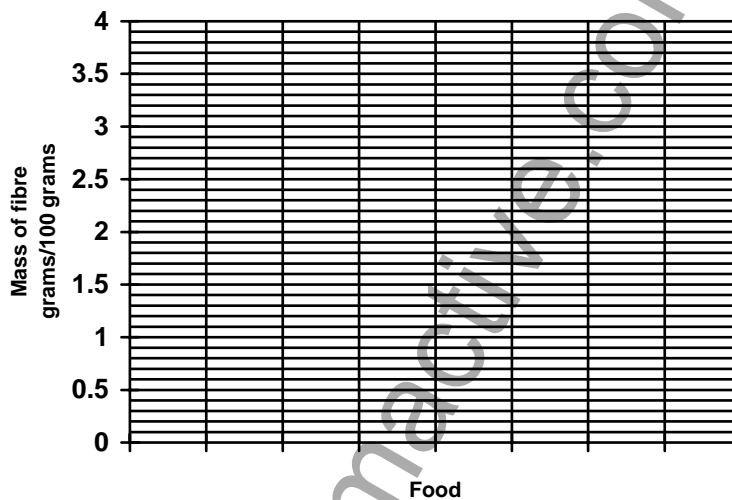


The table shows the mass of fibre in 100 grams of 5 foods.

Food	Mass of fibre (grams per 100 grams)
Beans	3.6
Bread	2.4
Soup	0.7
Cornflakes	2.5
Pasta	3.0

(a) Plot a bar chart of these figures on the grid below.



[3]

(b) A small tin of beans contains 200 grams. If you eat $\frac{2}{3}$ s of a small tin of beans, how much fibre would you eat? Show your working.

[2]

(c) What is the function of fibre in the diet?

.....
 [1]

(d) Give **two** effects of lack of fibre in the diet.

.....
 [2]

Low Demand Questions

QUESTIONSHEET 2

Complete the following table by choosing the correct function from the list. Write the letter of the function in the box. The first one has been completed as an example.

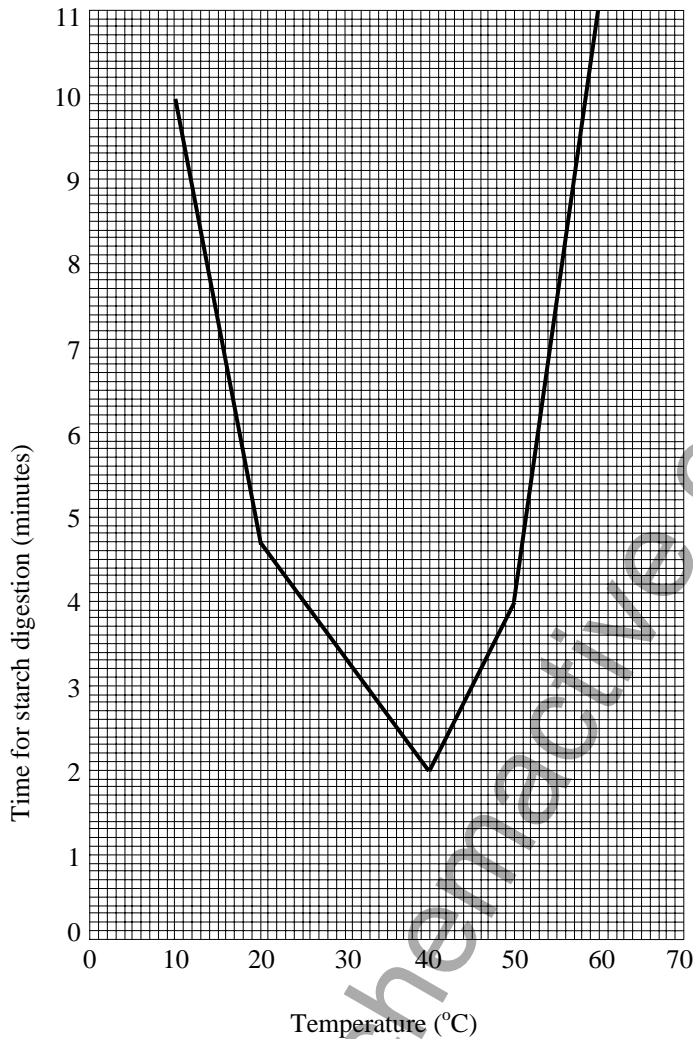
FUNCTION

1. Chews and grinds food.
2. Absorbs water from food.
3. Produces bile.
4. Stores bile.
5. Produces acid and a protein-digesting enzyme.
6. Absorbs digested food into the blood.

Part of digestive system	Function
Teeth	1
Gall bladder	
Stomach	
Liver	
Small intestine	
Large intestine	

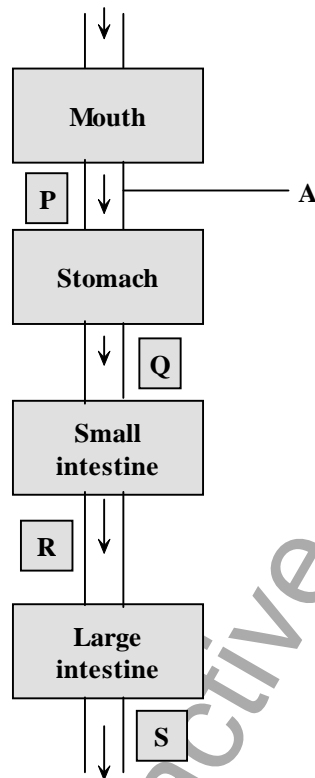
[5]

The graph shows the time taken for 1 gram of starch to be digested at different temperatures.



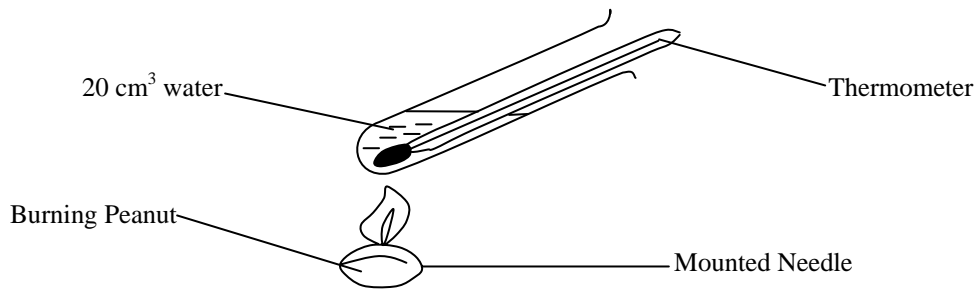
- (a) At which temperature was the starch digested
- (i) most quickly [1]
- (ii) most slowly? [1]
- (b) At which **two** temperatures did it take 4 minutes for the starch to be digested?
1. [1]
2. [2]
- (c) Which of these types of enzymes digests starch?
- proteases carbohydrases lipases**
- Answer [1]
- (d) What is starch digested into?
- [1]

The diagram shows the main parts of the digestive system



- (a) Name structure A. Choose from this list.
duodenum rectum trachea oesophagus
- [1]
- (b) How is food moved along structure A?
- [1]
- (c) As food passes along the digestive system enzymes are added to it. There are three types of digestive enzyme - lipases, carbohydrases and proteases. Which of these types of enzyme is produced in:
- (i) the mouth?..... [1]
- (ii) the stomach?..... [1]
- (d) The pancreas also produces digestive enzymes. Which of the positions, P, Q, R or S shows the position of the pancreas?
- [1]
- (e)(i) In which part of the digestive system are villi found?
- [1]
- (ii) What is the function of villi?
- [1]

Below is a simplified version of an experiment to measure the energy content of food.



The results of the experiment are shown in the table below

	Mass	Temperature of water before heating	Temperature of water after heating
Peanut	1 g	17 °C	95 °C
Bread	1 g	19 °C	40 °C

- (a) Calculate the rise in temperature of the water with:
- (i) the peanut.
 [1]
- (ii) the bread
 [1]
- (b) Not all the heat given off by the burning food is absorbed by the water. Give *two* reasons for this.

 [2]
- (c) The amount of heat absorbed by the water using the following formula
 $4.2 \times \text{amount of water} \times \text{temperature rise} = \text{heat absorbed}$

 [2]
- (d) What is the relationship between the temperature rise and the energy content of a food?

 [1]
- (e) What is present in the peanut that makes it burn readily?
 [1]
- (f) What is left at the end of the experiment when the foods are completely burnt?
 [1]

Medium Demand Questions

QUESTIONSHEET 6

- (a) Complete the following table of nutrients and their effects in the body by filling in the boxes with the most appropriate word or words.

Nutrient	Use in body	Symptoms of deficiency
iron	(i)	anaemia- too few red blood cells
(ii)	absorption of calcium from food	(iii)
calcium	strengthening of bones and teeth	rickets-soft bones and teeth
vitamin C	(iv)	scurvy-bleeding gums, poor wound healing

[4]

- (b) Explain why people with anaemia always feel tired.

.....

..... [2]

- (c) In addition to vitamins and minerals a balanced diet should include carbohydrates, fats, protein and fibre. Explain why each of these nutrients is needed.

(i) Carbohydrates [1]

(ii) Fats [1]

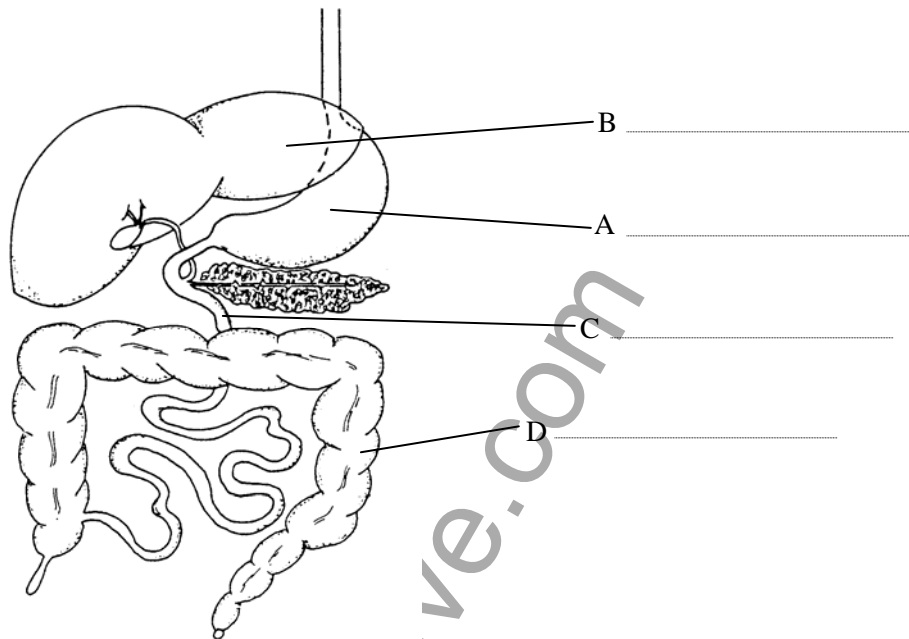
(iii) Protein [1]

- (d) Explain why too much fat in the diet is unhealthy.

.....

..... [2]

The diagram below shows part of the human digestive system.

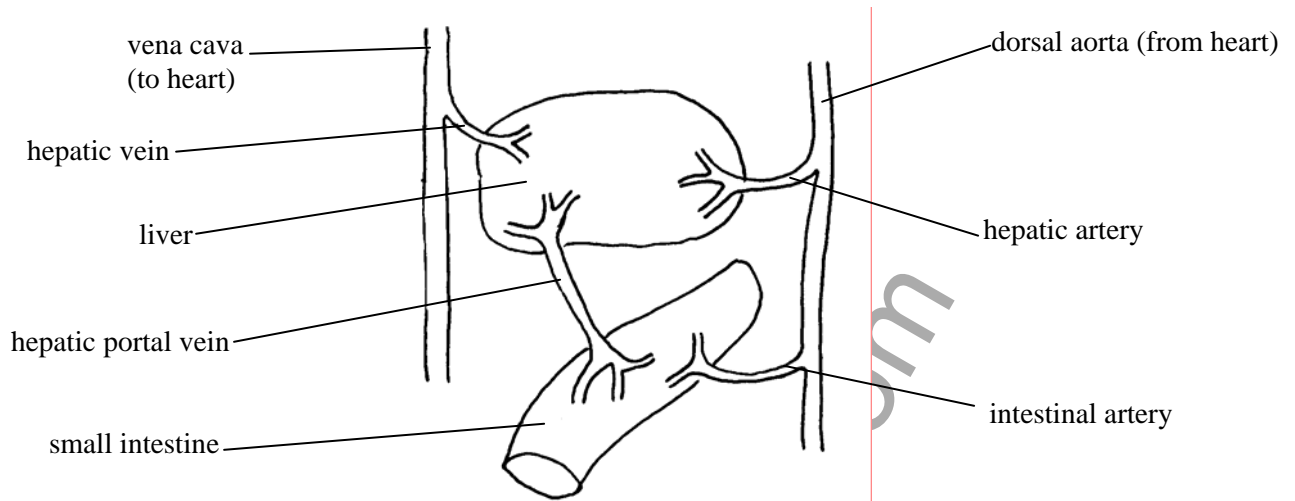


- (a) On the diagram, name the parts A, B, C and D. [4]
- (b) Name one part of the digestive system where:
- (i) bile is produced. [1]
 - (ii) faeces are stored. [1]
 - (iii) the digestion of protein begins. [1]
 - (iv) carbohydrase, protease and lipase enzymes are produced.
..... [1]

Medium Demand Questions

QUESTIONSHEET 8

The diagram below shows some of the blood vessels associated with the intestine and the liver.



- (a) Digested foods are absorbed into the blood and carried to the liver. Through which blood vessel do they travel? [1]
- (b)(i) What happens to excess glucose when it reaches the liver?

 [2]
- (ii) Name the hormone which controls this process.
 [1]
- (iii) Where is this hormone produced?
 [1]
- (c)(i) In the liver excess amino acids are deaminated. What chemical is produced as a result of this deamination?
 [1]
- (ii) This chemical is transported to the kidneys. Through which *two* blood vessels, shown on the diagram above does this chemical travel?

 [2]

Medium Demand Questions

QUESTIONSHEET 9

- (a) What is the purpose of digestion?

.....

..... [2]

- (b)(i) The table shows some parts of the human digestive system, the enzymes used for digestion, the nutrients digested and the products of digestion.

Complete the table by writing the most appropriate word or words in the blank spaces.

Part of digestive system	Enzyme used for digestion	Nutrients digested	Products of digestion
mouth	salivary amylase (carbohydrate)	starch	sugars
stomach	pepsin	1.	
small intestine	2.	lipids	3

[3]

- (ii) Name
- one**
- other enzyme which would be present in the small intestine.

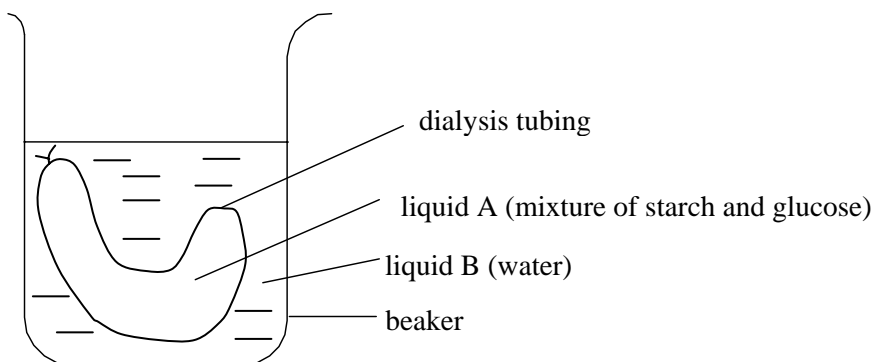
..... [1]

- (c) The rate at which enzymes digest nutrients in the digestive systems depends upon the conditions. Name
- two*
- conditions present in the stomach which are needed for the action of protease.

.....

..... [2]

The diagram shows an experiment to illustrate absorption in the digestive system.



(a) Dialysis tubing is described as selectively permeable. What does this mean?

 [1]

(b) The dialysis tubing represents the wall of the small intestine. What is represented by:
 (i) liquid A? [1]
 (ii) liquid B? [1]

(c) (i) At the start and after 1 hour samples of liquids A and B were tested for starch and sugar. Complete the following table to show the results of these tests. Use a tick (✓) to indicate a positive result and a cross (X) to indicate a negative result.

Time of test	Liquid A		Liquid B	
	Starch test	Glucose test	Starch test	Glucose test
At start	✓			✓
After 1 hour	✓			✓

[4]

(ii) What do these results indicate about the relative size of starch and glucose molecules?
 [1]

(d) (i) Describe how you would carry out a starch test. What would show a positive result?

 [2]

(ii) Describe how you would carry out a test for glucose. What would show a positive result?

 [3]

Medium Demand Questions

QUESTIONSHEET 11

The table below lists some features of 3 digestive juices. If a feature is correct place a tick (✓) in the appropriate box and if it is incorrect place a cross in the appropriate box. The first feature has been answered for you.

Feature	Saliva	Gastric juice	Pancreatic juice
is slightly alkaline (pH above 7).	✓	X	✓
contains a protein-digesting enzyme.			
contains lipase.			
helps to kill bacteria taken in with food			
contains amylase			
passes down the oesophagus			
is produced by the stomach			

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(a) Name the part of the digestive system where:

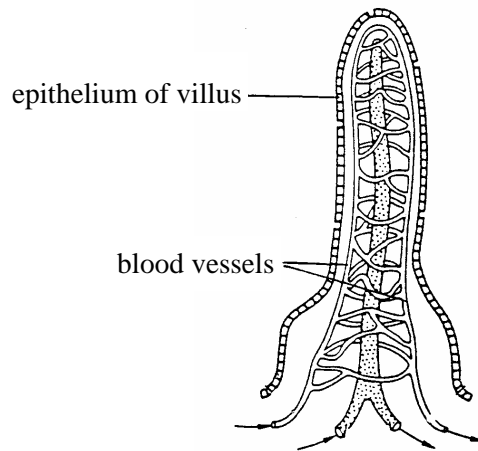
(i) most absorption of digested food takes place.

..... [1]

(ii) most absorption of water takes place.

..... [1]

(b) The diagram shows a villus used to absorb food from the digestive system. During absorption food passes from the intestine into the blood.



(i) State *two* ways in which a villus is adapted to speed up absorption.

1..... [1]

2..... [2]

(ii) Name *one* process by which digested foods may be absorbed.

..... [1]

(c) Describe what happens to food which is not digested and absorbed.

.....

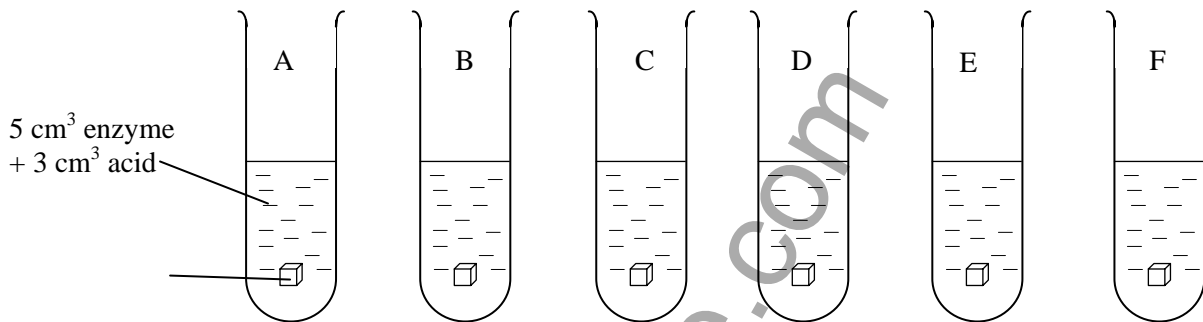
.....

..... [3]

High Demand Questions

QUESTIONSHEET 13

An enzyme extracted from the stomach breaks down protein. Boiled egg white is made mainly of protein. A student carried out an investigation into the effects of temperature activity of this enzyme. The student set up six test tubes each containing the same concentration of enzyme and hydrochloric acid. Each tube was placed in a water bath at a different temperature. All the tubes were left in the water bath for 5 minutes. A cube of egg white of the same size was added to each of the tubes. The time taken for the cube of egg white to disappear in each tube was recorded. The diagram below shows the six test tubes and the results.



Temperature of contents/ °C	20	30	40	50	60	70
Time for cube of egg white to disappear	14	10	5	12	did not disappear	did not disappear

(a) (i) Describe the pattern shown by these results.

.....

.....

.....

..... [4]

(ii) At which temperature did the enzyme work best? [1]

(b) (i) Why was hydrochloric acid added to each tube?

..... [1]

(ii) Suggest why the tubes were left in a water bath for 5 minutes before adding the cube of egg white.

..... [1]

(c) (i) Explain why the cube of egg white disappeared.

.....

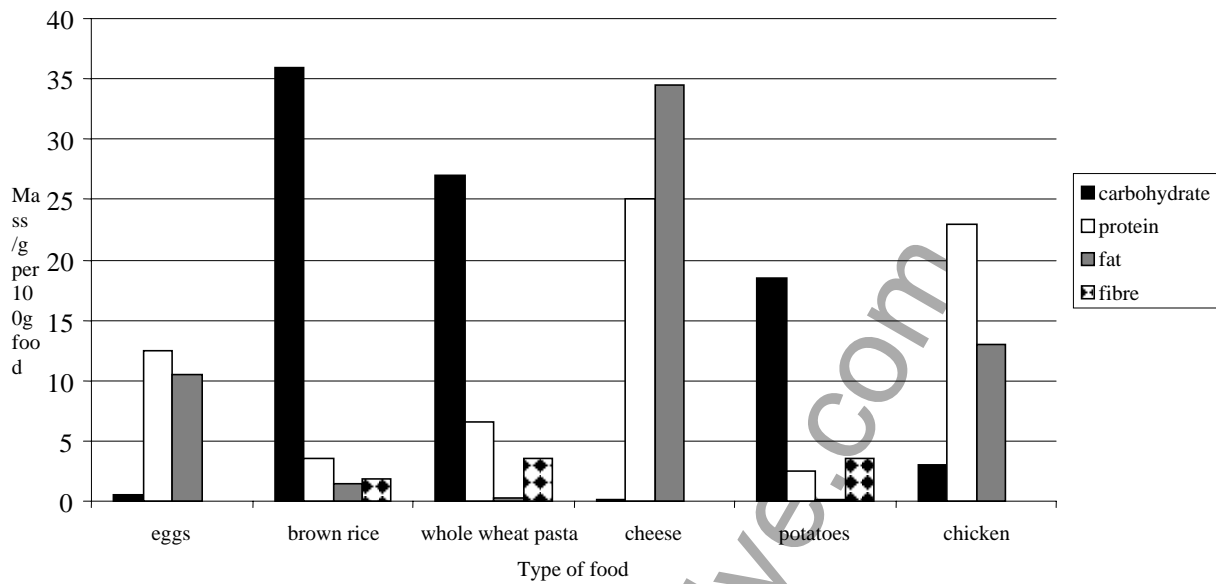
.....

..... [3]

(ii) Suggest why the protein was not digested in the tubes kept at 60°C and 70°C.

..... [1]

The bar chart below shows the composition of some common foods.



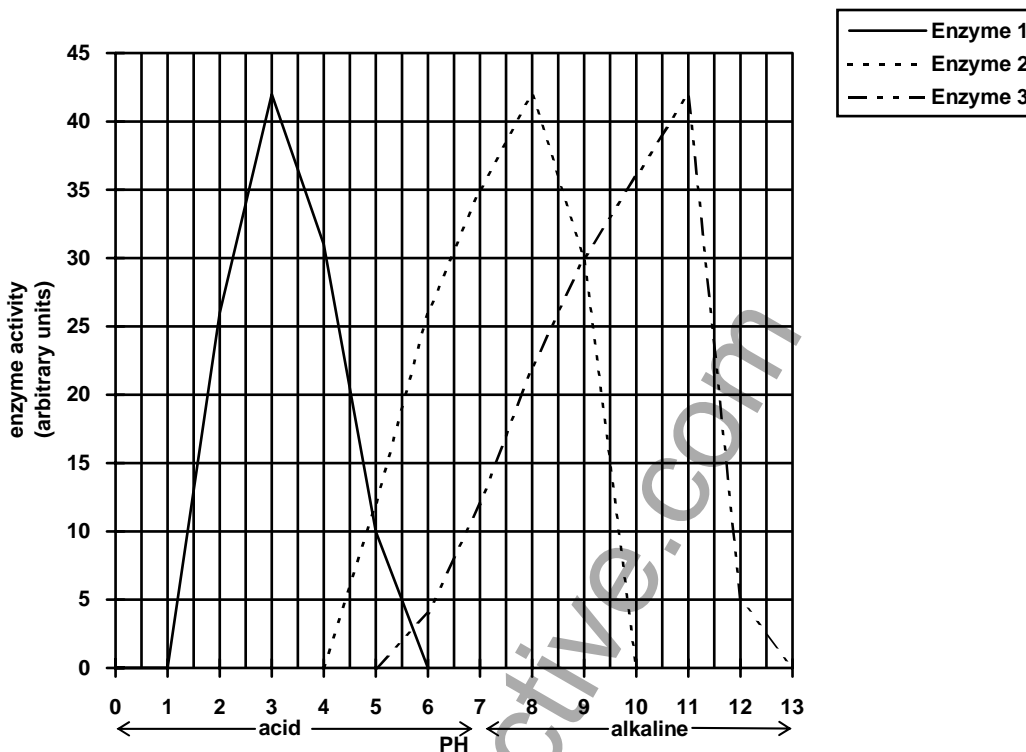
- (a) (i) Name *two* foods from the bar chart a person suffering from constipation would be advised to eat.
 [1]
- (ii) Give a reason for you answer.
 [1]
- (b) Coeliac disease occurs in people who are sensitive to the protein gluten. This protein is found in wheat and other cereals. As a result of exposure to gluten, the small intestine loses its villi.
- (i) Name *one* energy containing food people with coeliac disease could eat to obtain fibre. Give a reason for your choice.
 [2]
- (ii) Suggest why people with coeliac disease are often underweight.
 [2]
- (c) Describe the chemical digestion of pasta in the mouth and stomach.
 [4]

The table shows the daily nutrient needs of children of different ages

Mass of nutrient needed per day				
Nutrient	Boy aged 5 -11	Girl aged 5 -11	Boy aged 12 -16	Girl aged 12 - 16
Fat /g	66 - 85	60 - 75	75	70
Protein /g	30 - 65	30 - 65	80 - 100	75 - 90
Calcium /mg	700	700	500	500
Iron /mg	10	10	8	10

- (a) A 9 - year old boy needs 10 mg of iron per day. Calculate the percentage change in the daily mass of iron needed when the same boy is 14 years old. Show your working
- [3]
- (b) The daily mass of iron needed by boys changes as they get older but the mass of iron needed by girls does not change. Suggest and explain *one* reason why.
-
- [2]
- (c) (i) Describe the pattern shown in the need for calcium of children of different ages
-
- [1]
- (ii) Give *one* explanation for this pattern.
-
- [1]
- (d) (i) Explain why boys and girls aged 12 - 16 need more protein than boys and girls aged 5 - 11.
- [1]
- (ii) Explain why boys aged 12 - 16 need more protein than girls of the same age.
- [1]
- (e) A boy of 16 has a greater mass than a boy of 11. The energy requirement of the boy aged 16 is less than that of the boy age 11. Suggest an explanation
-
- [2]

The graph shows the effect of pH on the activity of 3 enzymes.



- (a) Which enzyme is:
- (i) pepsin? [1]
 - (ii) salivary amylase? [1]
- (b)(i) Which of the 3 enzymes works best in strongly acid conditions?
..... [1]
- (ii) How does the digestive system provide these conditions?
..... [1]
- (c)(i) Which enzyme works best in very alkaline conditions?
..... [1]
- (ii) Why is it unlikely that this enzyme is found in humans?
..... [1]
- (d) Describe the effect of pH on the activity of enzyme 2.
.....
.....
.....
..... [4]

A student carried out an investigation into the digestion of fat in milk. The student set up 5 test tubes containing the substances shown in the table 1. The indicator changes from blue in alkaline conditions to colourless in acid conditions.

TABLE 1

Contents of tube	Test tube number				
	1	2	3	4	5
Milk	3.0 ml	3.0 ml	3.0 ml	3.0 ml	3.0 m
Indicator	1.0 ml	1.0 ml	1.0 ml	1.0 ml	1.0 ml
Enzyme	1.0 ml	1.0 ml	1.0 ml	1.0 ml	0.0 ml
Distilled water	1.0 ml	0.9 ml	0.8 ml	0.6 ml	1.5 ml
Alkali solution	0.0 ml	0.1 ml	0.2 ml	0.4 ml	0.5 ml
Temperature of tube (°C)	35	35	35	35	35

- (a) Which tube would be:
- (i) most alkaline? [1]
- (ii) least alkaline? [1]
- (b) Why were the 5 test tubes kept at the same temperature?
..... [1]
- (c) Tube 5 did not contain any enzyme. Why was this tube set up?
..... [2]
- (d) Table 2 shows the times taken for the indicator in each test tube to become colourless.

TABLE 2

Test tube number	1	2	3	4	5
Time for indicator to become colourless (minutes)	22.1	7.8	4.5	16.5	No change

- (i) Name the type of enzyme used in this investigation.
..... [1]
- (ii) Explain why the indicator changes from blue to colourless.
..... [2]
- (iii) In a second investigation, the student set up test tube 3 again but added bile salts to the tube. The indicator changed colour in 2.5 minutes. Explain why.
..... [3]

The table shows the nutritional requirements of a 16 year old male.

Mass	74 kg
Energy requirement per day	9,180 kJ
Energy required from carbohydrates	2/3 of daily requirement
Energy required from fat	1/3 of daily requirement
Mass of protein required per day	1.2 g per kg of body mass

Carbohydrate has an energy value of 17 kJ per gram and fat has an energy value of 35 kJ per gram

- (a) Calculate the mass of protein needed per day by the 16 year old male. Show your working.

Answer [2]

- (b) (i) Calculate how much energy the 16 year old should obtain from carbohydrate. Show your working.

Answer [2]

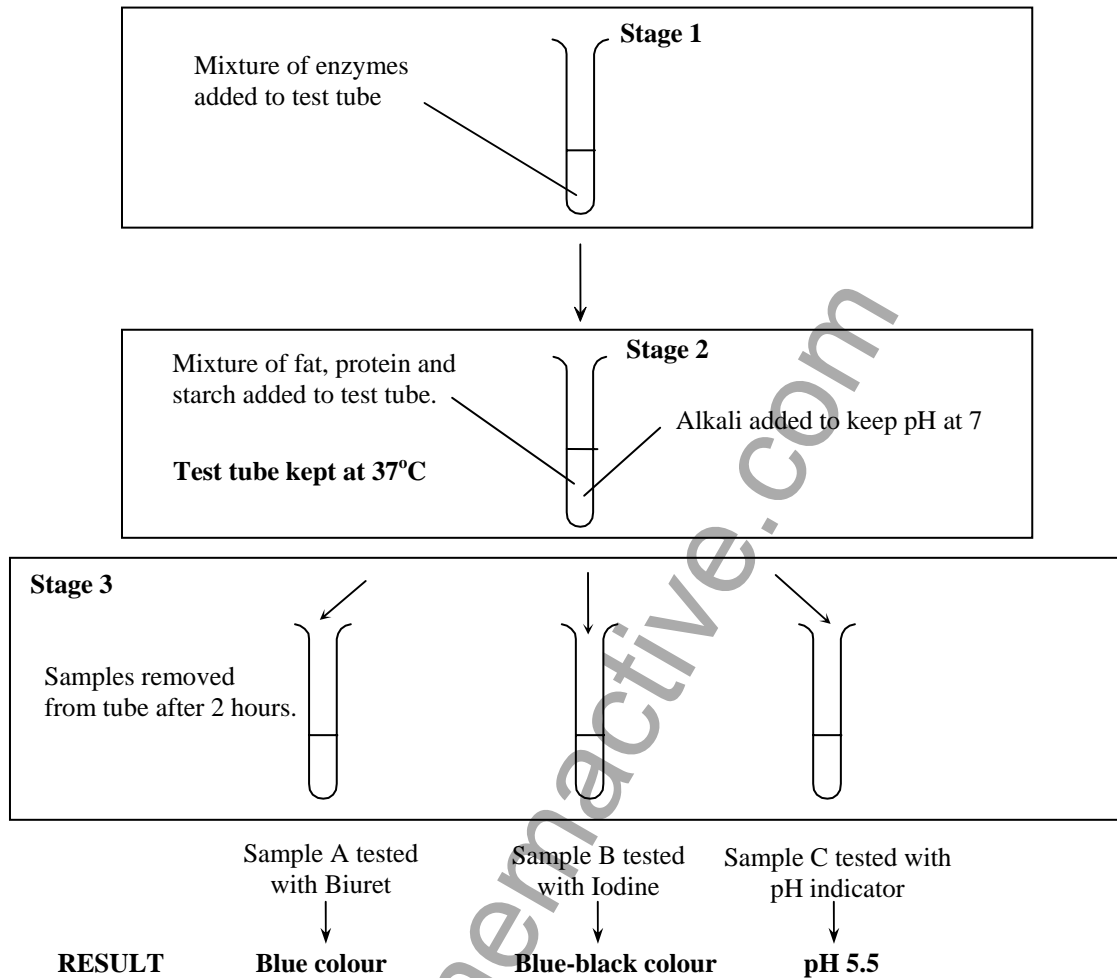
- (ii) Calculate the mass of carbohydrate the 16 year old would need to eat to supply the energy needed from carbohydrate. Show your working.

Answer [2]

- (c) Eskimos of the same age have a daily energy requirement which is 40% higher. Suggest a reason for this.

.....
..... [1]

The following investigation was carried out using a mixture of enzymes.

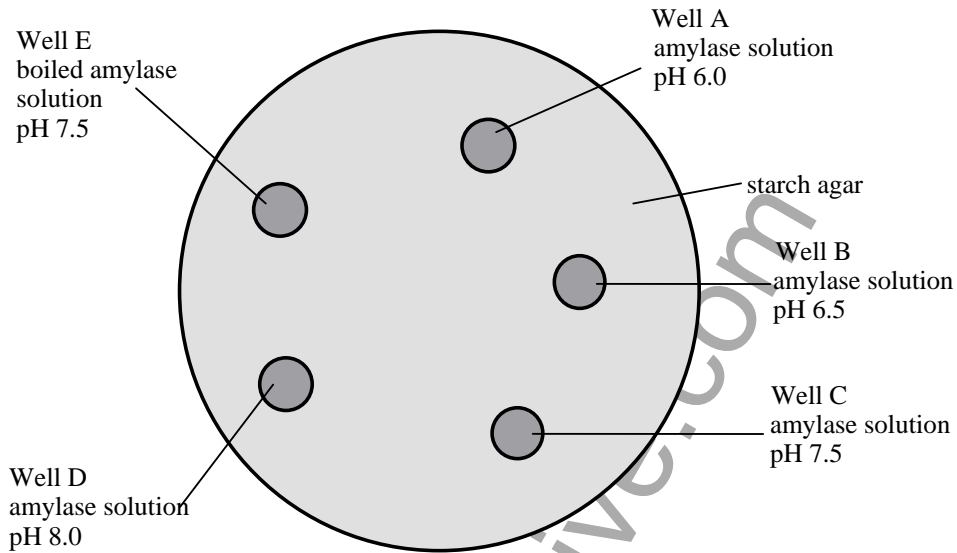


- (a) How would you keep the test tube at 37°C?
..... [1]
- (b) (i) What does the blue - black indicate when sample B was tested with Iodine?
..... [1]
- (ii) Explain why this result was obtained.
..... [1]
- (c) Explain why the mixture of enzymes must have contained a protein-digesting enzyme.
..... [2]
- (d) Explain why sample C had a pH of 5.5 when tested with pH indicator.
..... [2]

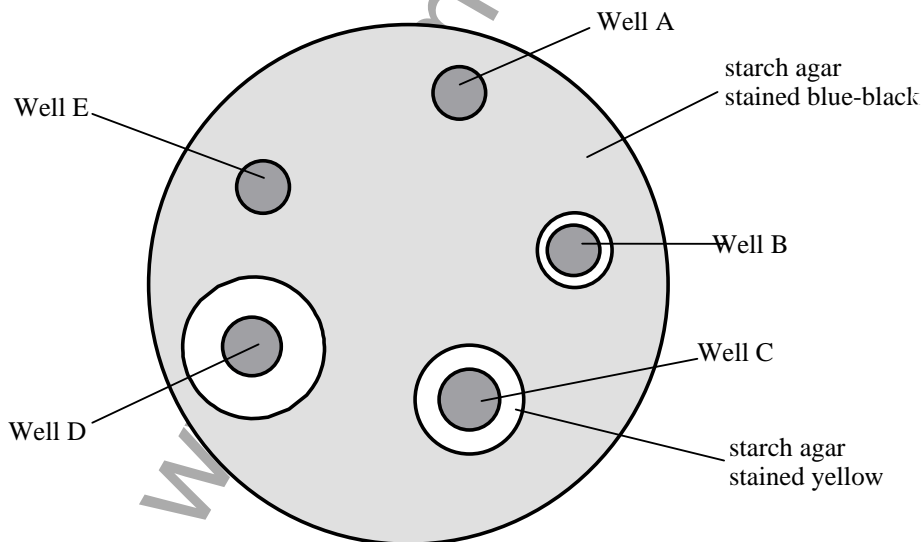
High Demand Questions

QUESTIONSHEET 20

An investigation was carried to find out how pH affected the activity of amylase. Starch agar was poured into a petri dish and allowed to cool and set. 5 wells were cut in the agar and a different solution placed into each well as shown in the diagram.



The petri dish was kept at 37°C for 2 hours and then the surface of the agar was flooded with iodine solution. The result of this iodine test is shown below.



(a) (i) What do the yellow areas on the agar indicate?

..... [1]

(ii) Explain how the yellow areas were caused.

.....

..... [2]

(Continued...)

QUESTIONSHEET 20 CONTINUED

(b) Explain why the largest yellow area was found around well D.

.....
..... [2]

(c) Why was there no yellow area around well E?

.....
..... [2]

(d) What does this investigation tell you about the effect of pH on the activity of amylase?

.....
.....
..... [3]

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