**B** oxygen

**C** suitable temperature

**D** water

**30** In some mammals the allele for brown coat colour is dominant to the allele for white coat colour.

Which percentage of offspring will be white if a cross is made between two heterozygous mammals?

**A** 0% **B** 25% **C** 50% **D** 100%

**31** Which term is defined as a length of DNA that codes for a protein?

**A** amino acid

**B** chromosome

**C** gene

**D** mutation

**32** The following are involved in protein synthesis.

1 amino acids assembled in order

2 mRNA moves to the cytoplasm

3 mRNA passing through a ribosome

4 DNA in the nucleus

In which order do they become involved when proteins are made?

**A** 1 → 3 → 2 → 4

**B** 3 → 2 → 1 → 4

**C** 4 → 2 → 3 → 1

**D** 4 → 3 → 2 → 1

**34** The distribution of the sickle-cell allele in human populations varies in different areas of the world.

What is an explanation for this difference?

**A** People that are heterozygous for the sickle-cell allele have a resistance to cholera.

**B** People that are heterozygous for the sickle-cell allele have a resistance to malaria.

**C** People that are heterozygous for the sickle-cell allele are more likely to suffer from anaemia.

**D** People with sickle-cell anaemia have more alleles.

**38** Ligase enzymes are used in genetic engineering to

**A** cut open plasmid DNA.

**B** insert plasmids into bacteria.

**C** isolate the DNA making up a human gene.

**D** join human DNA to plasmid DNA