



2 Organisation higher (import)

Name: _____

Class: _____

Date: _____

Time: **56 minutes**

Marks: **56 marks**

Comments:

1

The number of people in the UK with tumours is increasing.

(a) (i) Describe how tumours form.

.....
.....

(1)

(ii) Tumours can be malignant or benign.

What is the difference between a malignant tumour and a benign tumour?

.....
.....

(1)

(b) Describe how some tumours may spread to other parts of the body.

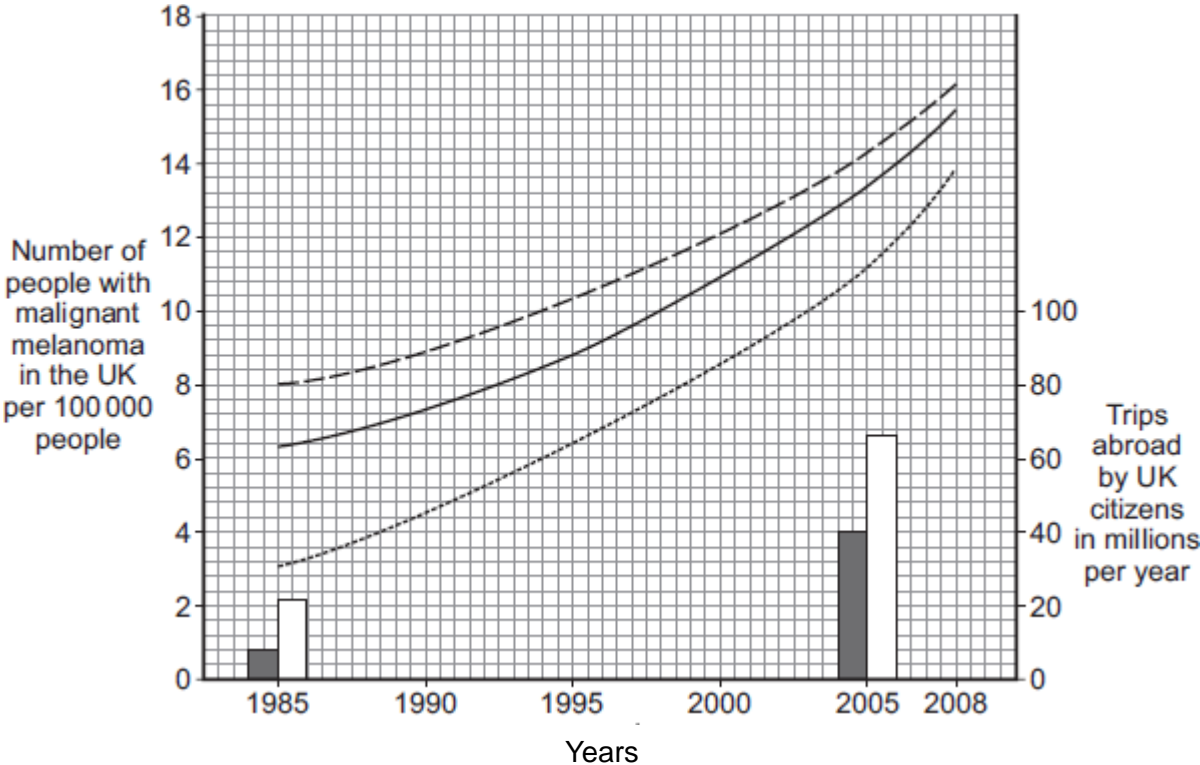
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(1)

(c) People from Northern Europe have fair skin and many people have malignant melanoma skin cancer.

The graph shows how the number of people in the UK with malignant melanoma changed between 1985 and 2008.

The bars on the graph show the number of people in the UK who travelled abroad and the number who took cheap holidays in the sun in 1985 and 2005.



Key

<p>—— Mean for all areas</p> <p>--- Mean for people from rich areas</p> <p>--- Mean for people from poor areas</p>	<p>□ Total number of trips abroad</p> <p>■ Number of cheap holidays in the sun</p>
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(i) Describe the trends in the number of people with malignant melanoma skin cancer between 1985 and 2008.

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(3)

(ii) Use the data about the number of trips abroad to suggest an explanation for the trends you have described in part **(c)(i)**.

.....

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.....

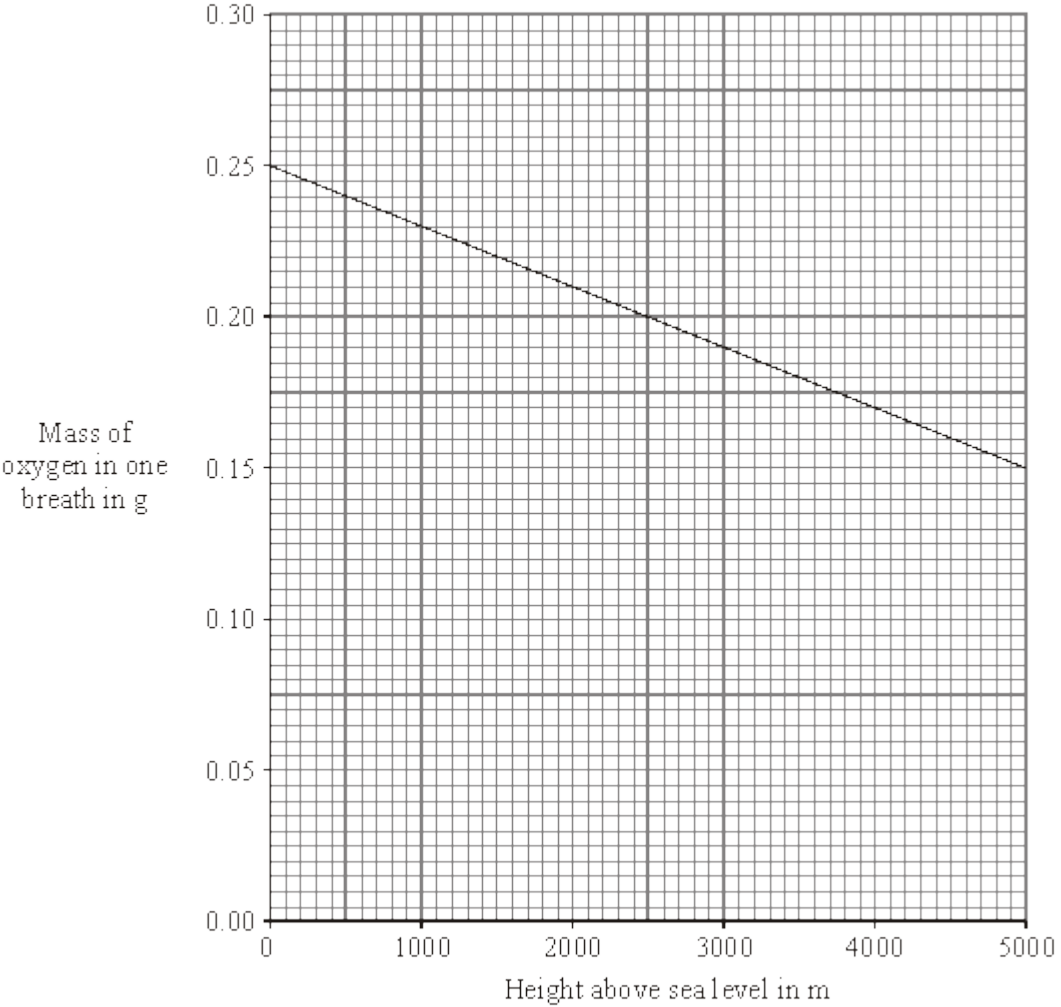
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(2)

(Total 8 marks)

2

(a) The graph shows how the mass of oxygen you breathe in changes as you climb up a mountain.



Describe, in as much detail as you can, how the mass of oxygen in one breath changes as you climb from sea level to 3000 m.

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.....

.....

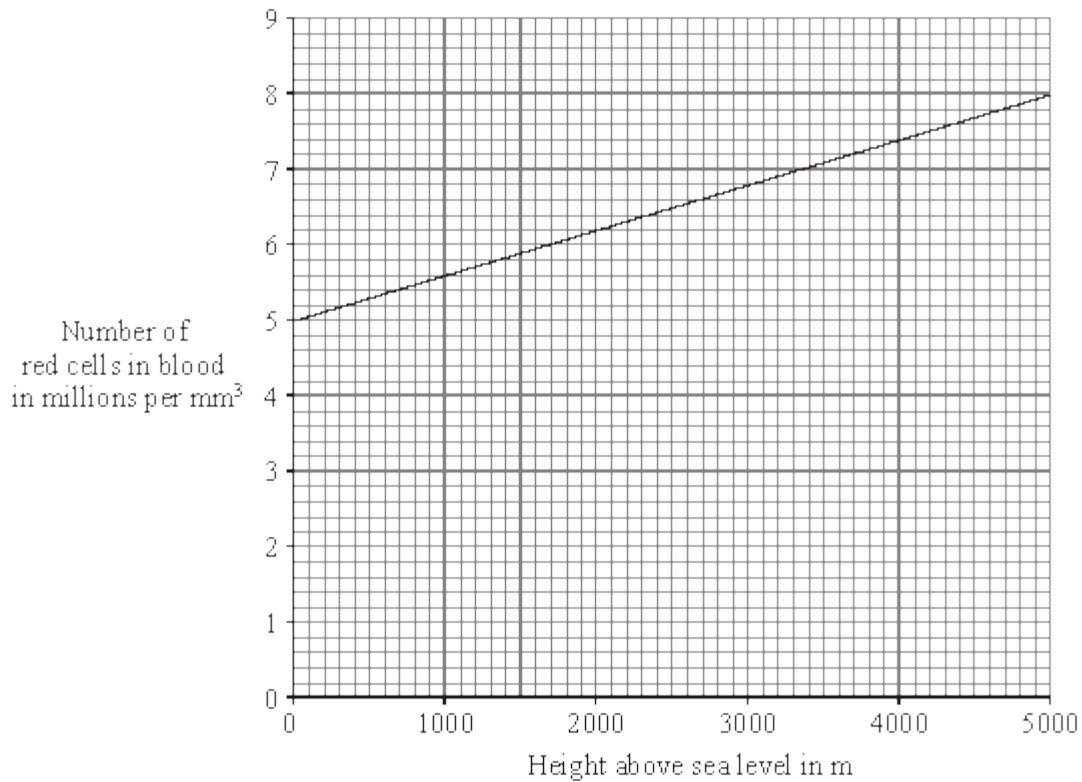
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(3)

- (b) People who live high up in mountainous areas have more red blood cells than people who live at sea level. The graph below shows how the number of red blood cells changes with height above sea level.



- (i) How many more red blood cells does a person living at 3000 m above sea level have than someone living at sea level? Show clearly how you work out your answer.

.....

Increase in number of red blood cells =millions per m³

(2)

- (ii) What is the advantage of having more red blood cells?

.....

(1)

(Total 6 marks)

3

- (a) (i) What name is given to an enzyme which catalyses the breakdown of protein?

.....

(1)

(ii) What product is formed when protein is broken down by the enzyme?

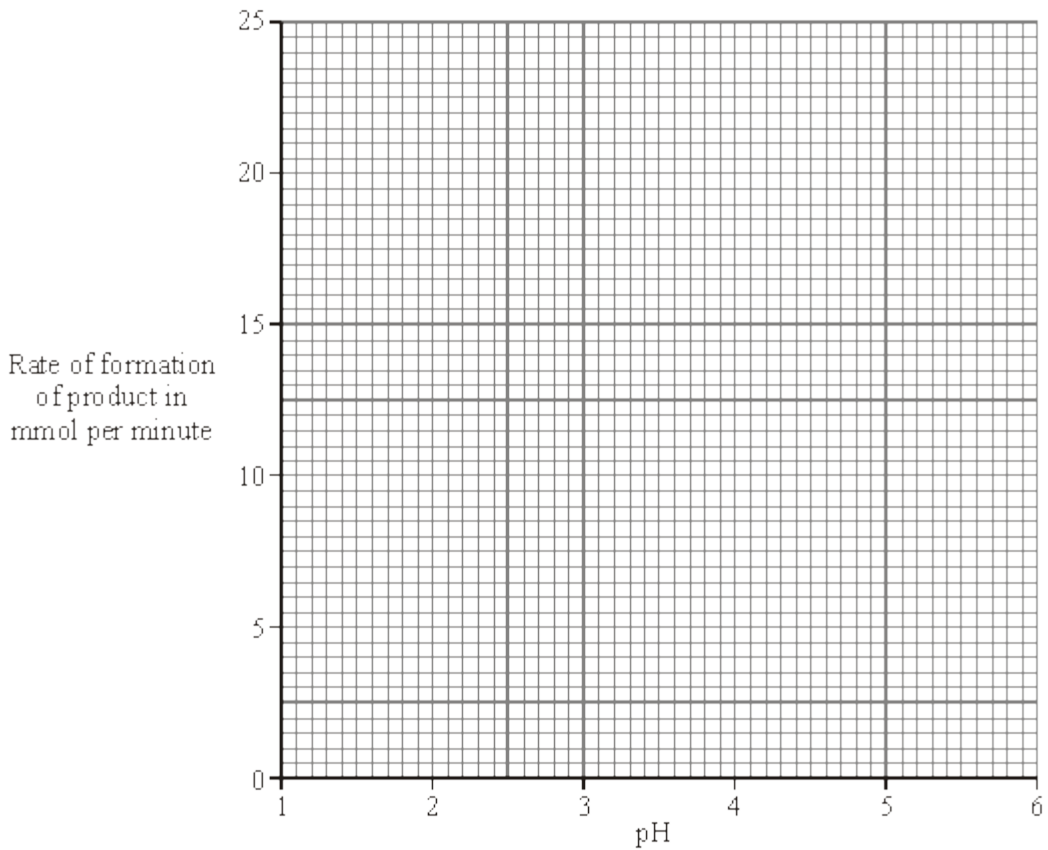
.....

(1)

The table shows the effect of pH on the activity of an enzyme which catalyses the breakdown of protein.

pH	1.0	2.0	3.0	4.0	5.0
Rate of formation of product in mmol per minute	10.5	23.0	10.5	2.5	0.0

(b) Draw a graph of the data in the table.



(3)

(c) The enzyme is produced by the human digestive system.

(i) At what pH does this enzyme work best?

(1)

(ii) Suggest which part of the digestive system produces this enzyme.

.....

(1)

(d) Why is it necessary to break down proteins in the digestive system?

.....
.....
.....
.....
.....
.....

(3)
(Total 10 marks)

4

Diet and exercise affect health.

(a) Many people are obese (very overweight).

Obesity can lead to heart disease.

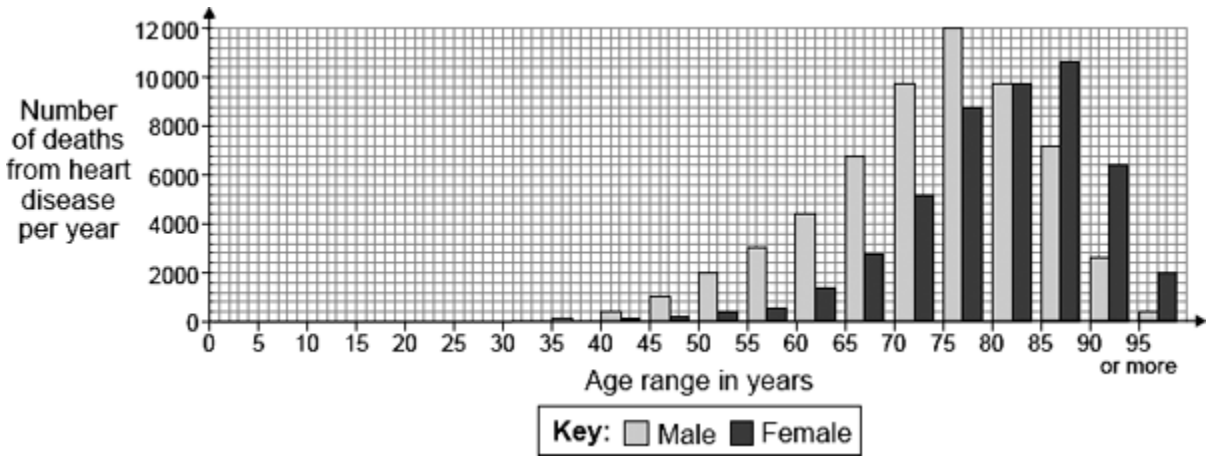
Other than heart disease, name **two** conditions which are linked to obesity.

1

2

(2)

(b) The graph shows the number of deaths from heart disease each year in the UK.



The pattern for deaths from heart disease in men is different from the pattern in women.

(i) Give **two** differences between the patterns for men and women.

- 1
-
- 2
-

(2)

(ii) Suggest **two** reasons for the difference in the number of deaths from heart disease in men and women between the ages of 40 and 60.

- 1
-
- 2
-

(2)

(c) Scientists have developed drugs to reduce the concentration of cholesterol in the blood.

Give the **three** main stages in testing a new drug before it is sold to the public.

1

.....

2

.....

3

.....

(3)
(Total 9 marks)

5

Describe the roles of the liver and the pancreas in the digestion of fats.

.....

.....

.....

.....

.....

.....

.....

.....

(Total 5 marks)

6

Plants exchange substances with the environment.

- (a) Plant roots absorb water mainly by osmosis.
Plant roots absorb ions mainly by active transport.

Explain why roots need to use the two different methods to absorb water and ions.

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.....

.....

(4)

- (b) What is meant by the *transpiration stream*?

.....

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.....

.....

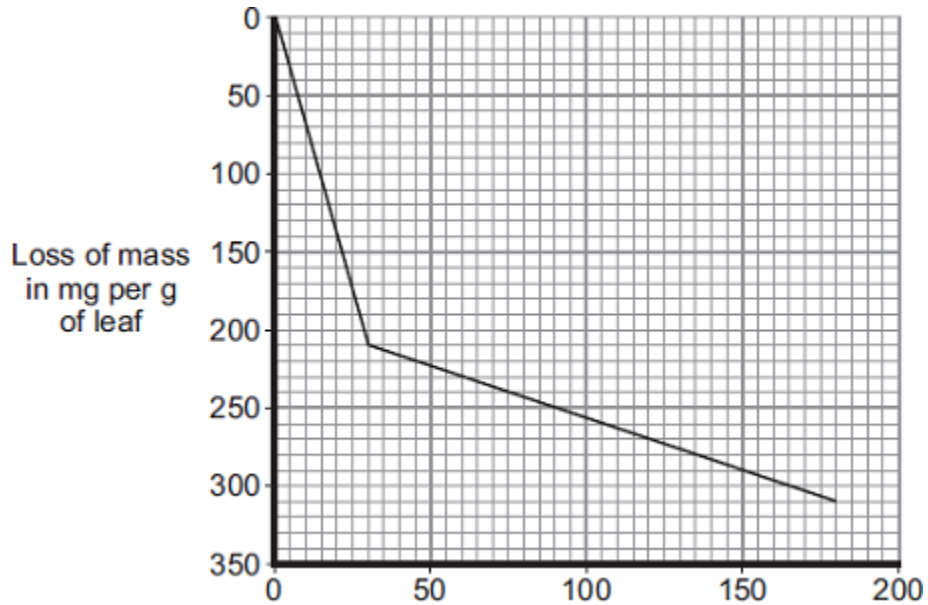
(3)

(c) Students investigated the loss of water vapour from leaves.

The students:

- cut some leaves off a plant
- measured the mass of these leaves every 30 minutes for 180 minutes.

The graph shows the students' results.



(i) The rate of mass loss in the first 30 minutes was 7 milligrams per gram of leaf per minute.

Calculate the rate of mass loss between 30 minutes and 180 minutes.

.....
.....

Rate of mass loss = milligrams per gram of leaf per minute

(2)

(ii) The rate of mass loss between 0 and 30 minutes was very different from the rate of mass loss between 30 and 180 minutes.

Suggest an explanation for the difference between the two rates.

.....
.....
.....
.....

(2)
(Total 11 marks)

7

Fresh milk is a mixture of compounds including fat, protein and about 5 % lactose sugar. Lactose must be digested by the enzyme lactase, before the products can be absorbed.

Lactase can be added to fresh milk to pre-digest the lactose. This makes 'lactose-free' milk, which is suitable for people who do not produce enough lactase of their own.

A student investigated the effect of changing pH and temperature on the digestion of lactose in milk.

The results are shown in **Tables 1** and **2**.

Table 1
Effect of pH

pH	Time taken to digest lactose in minutes
4.0	20
5.0	18
6.0	13
7.0	7
8.0	5
9.0	6

Table 2
Effect of temperature

Temperature in °C	Time taken to digest lactose in minutes
30	20
35	14
40	11
45	6
50	12
55	23

(a) The label on a carton of lactose-free milk states:

'Lactase is normally produced in the stomach of mammals.'

The results in **Table 1** show that this statement is unlikely to be true.

Explain how.

.....

.....

.....

.....

(2)

(b) Explain as fully as you can the results shown in **Table 2**.

.....
.....
.....
.....
.....
.....
.....

(3)

(c) Bile is produced in the liver and is released into the small intestine.

Explain how bile helps the digestion of milk.

.....
.....
.....
.....

(2)

(Total 7 marks)

Mark schemes

1

- (a) (i) (as a result of) uncontrolled / abnormal growth / division of cells

ignore mutation

allow cells dividing with no contact inhibition

1

- (ii) benign tumours do not invade / spread to other tissues / do not form secondary tumours

accept converse for malignant

accept benign tumours do not metastasise

1

- (b) via the blood / circulatory system

accept via lymphatic system

1

- (c) (i) incidence is increasing

1

more rapidly (over the years)

ignore figures

1

difference between rich and poor areas is getting less

or

the incidence is rising fastest in people from poor areas

accept converse for people from rich areas

1

- (ii) risk factor is UV from sunlight

ignore ionising radiation

1

more UK citizens going abroad or taking holidays in the Sun

or

poorer people can afford holidays in the Sun

or

more poorer people are taking holidays in the Sun

1

[8]

2

- (a) falls 1
- from 0.25 1
- to 0.19
- but by 0.06 gains two marks
- if neither figure given, accept steadily /
at constant rate for one mark
accept mass of oxygen inversely related
/ negative correlation to height above
sea level for 2 marks* 1
- (b) (i) 1.8
- accept correct readings from graph for (5 and 6.8) if subtraction
incorrect for one mark
allow one mark for correct subtraction from incorrect readings* 2
- (ii) (blood can carry) more oxygen 1

[6]

3

- (a) (i) protease
- accept peptidase **or** named protease
e.g. pepsin / trypsin
allow 'proteinase'* 1
- (ii) amino acids
- accept peptides / polypeptides / peptones* 1

(b) points plotted accurately

$$\pm \frac{1}{2} \text{ square}$$

deduct **1** mark per error

2

best fit curve **or** ruled point-to-point

if double line within $\frac{1}{2}$ square

allow sharp apex

do **not** allow single straight line

if no points line defines points

if (5,0) not plotted only penalise **1** mark

bar graph wide bars – **no** marks

bar graph $\pm \frac{1}{2}$ square max **2** for points

1

(c) (i) **2** **or** correct from candidate's graph

$$\pm \frac{1}{2} \text{ square}$$

1

(ii) stomach

1

(d) proteins are large / product is small

1

proteins (may be) insoluble / product is soluble

1

cannot be absorbed / cannot enter blood **or** cannot pass through gut lining

accept reverse referring to product

1

[10]

4

(a) any **two** from:

- arthritis
allow damaged joints
- diabetes
accept high blood sugar
- high blood pressure
- strokes
allow blocked blood vessels / thrombosis
- allow breathing difficulties
ignore cancer
ignore high cholesterol

2

(b) (i) any **two** from:

to gain marks there must be a comparison
ignore comparison at single age

- lower number of women deaths up to age of 75-80
- higher number of women deaths after 80
ignore women die older or men die younger
- men's peak higher
- men's peak at an earlier age
- men's death start earlier than women
- more men than women die of heart disease

2

(ii) any **two** from:

- men smoke more (cigarettes)
ignore alcohol
- more men smoke
- men under more stress
- men less active
- more men overweight / eat more / less diet conscious **or** different fat distribution
ignore reference to body size
- genetic factors
- men might have lower metabolic rate
ignore references to hormones
- men less likely to visit doctor even though they have symptoms

2

(c) *points can be in any order*

laboratory tests / tests on tissues

or

tests on animals

or

tests for toxicity

ignore computer simulations

1

tests for side effects on volunteers / healthy people / small numbers

1

widespread testing

or

testing for optimum dose

or

test on patients / sick people

or

test to see if it is effective

accept use of placebo

1

[9]

5

pancreas produces lipase
which breaks down / digests fats into fatty acids and glycerol
liver produces bile / hydrogen carbonate
which neutralises acids / makes alkaline
provides optimum / best / most effective pH for lipase / enzyme action
bile emulsifies fats / description
increasing the surface area for lipase / enzyme to act on

any five for 1 mark each

(digestion is in stomach / liver / pancreas – penalise only once)

[5]

6

(a) solution in soil is more dilute (than in root cells)

concentration of water higher in the soil (than in root cells)

1

so water moves from the dilute to the more concentrated region

*so water moves down (its) concentration gradient **or** water moves from a high concentration of water to a lower concentration*

1

concentration of ions in soil less (than that in root cells)

1

so energy needed to move ions

or

ions are moved against concentration gradient

the direction of the concentration gradient must be expressed clearly

accept correct reference to water potential or to concentrations of water

1

(b) any **three** from:

- movement of water from roots / root hairs (up stem)
- via xylem
- to the leaves
- (water) evaporates
- via stomata

3

(c) (i) 0.67/0.7

accept 0.66, 0.666666... or $\frac{2}{3}$ or 0.6

correct answer gains 2 marks with or without working

if answer incorrect allow evidence of $\frac{100}{150}$ for 1 mark

*do **not** accept 0.6 or 0.70*

2

(ii) during the first 30 minutes

any **one** from:

- it was warmer
- it was windier
- it was less humid
- there was more water (vapour) in the leaves

1

so there was more evaporation

ignore 'water loss'

or

stomata open during first 30 minutes **or** closed after 30 minutes (1)

so faster (rate of) evaporation in first 30 min **or** reducing (rate of) evaporation after 30 min (1)

1

[11]

7

(a) stomach is acidic / has low pH

allow any pH below 7

ignore stomach is not alkaline

1

lactase works best / well in alkali / high pH / neutral / non-acidic conditions

allow any pH of 7 and above

accept works slowly in acid conditions

*allow figures from table with a **comparison***

ignore reference to temperature

1

(b) any **three** from

- (below 45(°C)) increase in temperature increases rate / *speed* of reaction
- reference to molecules moving faster / colliding faster / harder / more collisions
- optimum / best at 45(°C)
allow value(s) in range 41 - 49
- high temps / above 45(°C) (rate slows due to) denaturation of enzyme /lactase
*allow synonyms of denaturation but **not** killed*
*denaturation at high **and** low temperature does **not** gain this mark*
ignore body temperature
ignore references to time / pH

3

(c) any **two** from

- acid neutralised **or** conditions made neutral / alkali
accept bile is alkaline
- (allow) emulsification / greater surface area of fat / lipid
allow description of emulsification eg fat is broken down / broken up into droplets
- enzymes (in small intestine) work (more effectively / better)
allow better for enzymes

2

[7]