B9- Respiration Exam Practice 1

Name:

Score:

Q1.

Two students investigated the effect of exercise on breathing rate.

Breathing rate was measured by counting the number of times a student breathed in during 1 minute.

This is the method used.

1. Measure the breathing rate at rest before exercise.
2. Run on the spot for 5 minutes.
3. Measure the breathing rate every minute during exercise.
4. Measure the breathing rate every minute after exercise for 10 minutes.

(a) The students had different breathing rates at rest.

Suggest **two** factors that could cause the students' breathing rates at rest to be different.

1 _____

_____

2 _____

_____

(2)

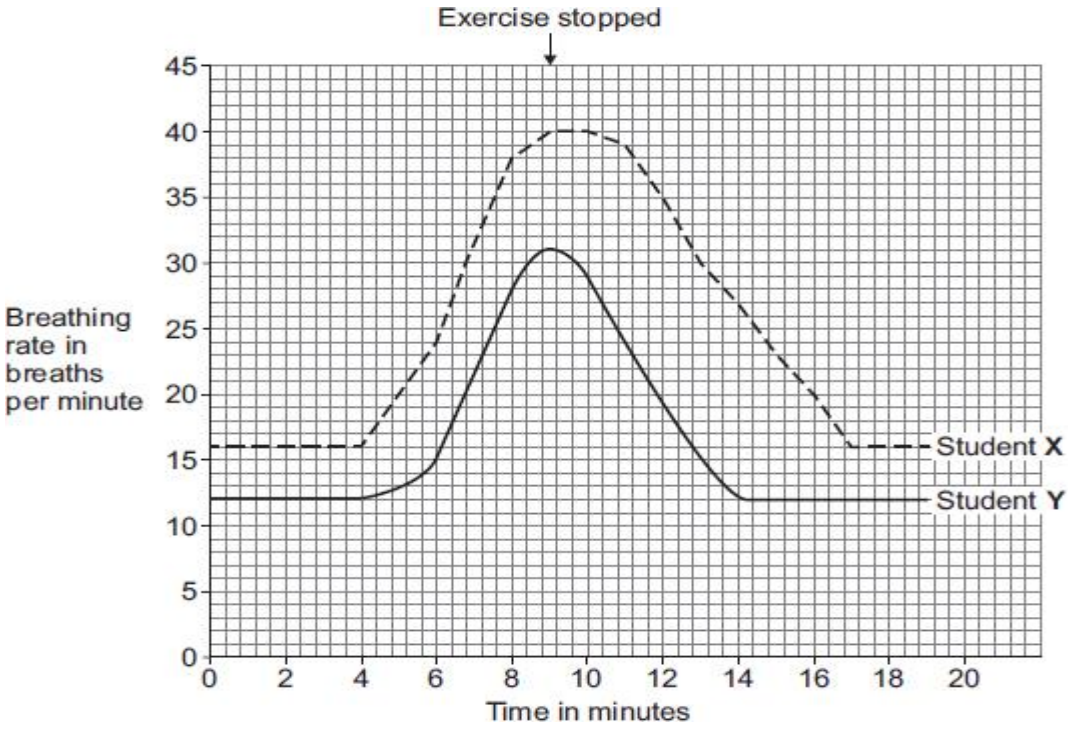
(b) Suggest **one** reason why the measurements for breathing rate may **not** be accurate.

_____

_____

(1)

The graph below shows the results.



(c) What time did the students start exercising?

Use the graph above.

Time exercise started = _____ minutes

(1)

(d) Describe **two** differences between the results of student **X** and of student **Y**.

Use the graph above.

1 _____

_____

2 _____

_____

(2)

(e) Why does breathing rate change during exercise?

Tick (✓) **one** box.

To increase the uptake of carbon dioxide **and** oxygen from the air ☐

To increase the uptake of carbon dioxide from the air ☐

To increase the uptake of oxygen from the air ☐

(1)

(f) The breathing rate of the students stayed high after the exercise stopped.

Why does breathing rate stay high after exercise has stopped?

Tick (✓) **one** box.

To break down amino acids ☐

To break down fatty acids ☐

To break down lactic acid ☐

(1)

(g) Give **one** other change that happens in the body during exercise.

Do **not** refer to breathing rate.

_____

_____

(1)

(Total 9 marks)

Q2.

Respiration can happen aerobically or anaerobically.

Respiration transfers energy from glucose.

(a) Draw **one** line from each type of respiration in human cells to the correct information.

Type of respiration in human cells	**Information**
	Produces ethanol
Aerobic respiration	Uses oxygen
Anaerobic respiration	Uses carbon dioxide
	Produces lactic acid

(2)

(b) The table below shows the amount of energy released by aerobic and anaerobic respiration.

	Energy in kJ transferred from 1 g of glucose
Aerobic respiration	16.1
Anaerobic respiration	1.2

Suggest why human cells might respire anaerobically, even though only a small amount of energy is transferred.

_____

_____

(1)

(c) Yeast is used in the brewing and baking industries.

Why is yeast used in these industries?

_____

_____

_____

_____

_____

_____

_____

_____

(4)

(Total 7 marks)

Higher Questions:

Q3.

(a) Respiration is a process which takes place in living cells. What is the purpose of *respiration*?

_____

_____

(1)

(b) (i) Balance the equation for the process of respiration when oxygen is available.

$C_6H_{12}O_6$ + O_2 → CO_2 + H_2O

(1)

(ii) What is the name of the substance in the equation with the formula $C_6H_{12}O_6$?

_____

(1)

(c) Oxygen is absorbed through the alveoli in the lungs.

(i) How are the alveoli adapted for this function?

_____

_____

_____

(2)

(ii) Name the gas which is excreted through the alveoli.

_____

(1)

(d) (i) What is the name of the process of respiration when oxygen is **not** available?

_____

(1)

(ii) Describe the process of respiration which takes place in human beings when oxygen is **not** available and give an effect.

_____

_____

_____

_____

_____

(3)

(Total 10 marks)

Q4.

Eukaryotic cells respire continuously to transfer energy.

(a) Give **two** uses of energy transferred by respiration in eukaryotes.

1. _____

2. _____

(2)

(b) Name the cell structure in a eukaryotic cell where aerobic respiration occurs.

_____

(1)

(c) Muscle cells and plant cells can respire anaerobically.

Compare the processes of anaerobic respiration in muscle and plant cells.

_____

_____

_____

_____

_____

_____

_____

_____

(4)

(d) Anaerobic respiration in muscle cells creates an oxygen debt.

What does oxygen debt mean?

_____

_____

(1)

(Total 8 marks)

Q1.

(a) any **two** from:

- sex
- age
- fitness levels

Ignore reference to healthier unqualified

allow gender

allow level of exercise

- weight

allow BMI

ignore height / size

- medical condition / illness

allow relevant named medical condition / illness eg asthma

- smoking

allow use of caffeine / drugs

2

(b) difficult to count breaths while exercising

ignore human error unqualified

allow lose count of breaths (over minute)

allow breaths too fast to count

allow description of overlap in counting breaths each minute

1

(c) 4 / 4.0 / four (minutes)

1

(d) any **two** from: (student **X**)

- has a higher (resting) breathing rate
- breathing rate increased more
- breathing rate decreased later after exercise stopped
- breathing rate returned to resting rate later
- breathing rate stayed higher after exercise stopped

*allow converse if clearly referring to student **Y***

2

(e) to increase the uptake of oxygen from the air

1

(f) to break down lactic acid

1

(g) any **one** from:

- increase in heart rate
  allow increase in pulse rate

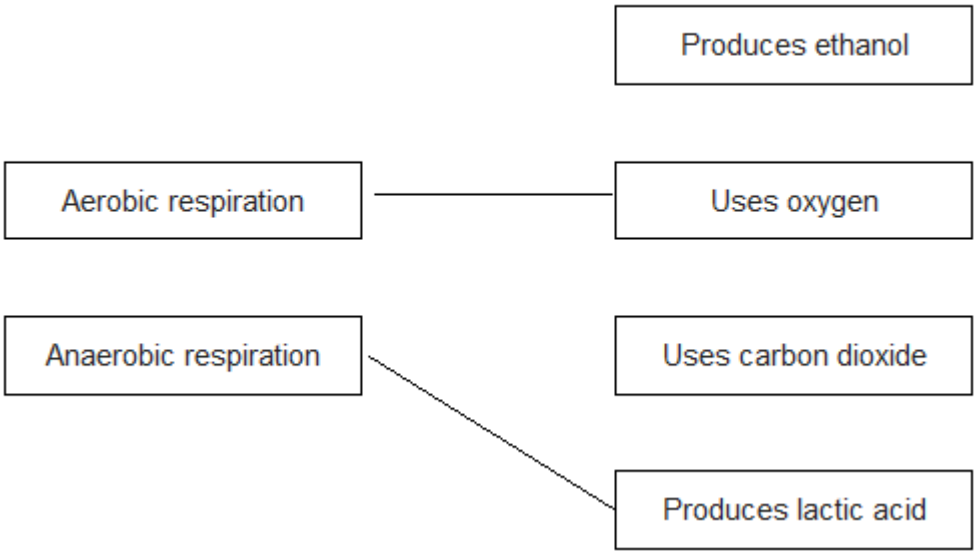
- increase in depth of breathing
  allow heavier breathing
  allow panting
  allow increase in temperature
  allow sweating
  allow blushing
  allow reddening of skin
  allow increase in metabolic rate

1

[9]

Q2.

(a)



an extra line from a LH box negates that mark

2

(b) any **one** from:

- not enough oxygen present (for aerobic respiration)
- more energy required for exercise (than can be transferred by aerobic respiration)

1

allow named example for exercise

(c) produces carbon dioxide

1

produces ethanol

1

plus any **two** from:

- (carbon dioxide) makes bread rise

- (carbon dioxide) makes beer / cider / (some) wines fizzy
  allow for alcoholic drinks / named drink
- (ethanol) is the alcohol in beer / cider / wine / spirits

2

[7]

Higher Mark Scheme

Q3.

(a) to transfer / provide / give release energy
or *production of ATP / adenosine triphosphate (molecules)*
accept to give heat

1

(b) (i) $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$
accept any other
n : 6n : 6n : 6n ratio
do not credit if any other changes have been made

1

(ii) glucose
do not credit sugar / sucrose

1

(c) (i) any **two** from

large surface

thin (surface)

moist (surface)

(with a good) blood supply

2

(ii) carbon dioxide
accept water vapour
do not credit just water

1

(d) (i) anaerobic (respiration)

1

(ii) any **three** from

in mitochondria

glucose decomposes / breaks down / reacts
or *glucose → lactic acid for (2) marks*

to give lactic acid
or *breathing hard*
or *lactic acid → CO2 + water*

causing pain

(leaving an) oxygen debt

(quick) source of energy

(but) less efficient than aerobic respiration

accept less efficient than with oxygen

3

[10]

Q4.

(a) any **two** from:

- synthesis of new molecules

  allow named molecule eg starch / glycogen / cellulose / lipids / fats / proteins / hormones / antibodies

- for active transport

- to keep warm (in mammals / birds)

  allow description

  allow to keep warm (in animals)

  allow for movement (in animals)

  allow for transmission of nerve impulses (in animals)

2

(b) mitochondria / mitochondrion

1

(c) both occur without oxygen

1

both release (a small amount of) energy

1

muscle cells produce lactic acid but plant cells produce ethanol

1

muscle cells do **not** produce carbon dioxide but plant cells do

marks can be awarded from correct word or balanced symbol equations

1

(d) the amount of oxygen needed to react with the lactic acid formed

allow the amount of oxygen needed to break down

or *oxidise the lactic acid*

1

[8]