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5066064220

BIOLOGY **0610/32**

Paper 3 Theory (Core) **May/June 2020**

1 hour 15 minutes

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.
- You should show all your working and use appropriate units.

INFORMATION

- The total mark for this paper is 80.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **20** pages. Blank pages are indicated.

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1 **(a)** Some substances move into cells by the process of diffusion.

State the name of the outer part of an animal cell that substances move through during diffusion.

..... [1]

(b) Substances can also move by osmosis and active transport.

Table 1.1 shows some of the features of diffusion, osmosis and active transport.

Complete Table 1.1 by placing **one** tick (✓) in each row to show the features of diffusion, osmosis and active transport.

One has been done for you.

Table 1.1

feature	diffusion	osmosis	active transport
involves movement of water only		✓	
always involves movement across a partially permeable membrane			
movement is from a higher solute concentration to a lower solute concentration			
requires energy from respiration			
involves the movement of both gases and solutes			

[4]

(c) Oxygen moves from the air that we breathe into the blood.

State **three** structures of the gas exchange system that oxygen molecules must pass through on their way to the blood.

1 .....

2 .....

3 .....

[3]

[Total: 8]

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2 **(a)** Fig. 2.1 is a diagram of the human female reproductive system.

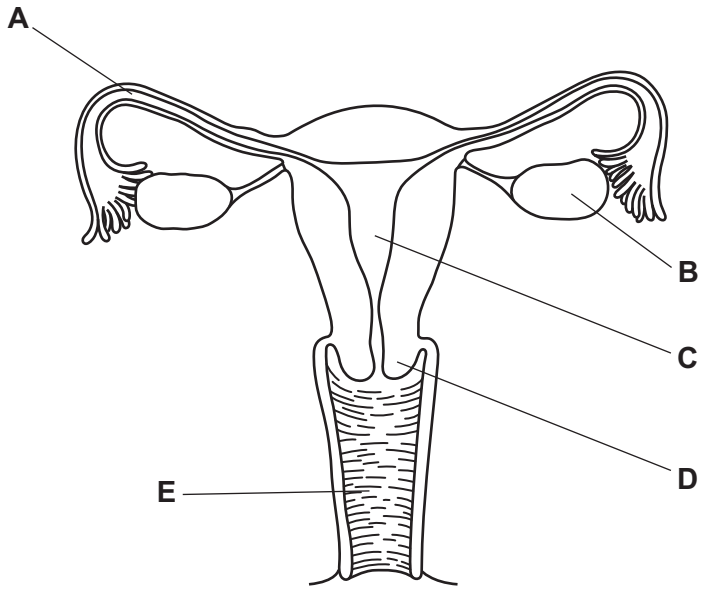


Fig. 2.1

Identify the letter from Fig. 2.1 which represents:

- the vagina .....
- the uterus .....
- where ovulation occurs .....
- where the fetus grows .....
- where fertilisation occurs. .....

Each letter may be used once, more than once or not at all. [5]

(b) Egg cells are the female gametes and have special adaptive features.

Complete the sentences using words from the list.

Each word may be used once, more than once or not at all.

birth **cellulose** **cytoplasm** **energy**

fertilisation **jelly** **labour**

Egg cells have ..... stores so that they can survive for several days in the female reproductive system after ovulation.

They also have a ..... coating which changes after ..... to prevent more sperm from entering the egg.

[3]

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(c) Table 2.1 shows the average diameters of egg cells from different mammals.

Table 2.1

mammal	average diameter of egg cell / μm
goat	122
horse	168
human	165
mouse	90
rabbit	165
sheep	125

(i) State the name of the mammal with the egg cell that has the smallest average diameter in Table 2.1.

..... [1]

(ii) Calculate the difference in average diameter between the egg cells of humans and goats.

..... μm [1]

(d) Larger mammals usually have egg cells with a greater diameter.

Suggest which is the largest mammal using the information in Table 2.1.

..... [1]

[Total: 11]

3 **(a)** A student investigated respiration in yeast. An equal mass of yeast was added to different types of sugar solution.

The student measured the volume of carbon dioxide released by the yeast using four different sugar solutions with the same concentrations.

The four different sugar solutions used were:

- dextrose
- lactose
- maltose
- sucrose.

Fig. 3.1 is a graph of the results.

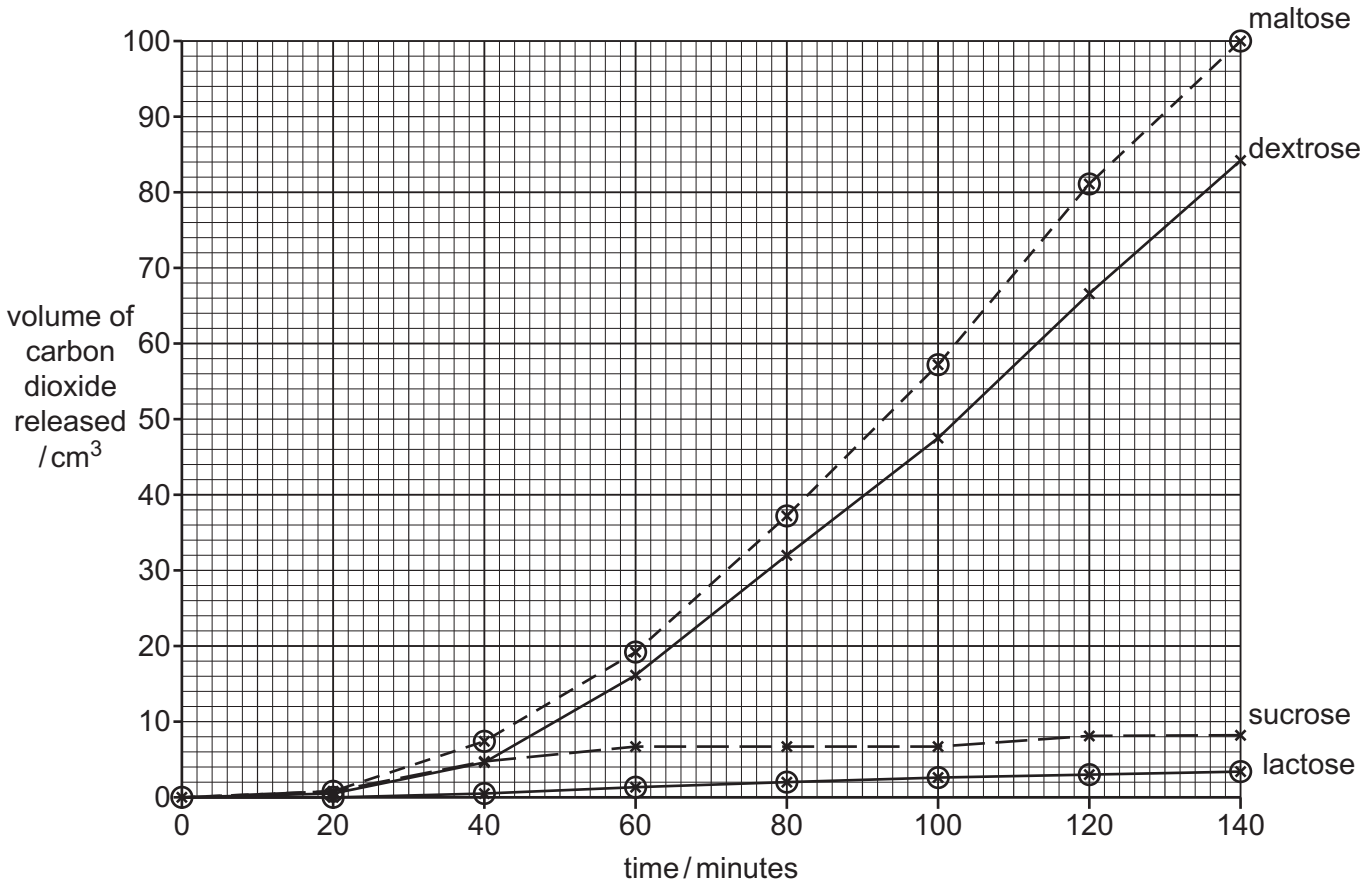


Fig. 3.1

(i) State the name of the sugar solution that produced the most carbon dioxide.

..... [1]

(ii) State the volume of carbon dioxide produced by yeast with the dextrose solution at 80 minutes.

..... cm^3 [1]

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(b) The temperature during the investigation was maintained at 20 °C.

Predict the effect on the volume of carbon dioxide produced if the investigation was repeated at 30 °C.

.....

.....

..... [1]

(c) State **two** ways humans use anaerobic respiration in yeast to make useful products.

1 .....

2 .....
[2]

(d) Describe the similarities **and** differences between **anaerobic** respiration in yeast and **aerobic** respiration in humans.

similarities .....

.....

.....

.....

.....

differences .....

.....

.....

.....

.....
[4]

(e) State the word equation for **anaerobic** respiration in humans.

..... [2]

[Total: 11]

4 Fig. 4.1 shows some of the processes involved in the treatment of sewage.

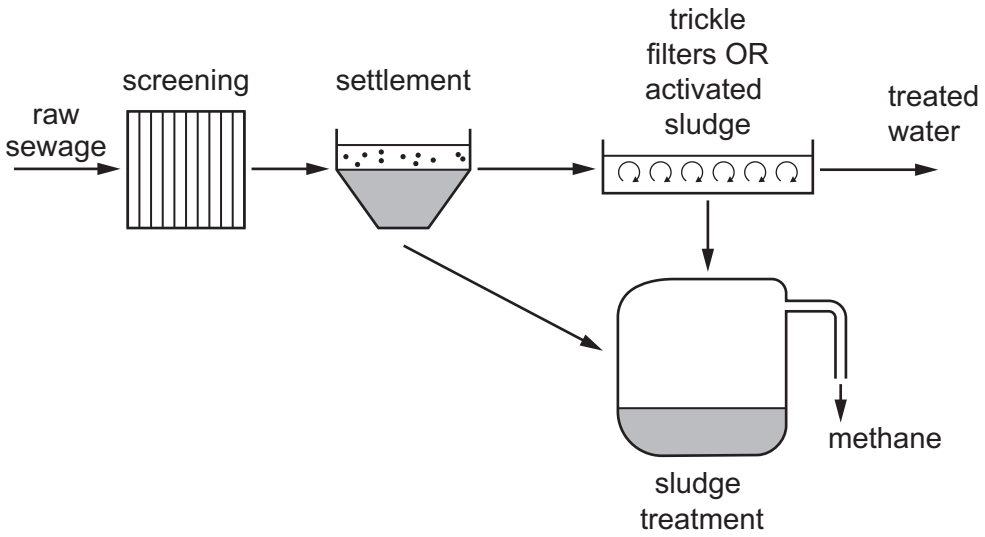


Fig. 4.1

(a) Complete Table 4.1 by placing ticks (✓) in the correct boxes to show what is involved in each process during the treatment of sewage.

The first row has been completed for you.

Table 4.1

process	process involves:			
	aeration	removal of large solids	separating liquid waste from solid waste	the use of microorganisms
production of methane				✓
screening				
settlement				
sludge treatment				
trickle filters OR activated sludge				

[4]

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(b) Describe **two** reasons why it is necessary to treat sewage before returning the water to the environment.

1 .....

.....

2 .....

.....

[2]

[Total: 6]

5 **(a)** Fig. 5.1 is a photograph of part of a flower.

Some of the outer structures have been removed to show the internal parts.



Fig. 5.1

(i) Label these structures on Fig. 5.1 with a label line and the name:

- anther
- petal
- stigma.

[3]

(ii) Describe **two** features visible in Fig. 5.1 that suggest that this is an insect-pollinated flower.

1 .....

.....

2 .....

.....

[2]

(b) Many living organisms can be classified as plants or animals.

Table 5.1 shows some features of animals and plants.

Place ticks (✓) in the boxes to show the correct features of animals and plants.

Table 5.1

feature	animals	plants
can respire		
can grow		
can make their own food		
contain DNA		
can respond to changes in their environment		

[5]

(c) State **two** structures that are present in plant cells but **not** in animal cells.

1 .....

2 .....

[2]

[Total: 12]

6 **(a)** A student wrote an incorrect definition of the term *hormone*.

The student's incorrect definition is shown in Fig. 6.1.

> *A hormone is an electrical substance, produced by a gland and carried by the neurones, which alters the activity of one or more specific target organs.*

Fig. 6.1

Identify the **two** incorrect words in the student's definition.

1 .....

2 .....

[2]

(b) Table 6.1 shows the names of some hormones and the glands where they are secreted.

Complete Table 6.1.

Table 6.1

hormone	gland
	adrenal
insulin	
oestrogen	
	testes

[4]

(c) Fig. 6.2 shows the position of some of the organs and endocrine glands in the body.

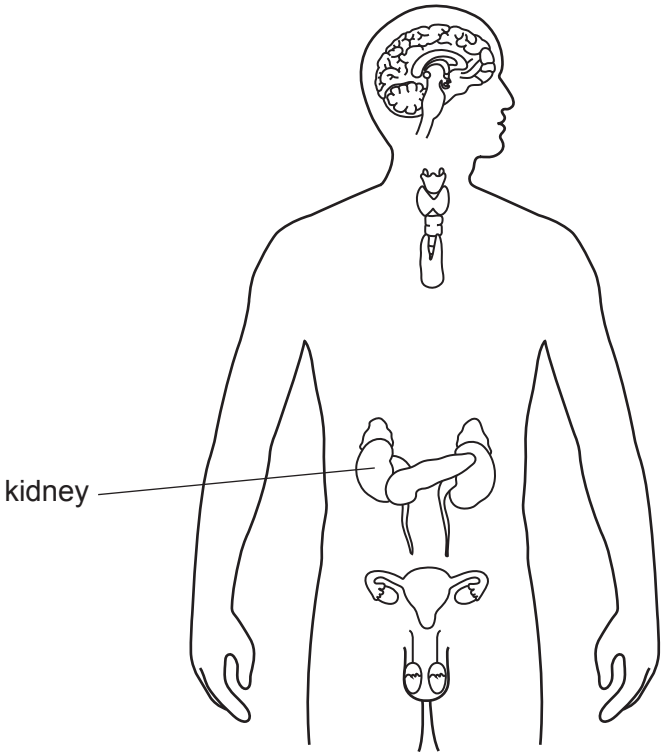


Fig. 6.2

Draw an **X on** Fig. 6.2 to identify an adrenal gland. [1]

(d) The list in Fig. 6.3 shows some of the changes that occur in boys and girls during puberty.

breasts grow	hair grows in armpits	pubic hair grows
hips widen	menstruation	testes grow

Fig. 6.3

(i) State **two** changes that occur in girls **only** from the list in Fig. 6.3.

1 .....

2 .....
[2]

(ii) State **one** change that occurs in **both** boys and girls from the list in Fig. 6.3.

..... [1]

[Total: 10]

7 Researchers investigated the effects of using a fertiliser on the number of leaves grown by plants.

The fertiliser contained nitrate and magnesium ions.

Plants in group 1 were grown in soil with fertiliser.

Plants in group 2 were grown in soil without fertiliser.

The results are shown in Fig. 7.1.

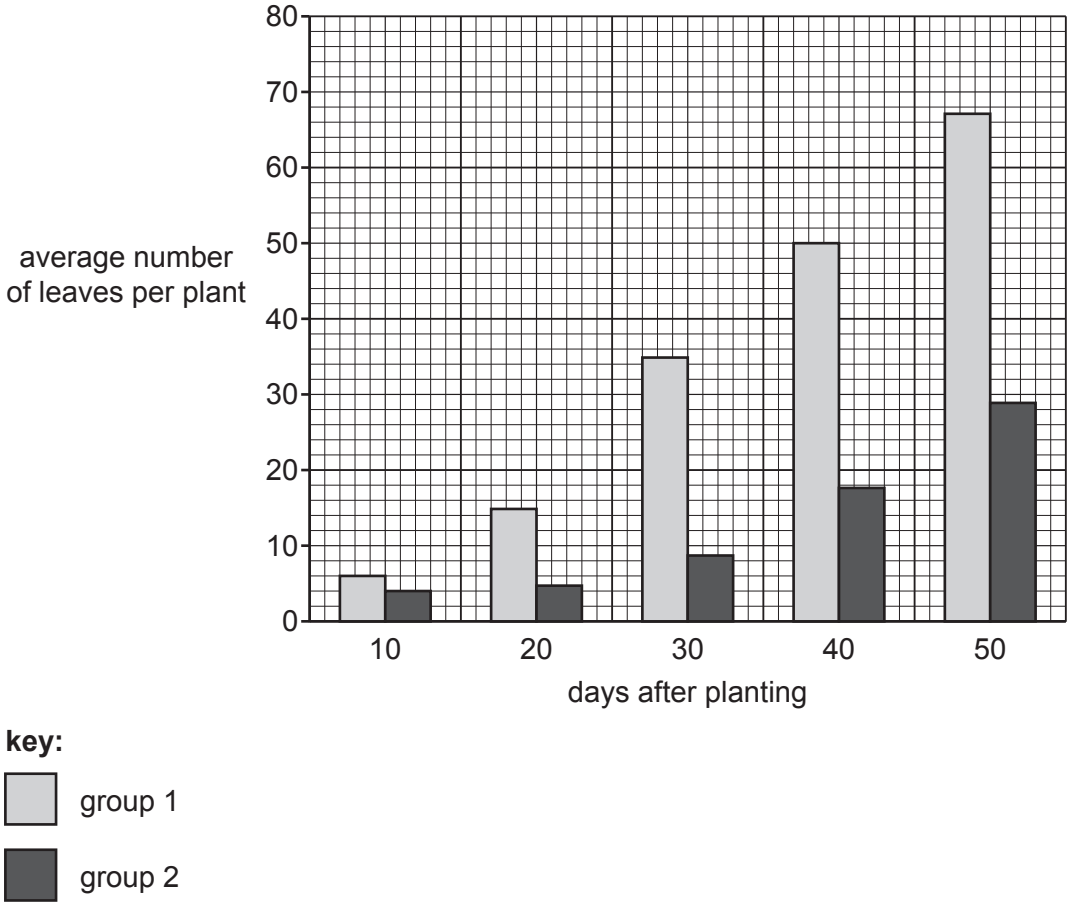


Fig. 7.1

(a) Describe the results shown in Fig. 7.1.

.....

.....

.....

.....

.....

.....

..... [3]

(b) A student wrote a series of statements to explain why an increase in nitrate and magnesium ions increased the number of leaves. Not all of the statements are correct.

A – Magnesium is required for the synthesis of chlorophyll.

B – Nitrate ions are a component of carbohydrates.

C – Chlorophyll is required for photosynthesis.

D – Proteins are needed for growth.

E – Plants make their own food by the process of respiration.

F – Respiration produces glucose.

State the letters of the correct statements.

..... [3]

(c) State the principal source of energy for plants.

..... [1]

[Total: 7]

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8 **(a)** Table 8.1 shows the mass of different materials recycled in one country in 2012 and 2017.

Table 8.1

year	material recycled / tonnes			
	cardboard	paper	metal	plastic
2012	193 091	222 455	41 488	44 262
2017	245 345	144 416	24 874	23 498

(i) Describe the data in Table 8.1.

.....

.....

.....

.....

.....

.....

..... [3]

(ii) Calculate the percentage change in mass of plastic recycled between 2012 and 2017.

..... %
[2]

(b) Discarded rubbish is one source of pollution.

Adding excess fertiliser to soil is another source of pollution.

(i) State **two** other types of substances used in agriculture that can pollute land and water.

1 .....

2 .....
[2]

(ii) State the names of **two** gases that pollute air and are linked to climate change.

1 .....

2 .....
[2]

[Total: 9]

9 **(a)** Fig. 9.1 is a flow chart showing the pathway of a reflex action.

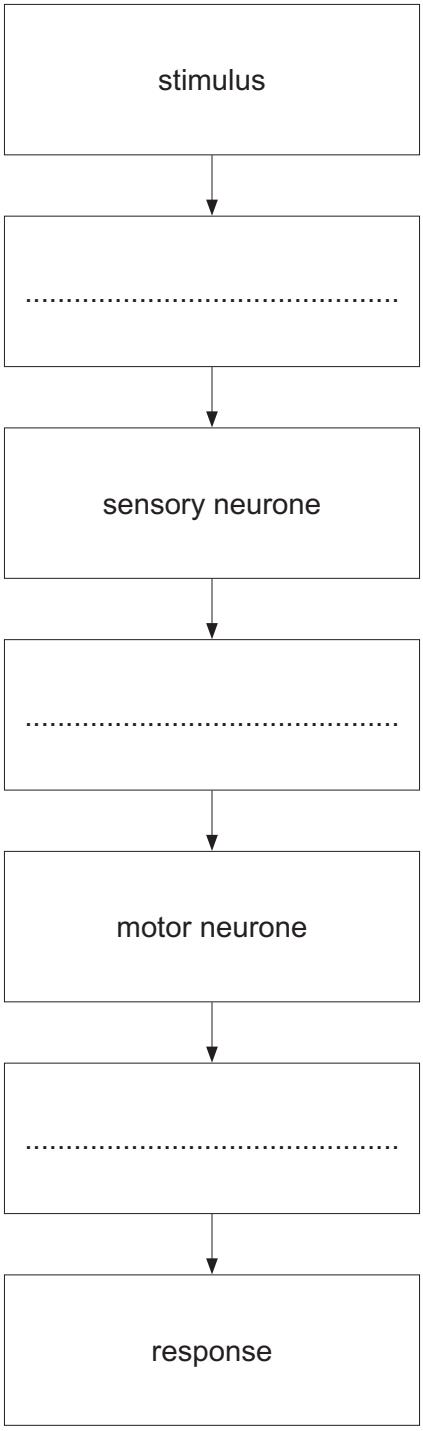


Fig. 9.1

Complete the missing parts of the reflex action pathway in Fig. 9.1. [3]

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(b) The box on the left contains the beginning of a sentence.

The boxes on the right show some endings of sentences.

Draw lines to make **three** correct sentences about reflex actions.

Reflex actions	are automatic.
	are slow.
	coordinate stimuli with responses.
	do not involve synapses.
	involve the central nervous system.
	occur only in plants.

[3]

[Total: 6]

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