Cambridge
O Level

Cambridge Assessment International Education
Cambridge Ordinary Level

BIOLOGY **5090/11**

Paper 1 Multiple Choice **October/November 2019**

1 hour

Additional Materials: Multiple Choice Answer Sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

2895912751

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.
Do not use staples, paper clips, glue or correction fluid.
Write your name, centre number and candidate number on the Answer Sheet in the spaces provided unless this has been done for you.
DO **NOT** WRITE IN ANY BARCODES.

There are **forty** questions on this paper. Answer **all** questions. For each question there are four possible answers **A**, **B**, **C** and **D**.
Choose the **one** you consider correct and record your choice in **soft pencil** on the separate Answer Sheet.

Read the instructions on the Answer Sheet very carefully.

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
Any rough working should be done in this booklet.
Electronic calculators may be used.

This document consists of **16** printed pages.

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1 During a lesson about animal and plant cells, a student reads out a number of statements about cell structure. Only three of his statements are correct.

1 All cells have a cell wall.

2 Cell walls are made of cellulose.

3 Chromosomes carry DNA.

4 Cell walls contain starch.

5 All cells have a cell membrane.

6 A sap vacuole helps an animal cell maintain its turgor.

7 Chromosomes are found in the cytoplasm.

Which three statements are correct?

A 1, 3 and 7 **B** 2, 3 and 5 **C** 2, 4 and 6 **D** 4, 5 and 7

2 Which statement is always correct for both diffusion and osmosis?

A They depend on energy from cells.

B They involve movement of particles down a concentration gradient.

C They involve the movement of water molecules.

D They take place only in liquids.

3 Which process occurs by active transport?

A uptake of glucose by villi

B uptake of oxygen by root hair cells

C uptake of starch by villi

D uptake of water by root hair cells

4 Which statement about enzymes is correct?

A Enzymes are made of lipid molecules and change the rate of a reaction.

B Enzymes are permanently denatured by high and low temperatures.

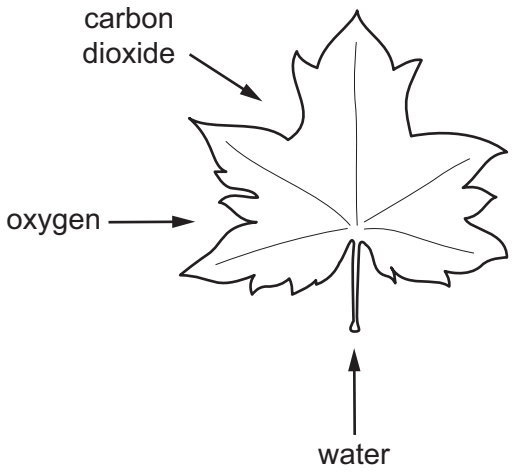
C Enzymes can only operate within a living organism.

D Enzymes have individual shapes that lock onto specific molecules.

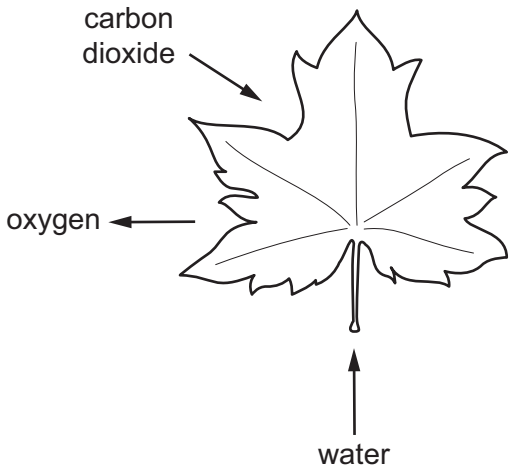
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5 Which diagram shows substances going into and out of a leaf when glucose is being formed?

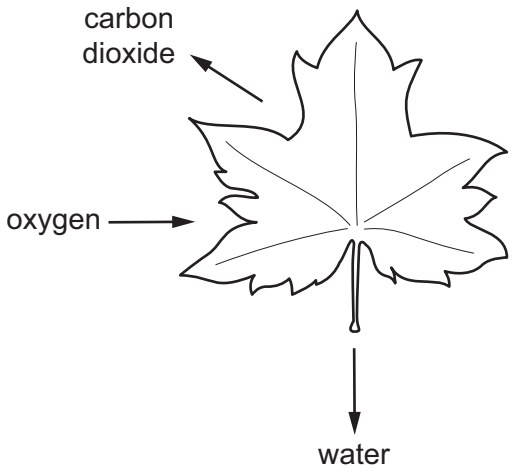
A



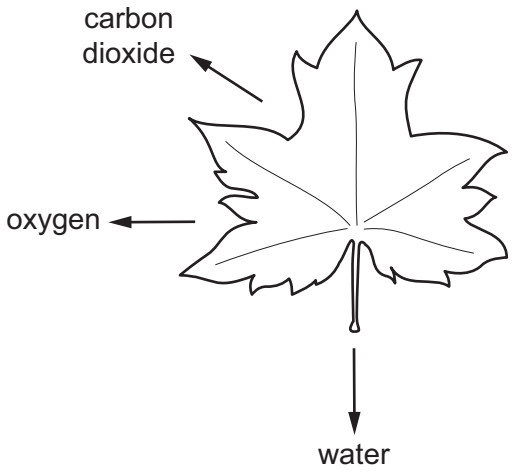
B



C



D



6 A small mountain lake has aquatic plants growing underwater on the lake bed. Shortly after heavy rainfall the mud on the lake bed becomes churned up and the water level rises.

Why does this cause the rate of photosynthesis of these plants to fall?

A extra carbon dioxide

B extra dissolved nitrates

C lower light intensity

D lower oxygen concentration

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[Turn over

7 The elements listed are found in all living organisms.

Which element is **not** obtained by plants from the soil?

A carbon

B iron

C magnesium

D nitrogen

8 The table describes some characteristics of four people.

Which person requires the highest energy intake in their diet?

	age / years	sex	level of activity	body weight / kg
A	5	male	high	18
B	25	male	low	85
C	30	female	high	82
D	65	female	low	75

9 Where do both physical and chemical breakdown of food occur?

A colon

B liver

C rectum

D stomach

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10 The table shows the rates of absorption of two different sugars, arabinose and glucose, in living and dead intestines. The concentrations of the sugars inside the intestines were the same in each case.

	rate of absorption / arbitrary units	
	arabinose	glucose
living intestine	31	102
dead intestine	31	34

What are the main methods of absorption of arabinose and glucose in living intestine?

	arabinose	glucose
A	active transport	active transport
B	active transport	diffusion
C	diffusion	active transport
D	diffusion	diffusion

11 What is the importance of the large surface area of the root hairs of a plant?

A for anchoring the plant in soil

B for storage of starch

C for transport of sugars made during photosynthesis

D for water and mineral ion uptake

12 What is the main cause of water moving up to the leaves in xylem vessels?

A active transport

B evaporation from the epidermis of the leaf

C evaporation from the walls of the mesophyll cells

D use of water in photosynthesis

13 What is meant by double circulation?

A Blood travels down the left-hand side of the body and up the right.

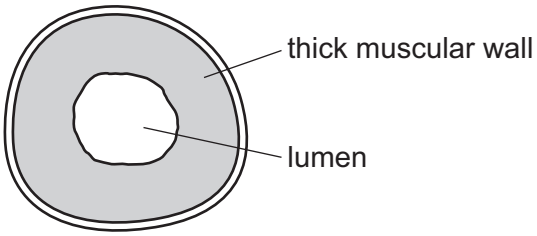
B Blood travels away from the heart in the arteries and back to the heart in the veins.

C There are two separate circulatory systems in the body.

D There is a low pressure circulation to the lungs and a high pressure circulation to body tissues.

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14 The diagram shows a section through a vessel carrying oxygenated blood, as seen through a microscope.



What is this vessel?

A coronary artery

B hepatic portal vein

C pulmonary artery

D renal vein

15 Hypoplastic left heart failure is a rare heart condition in which the lower left chamber of the heart has not developed properly and is much smaller than normal.

The immediate result of this condition is to cause lower than normal blood flow into which blood vessel?

A aorta

B pulmonary artery

C pulmonary vein

D vena cava

16 During a race the leg muscles of an athlete use more energy than can be supplied by aerobic respiration.

Which substance will build up in the leg muscles and cause pain?

A carbon dioxide

B ethanol

C lactic acid

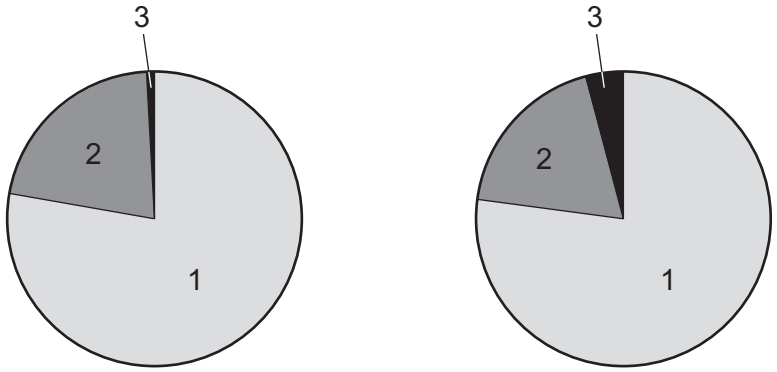
D water

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17 What happens during expiration?

	diaphragm muscles	pressure in thoracic cavity	volume of thoracic cavity
A	contract	falls and then rises	decreases
B	relax	rises and then falls	decreases
C	contract	rises and then falls	increases
D	relax	falls and then rises	increases

18 The pie charts show the proportions of gases in samples of inspired and expired air.

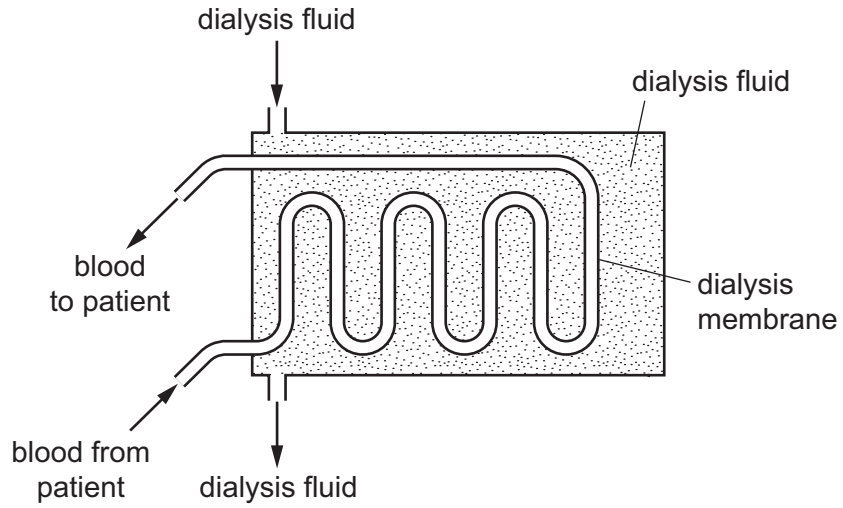


inspired air expired air

Which segments represent which gases?

	segment 1	segment 2	segment 3
A	nitrogen	other gases	oxygen
B	nitrogen	oxygen	other gases
C	oxygen	other gases	nitrogen
D	oxygen	other gases	carbon dioxide

19 In a kidney dialysis machine, which substance **cannot** diffuse through the dialysis membrane?



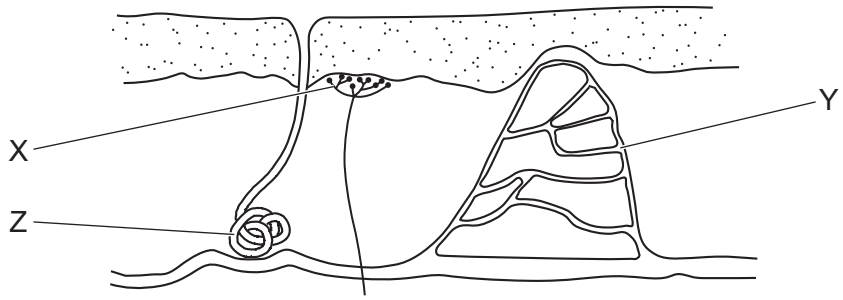
A glucose

B insulin

C sodium

D urea

20 The diagram represents a section through the skin.



Which row shows the functions of the labelled parts?

	controls heat loss from blood	receives an external stimulus	releases fluid
A	Y	X	Z
B	Y	Z	X
C	Z	X	Y
D	Z	Y	X

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21 Which structure in the brain registers changes in the blood concentration?

A cerebellum

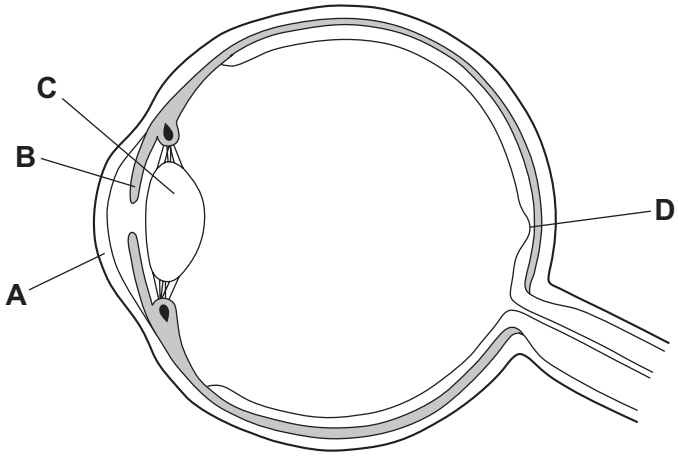
B hypothalamus

C medulla

D pituitary gland

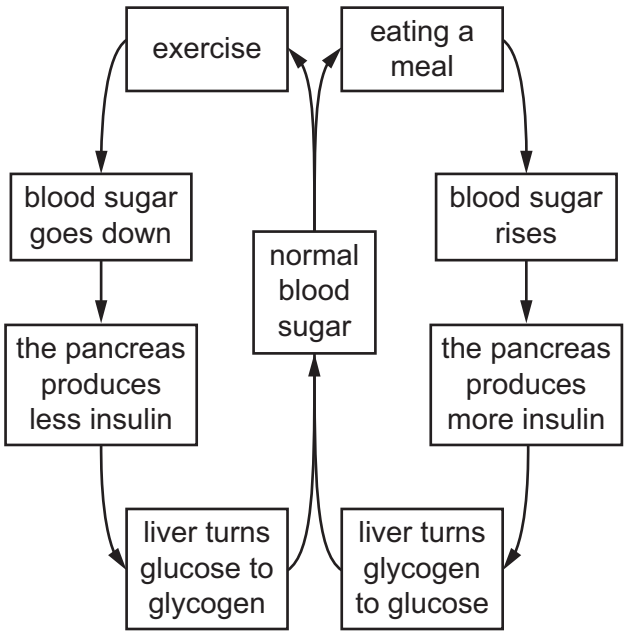
22 The diagram shows a section through a human eye.

Where are the receptors for the pupil (iris) reflex?

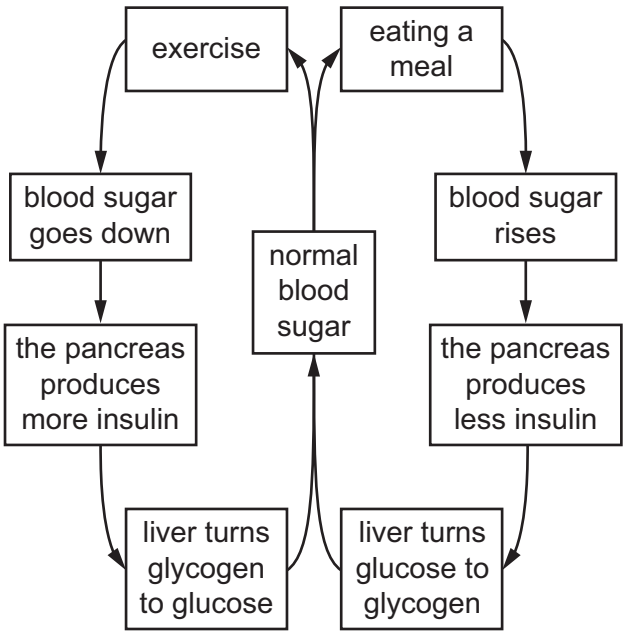


23 Which flow diagram shows the regulation of blood sugar levels?

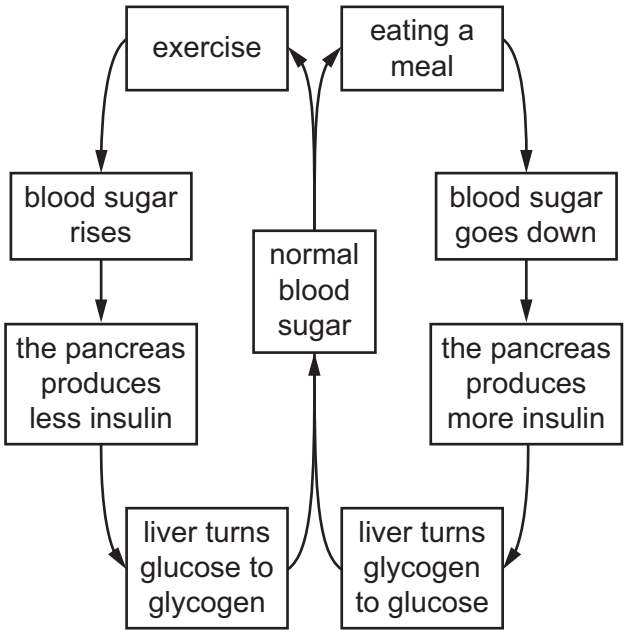
A



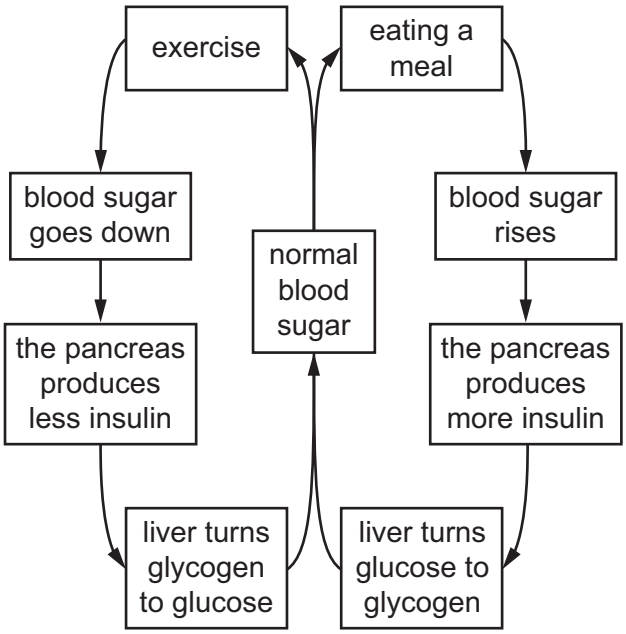
B



C



D



24 Which bone forms a ball and socket joint at one end and a hinge joint at the other?

A humerus

B radius

C scapula

D ulna

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25 Which risk is greatly increased by the nicotine in cigarette smoke?

A bronchitis and emphysema

B cancer of the airways

C high blood pressure

D reduced birth weight of babies

26 During cheese-making the pH of milk falls and this causes milk proteins to coagulate.

What is the main cause of the lower pH?

A aerobic respiration by bacteria

B aerobic respiration by yeast

C anaerobic respiration by bacteria

D anaerobic respiration by yeast

27 Which type of organism produces penicillin, and which type of infection can be treated using penicillin?

	type of organism	type of infection treated
A	bacterium	bacterial
B	bacterium	viral
C	fungus	bacterial
D	fungus	viral

28 Four students are studying a pond ecosystem on a bright sunny day.

They see the underwater plants giving off bubbles.

What is the explanation of this observation?

A The bubbles are carbon dioxide produced during photosynthesis. The plants are getting their energy from the Sun.

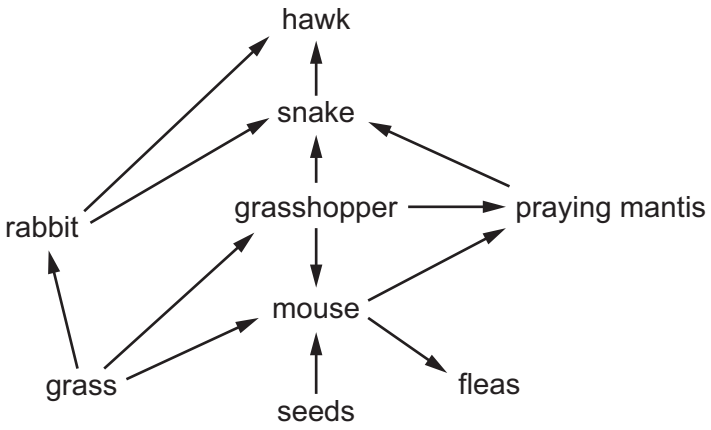
B The bubbles are carbon dioxide. The plants are getting their energy for photosynthesis from respiration.

C The bubbles are oxygen produced during photosynthesis. The plants are getting their energy from the Sun.

D The bubbles are oxygen. The plants are getting their energy for photosynthesis from the minerals absorbed through their roots.

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29 The diagram shows a food web.



What is a food chain in this web?

A fleas → mouse → grasshopper → grass

B grass → seeds → mouse → fleas

C hawk → snake → rabbit → grass

D seeds → mouse → praying mantis → snake

30 Some bacteria survive best in waterlogged soils where they are able to obtain oxygen for respiration by breaking down nitrates. Nitrogen gas is released as a waste product.

To which type of bacteria does this description apply?

A decomposing bacteria

B denitrifying bacteria

C nitrogen-fixing bacteria

D root nodule bacteria

31 How many times must an uninfected mosquito feed on human blood to transmit the malarial parasite in the human population?

A only once

B at least twice

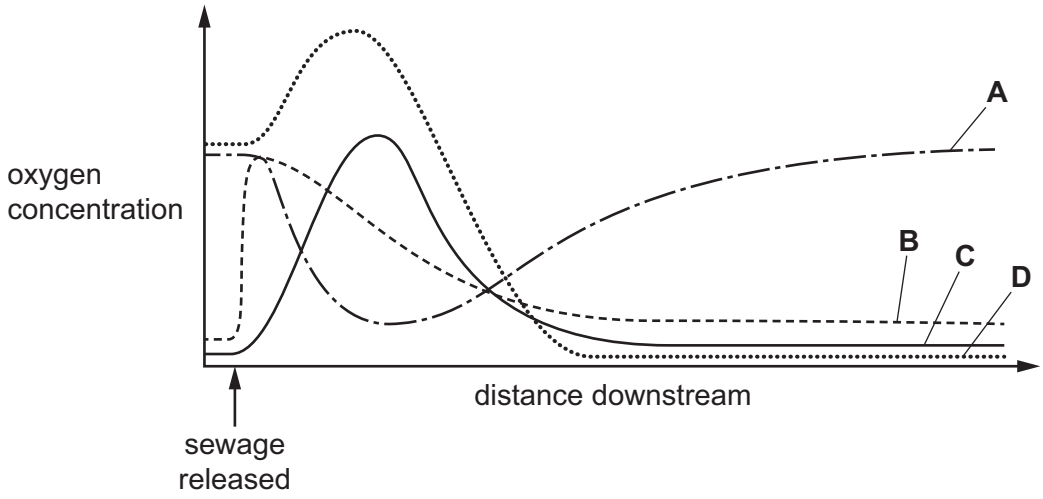
C at least three times

D more than three times

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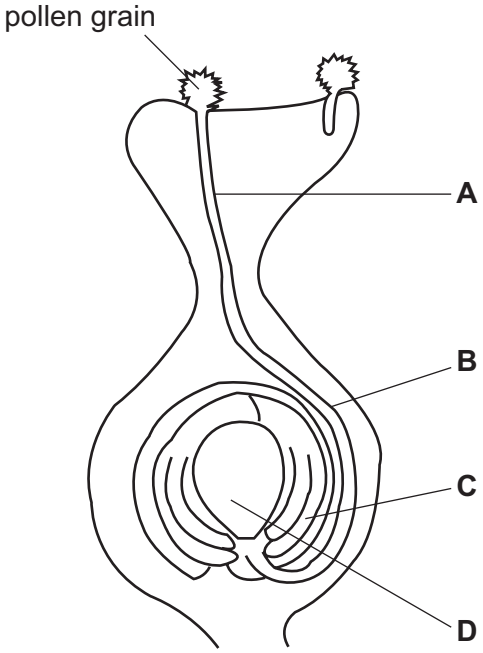
32 Sewage is released into a river.

Which curve represents the oxygen concentration in the river?



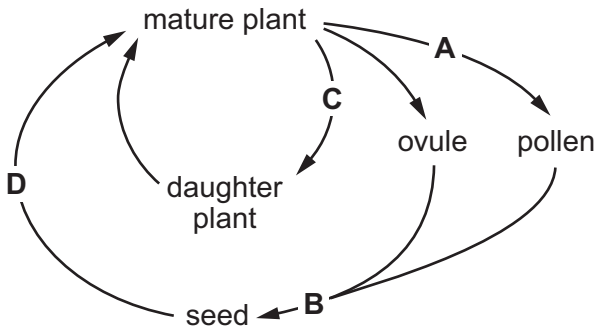
33 The diagram shows the development of a pollen tube and its entry into the ovule.

Which part develops into the testa after fertilisation?



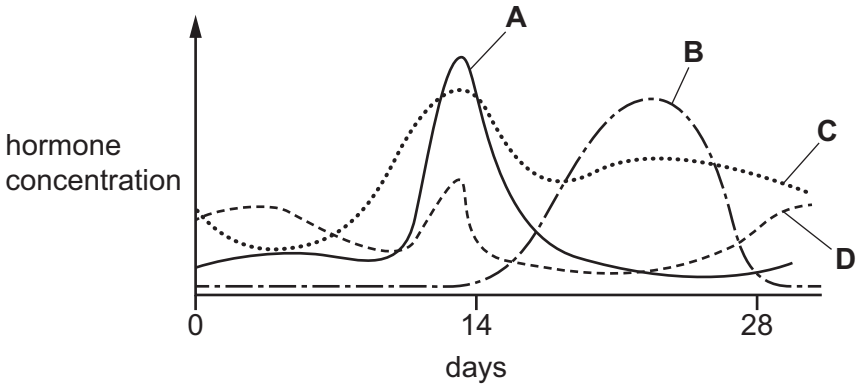
34 The diagram shows the life cycle of a species of plant.

During which stage does meiosis (reduction division) occur?

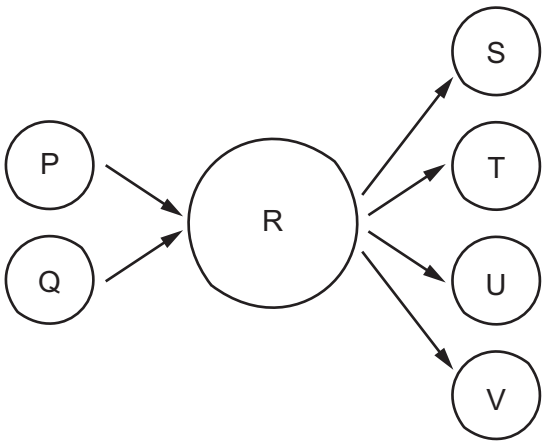


35 The graph shows changes in the concentrations of hormones during a menstrual cycle.

Which curve represents progesterone?



36 The diagram represents gametes P and Q fusing to give cell R. Cell R then produces gametes S, T, U and V.



Which statement about the numbers of chromosomes in the cells and gametes is correct?

A The numbers of chromosomes in P and Q are different.

B The numbers of chromosomes in P and S are the same.

C The number of chromosomes in S is one quarter of the number of chromosomes in R.

D The number of chromosomes in T is half the number of chromosomes in Q.

37 Which statements about DNA are correct?

1 An allele carries molecules of DNA.

2 A chromosome includes a molecule of DNA.

3 A molecule of DNA is divided into genes.

A 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

38 What is **not** an advantage of genetic engineering?

A Genes from genetically modified crops can spread to wild plants.

B It can give predictable results.

C It can improve the taste and nutritional value of crops.

D It can reduce the need to use insecticides and fungicides.

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39 A father has blood group AB and the mother has blood group O.

What is the predicted ratio of blood groups for the offspring?

A 1 : 1 A : B

B 1 : 1 AB : O

C 1 : 1 : 1 A : B : O

D 1 : 1 : 1 : 1 A : B : AB : O

40 Which statement about dominant and recessive alleles is **not** correct?

A A dominant characteristic is seen in the phenotype of a heterozygote.

B A homozygous genotype may be either dominant or recessive.

C Recessive phenotypes always have two recessive alleles.

D The phenotype of a homozygote is always dominant.

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