# ANIMAL NUTRITION P2 QUESTIONS 5090

## 5. Animal nutrition

**Content**

5.1 Nutrients
5.2 Diet
5.3 World food supplies
5.4 Human alimentary canal
5.5 Chemical digestion
5.6 Absorption and assimilation

**Learning outcomes**

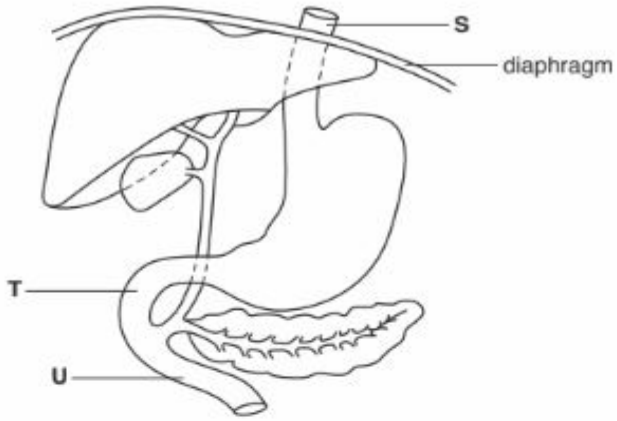
*Candidates should be able to:*

*(a)* list the chemical elements that make up:
• carbohydrates
• fats
• proteins
*(b)* describe tests for:
• starch (iodine in potassium iodide solution)
• reducing sugars (Benedict's solution)
• protein (biuret test)
• fats (ethanol emulsion test)
*(c)* list the principal sources of, and describe the dietary importance of carbohydrates, fats, proteins, vitamins (C and D only), mineral salts (calcium and iron only), fibre (roughage) and water
*(d)* name the diseases and describe the symptoms resulting from deficiencies of vitamin C (scurvy), vitamin D (rickets), calcium (rickets) and iron (anaemia)
*(e)* understand the concept of a balanced diet
*(f)* explain why diet, especially energy intake, should be related to age, sex and activity of an individual
*(g)* state the effects of malnutrition in relation to starvation, heart disease, constipation and obesity
*(h)* discuss the problems that contribute to famine (unequal distribution of food, drought and flooding, increasing population)
*(i)* identify the main regions of the alimentary canal and the associated organs: mouth (buccal) cavity, salivary
glands, oesophagus, stomach, duodenum, pancreas, gall bladder, liver, ileum, colon, rectum and anus
*(j)* describe the main functions of these parts in relation to ingestion, digestion, absorption, assimilation and
egestion of food, as appropriate
*(k)* identify the different types of human teeth and describe their structure and functions
*(l)* state the causes of dental decay and describe the proper care of teeth
*(m)* describe peristalsis
*(n)* explain why most foods must be digested
*(o)* describe:
• digestion in the alimentary canal
• the functions of a typical amylase, protease and lipase, listing the substrates and end-products
*(p)* describe the structure of a villus, including the roles of capillaries and lacteals
*(q)* describe the significance of villi in increasing the internal surface area

# ANIMAL NUTRITION P2 QUESTIONS 5090

**O/N18/21/Q7**

The diagram shows a region of the alimentary canal and the associated organs.




**(a) (i)** Identify part **S**.

.....

[1]

**(ii)** Name and describe the process which moves food through part **S**.

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..... [4]

**(b) (i)** Draw a (ring) around the correct words to complete the sentence below.

**higher than** **the same as** **lower than**

The pH at location **U** is ..... that at location **T**. [1]

**(ii)** Explain how the pH at location **U** results from secretions produced by organs shown in the diagram. Name these organs.

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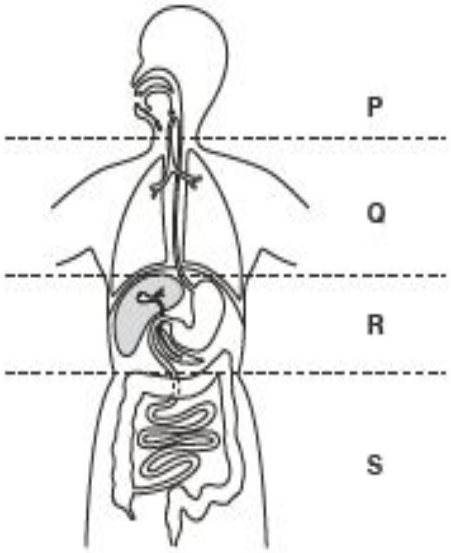
..... [4]

[Total: 10]

# ANIMAL NUTRITION P2 QUESTIONS 5090

**M/J18/22/Q5**

The diagram shows a section through the human body divided into regions P, Q, R and S.




Complete the table below by matching the letters from the diagram to the statements in the table. There may be one or more than one letter for each statement.

| contains an organ which | region or regions |
|---|---|
| ... produces an acidic secretion | R |
| ... contains villi | |
| ... digests protein | |
| ... produces insulin | |
| ... contains bronchi | |
| ... secretes amylase | |
| ... ingests food | |

[6]

[Total: 6]

# ANIMAL NUTRITION P2 QUESTIONS 5090

**M/J18/22/Q9**

(a) Explain why most foods eaten by a human must be digested.

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.....[4]

(b) Describe, with reference to the function(s) of named substances produced, the importance of each of the following organs in the process of digestion:

liver .....

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pancreas .....

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[6]

[Total: 10]

# ANIMAL NUTRITION P2 QUESTIONS 5090

## O/N17/21/Q1

Fig. 1.1 shows four types of human teeth A, B, C and D.

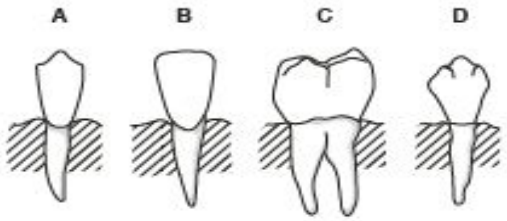



Fig. 1.1

Fig. 1.2 below shows the arrangement of teeth in the lower jaw of a human.

(a) Complete Fig. 1.2 to show the following for each of the two types of teeth indicated:

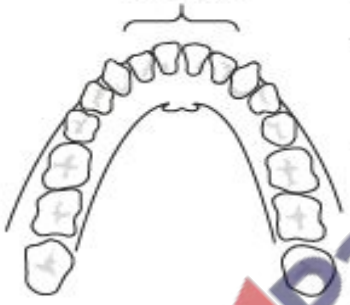
- the identity of each type of tooth by writing the correct letter A, B, C or D from Fig. 1.1
- the name of each type of tooth
- one function of each type of tooth. [6]

letter from Fig. 1.1 .....

name of type of tooth .....

one function .....

.....



letter from Fig. 1.1 .....

name of type of tooth .....

one function .....

.....

Fig. 1.2

(b) (i) State the causes of dental decay.

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.....

.....[2]

(ii) Describe the proper care of teeth.

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.....

.....[2]

[Total: 10]

# ANIMAL NUTRITION P2 QUESTIONS 5090

**O/N17/21/Q8**

**(a)** With reference to specific examples, explain how and why diet should be related to the age and activity of an individual.

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..... [4]

**(b)** Describe digestion in the human stomach.

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..... [6]

[Total: 10]

# ANIMAL NUTRITION P2 QUESTIONS 5090

**O/N17/22/Q7**

(a) Describe the causes and symptoms of each of the following:

(i) rickets,

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.....[4]

(ii) scurvy.

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.....[4]

(b) Suggest why the alimentary canal does not produce any enzymes to work on vitamins.

.....

.....

.....[2]

[Total: 10]

# ANIMAL NUTRITION P2 QUESTIONS 5090

**M/J17/22/Q2**

Four of the stages associated with human nutrition are:

**absorption** **digestion** **egestion** **ingestion**

**(a)** **(i)** State the stage in nutrition that has **not** been included in the list above.

.....[1]

Fig. 2.1 shows the human alimentary canal.

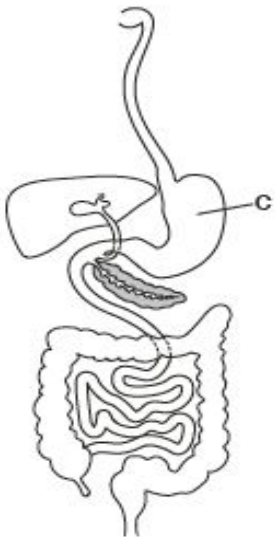


**Fig. 2.1**

**(ii)** On Fig. 2.1, use lines labelled **A** and **B** to indicate where egestion (**A**) and ingestion (**B**) occur. [2]

**(b)** State a component of the diet that is digested in region **C** in Fig. 2.1, and where the products are then absorbed into the blood.

component .....

where products absorbed .....

[2]

**(c)** Suggest the likely effect on digestion of removing a person's gall bladder.

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.....[5]

[Total: 10]

# ANIMAL NUTRITION P2 QUESTIONS 5090

**O/N16/21/Q4**

Table 4.1a shows some of the recommended dietary allowances for a child under the age of six months.

Table 4.1b shows part of the composition of bottle milk that may be fed to a child under the age of six months.

**Table 4.1a**

| component | recommended dietary allowance |
|---|---|
| energy | 2770 kJ |
| protein | 13 g |
| vitamin C | 30 mg |
| iron | 6 mg |

**Table 4.1b**

| component | amount per 100 $cm^3$ of bottle milk |
|---|---|
| energy | 277 kJ |
| fat | 3.6 g |
| carbohydrate | 7.3 g |
| protein | 1.3 g |
| vitamin C | 3.0 mg |
| iron | 0.6 mg |

(a) (I) Calculate the volume of bottle milk that a child under the age of six months should be fed each day to obtain the recommended dietary allowance of each component listed in Table 4.1a.

You may use the space below to work out your answer.

..... [2]

(II) State and explain the health risks to a child who is fed less bottle milk each day than the volume you have calculated.

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..... [4]

# ANIMAL NUTRITION P2 QUESTIONS 5090

(b) (I) Many mothers choose to feed their child breast milk rather than bottle milk.

Describe some advantages of breast milk compared with bottle milk.

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..... [4]

(II) Suggest **one** reason why a mother may choose to feed her child bottle milk.

.....

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..... [1]

[Total: 11]

# ANIMAL NUTRITION P2 QUESTIONS 5090

**M/J16/21/Q3**

Digestion in the human alimentary canal is carried out by the action of enzymes. Each food group is the substrate for a specific enzyme.

**(a)** Fig. 3.1 shows diagrams that each represent the action of a specific enzyme to break down a substrate into one or more end products.

Diagram **F** in Fig. 3.1 has been completed for you.

Complete diagrams **G** and **H** in Fig. 3.1.

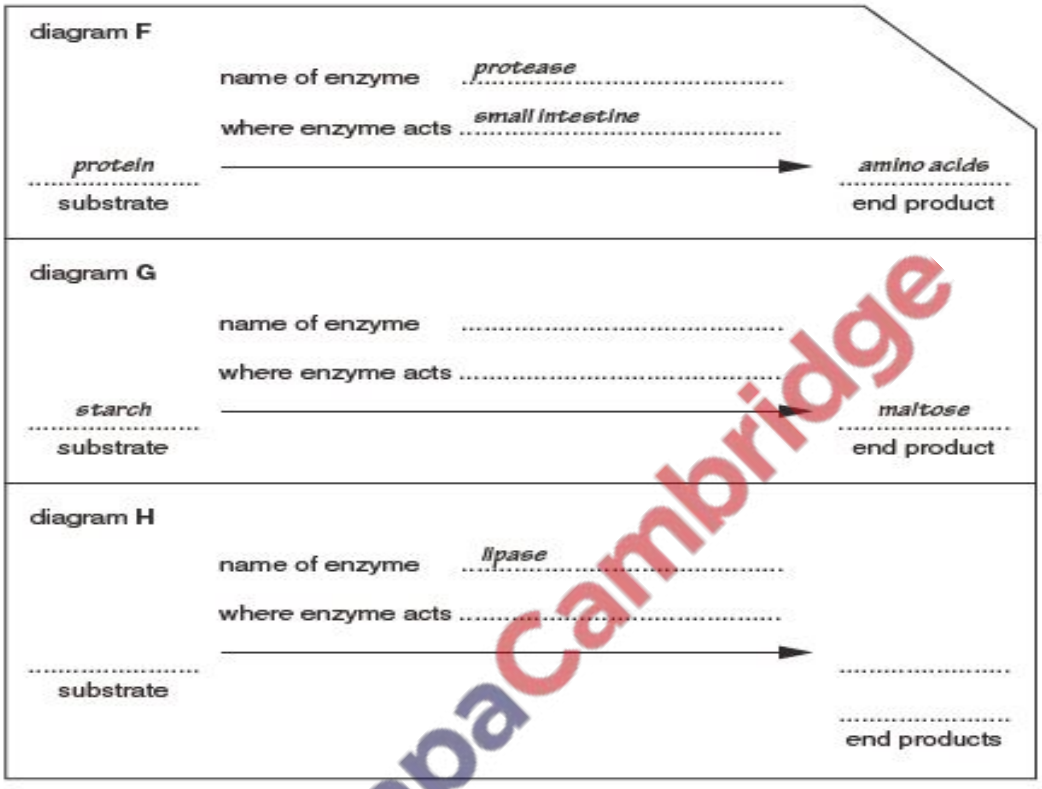


**Fig. 3.1**

[6]

**(b)** Amino acids are the end products of protein digestion. Describe what happens to these amino acids from the point of digestion until they reach the liver.

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..... [4]

[Total: 10]

# ANIMAL NUTRITION P2 QUESTIONS 5090

**M/J16/22/Q3**

Table 3.1 is a list of some of the constituents of a healthy human diet.

**Table 3.1**

| constituent |
|---|
| carbohydrates |
| fats |
| proteins |
| mineral salts |
| fibre/roughage |

**(a)** State one of these constituents that

**(I)** does not require digestion, .....[1]

**(II)** is the body's main storage substance. .....[1]

**(b)** Name **two** dietary constituents that are missing from the list in Table 3.1 and for each state **two** reasons for its importance in the diet.

constituent: .....

1 .....

.....

2 .....

.....

constituent: .....

1 .....

.....

2 .....

.....[6]

**(c)** The chimpanzee is an animal whose metabolism is very similar to that of a human, but one type of chimpanzee lacks the gene responsible for the manufacture of amylase.

Suggest how this will affect the diet of this type of chimpanzee.

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.....[2]

[Total: 10]

# ANIMAL NUTRITION P2 QUESTIONS 5090

**O/N15/21/Q6**

**(a)** Explain why most foods must be digested.

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..... [3]

**(b)** Describe the digestion of fats.

You should include reference to the following in your answer:

- named regions of the alimentary canal and associated organs
- named chemicals, including the end products of fat digestion.

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..... [7]

[Total: 10]

# ANIMAL NUTRITION P2 QUESTIONS 5090

**O/N15/22/Q6**

(a) Describe the digestive processes that take place in the mouth (buccal) cavity of a human.

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.....[6]

(b) Explain how food moves from the mouth (buccal) cavity to the stomach.

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.....[4]

[Total: 10]

# ANIMAL NUTRITION P2 QUESTIONS 5090

**M/J15/21/Q6**

Fig. 6.1 shows a structure found in part of the alimentary canal.

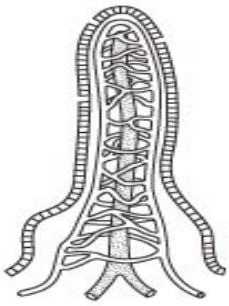

**Fig. 6.1**

**(a)** Name the structure shown in Fig. 6.1 and state the part of the alimentary canal in which it is found.

name of structure .....

location in alimentary canal ..... [2]

**(b)** Explain the ways in which this structure is adapted to enable it to carry out its function.

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..... [8]

[Total: 10]

# ANIMAL NUTRITION P2 QUESTIONS 5090

**O/N14/21/Q5**

Fig. 5.1 shows a decaying tooth.

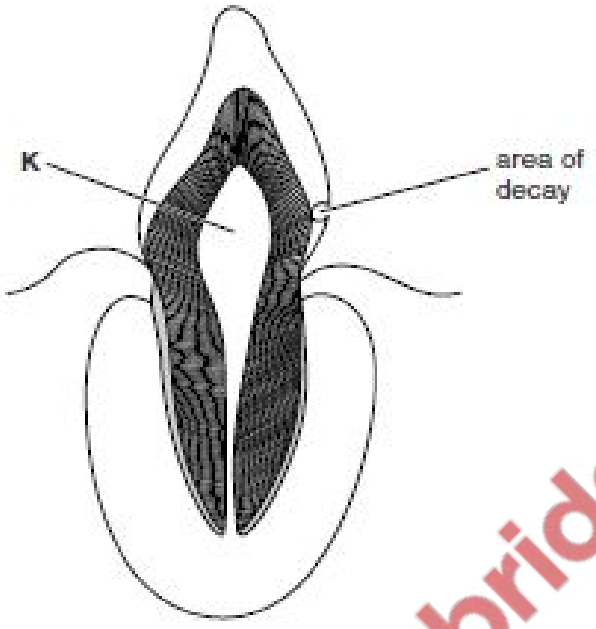


Fig. 5.1

**(a)** Name the type of tooth shown. ..... [1]

**(b)** Name **two** structures that are found in region **K**.

1 .....

2 ..... [2]

**(c)** Explain the causes of the decay shown in Fig. 5.1.

.....

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.....

..... [4]

# ANIMAL NUTRITION P2 QUESTIONS 5090

**(d)** Two different regions were studied to see the effect of fluoridation of drinking water on the mean number of decayed teeth in children living in those regions.

In region **L**, the percentage of children drinking fluoridated water gradually increased over a 30-year period. In region **M**, no fluoride was added to the drinking water over the same period.
Table 5.1 shows the mean number of decayed teeth per child in each region. It also shows the percentage of children drinking fluoridated water in region **L**.

**Table 5.1**

| date | region **L** | | region **M** |
|---|---|---|---|
| | percentage | mean number | mean number |
| 1970 | 28 | 3.9 | 2.1 |
| 1980 | 32 | 3.3 | 1.9 |
| 1990 | 38 | 2.7 | 1.8 |
| 2000 | 60 | 1.2 | 1.6 |

**(I)** State the effect of adding fluoride to the water supplies in region **L**.

..... [1]

**(II)** Suggest **three** possible reasons for the results shown for children in region **M**.

1 .....

.....

2 .....

.....

3 .....

.....

[3]

[Total: 11]

# ANIMAL NUTRITION P2 QUESTIONS 5090

**ON14/22/Q2**

Fig. 2.1 shows parts of the alimentary canal that lie in the upper part of the human body.

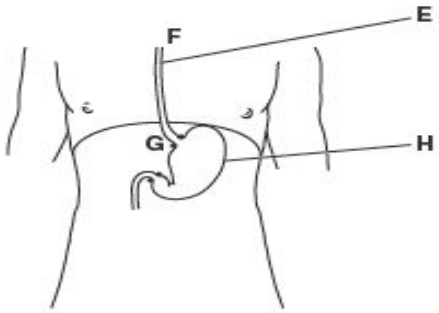


**Fig. 2.1**

**(a)** **(i)** Name the part labelled **E**. ..... [1]

**(ii)** Name the process that carries food from **F** to **G**. ..... [1]

**(b)** Suggest why the walls of part **H** are normally coated with mucus.

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..... [5]

**(c)** Sometimes, particularly when a person is lying flat, partly digested food returns into structure **E** through the valve at **G**. This can cause discomfort known as heartburn.

**(i)** Suggest why heartburn is not a biologically accurate name for this condition.

.....

..... [1]

**(ii)** Suggest and explain why medications for this condition are often alkaline in nature.

.....

.....

.....

..... [2]

[Total: 10]

# ANIMAL NUTRITION P2 QUESTIONS 5090

**M/J14/22/Q8(a)**

(a) Describe how peristalsis causes food to be moved along the alimentary canal.

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.....[6]

# ANIMAL NUTRITION P2 QUESTIONS 5090

**M/J14/22/Q9**

(a) Explain the health risks of each of the following:

(i) a high-fat diet

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.....[5]

(ii) a low-protein diet

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.....[3]

(b) Explain why women may sometimes require iron supplements to their diet.

.....

.....

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.....[2]

[Total: 10]

# ANIMAL NUTRITION P2 QUESTIONS 5090

**O/N13/21/Q3**

**(a)** Name **two** constituents of a diet that are absorbed without digestion. For each constituent, name the part of the alimentary canal in which it is absorbed.

constituent 1 ..... absorbed in .....

constituent 2 ..... absorbed in ..... [2]

**(b)** Suggest a constituent of a healthy diet that is never absorbed. .....[1]

**(c)** Fig. 3.1 is a diagrammatic representation of the small intestine containing three types of food molecule, a fat, a carbohydrate and a protein, before they have been digested. Fig. 3.1 also shows a lacteal and a capillary. The different features in Fig. 3.1 have not been drawn to the same scale.

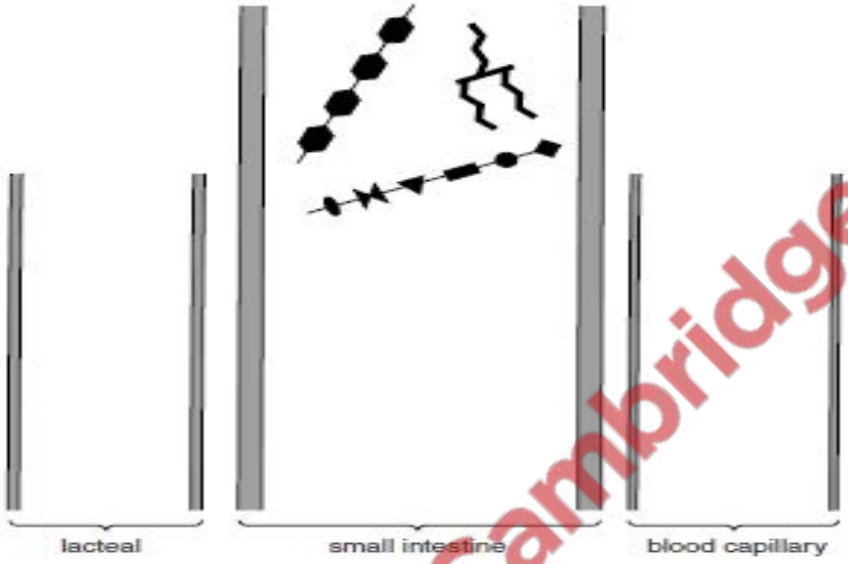


Fig. 3.1

On Fig. 3.1, draw **and** label the molecules as they would appear **after** they have been digested and then absorbed by the lacteal and by the capillary. [4]

**(d)** Some absorbed molecules travel directly to the liver.

**(I)** Name **three** of these molecules.

molecule 1 .....

molecule 2 .....

molecule 3 ..... [3]

**(II)** Explain how these molecules are carried to the liver.

.....

.....

.....

.....[2]

[Total: 12]

# ANIMAL NUTRITION P2 QUESTIONS 5090

**M/J13/21/Q1**

**(a)** Table 1.1 lists the daily requirements for some of the components in the diet of a young child.

**Table 1.1**

| diet component | daily requirement |
|---|---|
| energy | 8 MJ |
| fat | 50 g |
| protein | 19 g |
| vitamin C | 25 mg |
| vitamin D | 0.005 mg |
| calcium | 800 mg |
| iron | 10 mg |

State **two** components, other than those in Table 1.1, that are required in a balanced diet.

1. .....

2. .....

[2]

**(b)** Malnutrition is common in countries where there is famine.

List **two** problems that may contribute to famine.

1. .....

2. .....

[2]

# ANIMAL NUTRITION P2 QUESTIONS 5090

**(c)** Fig. 1.1 shows the label from the packet of a type of food sometimes fed to young children suffering from severe malnutrition.

**Emergency Famine Food**

92 g pack (provides 2.0 MJ)

*Ready to use – does not require water or refrigeration*

Contains: peanut paste, vegetable oil, powdered milk, powdered sugar, vitamins (including C and D), minerals (including iron and calcium)

*Date of manufacture: June 2012* *Use within 2 years*

**Fig. 1.1**

**(i)** State **three** effects of malnutrition which may occur in young children.

1. .....

2. .....

3. .....

[3]

**(ii)** Explain how this emergency famine food helps to overcome the effects of malnutrition.

.....

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.....[4]

[Total: 11]

# ANIMAL NUTRITION P2 QUESTIONS 5090

**M/J13/22/Q2**

In 1822, a man, Alexis Bidagan, suffered an injury from a gun fired at close range. The injury was in the form of a hole about 10 cm in diameter, penetrating both his chest and stomach walls, below his diaphragm. When the wound healed, the edge of the hole in his stomach sealed itself with the edge of the hole in his chest wall. Fig. 2.1 shows the position of the opening that remained to Alexis's stomach until he died 58 years later.

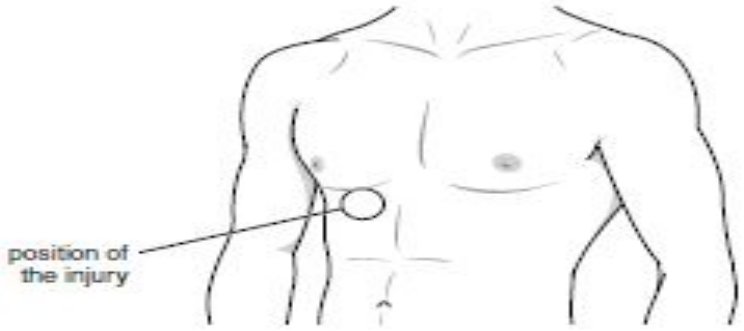


**Fig. 2.1**

**(a)** Name **two** organs, other than the stomach, that would have been exposed to infection through the hole **before** the wound healed.

1 .....

2 ..... [2]

**(b)** Suggest why there would have been less chance of the inside of his stomach suffering from an infection than other organs.

.....

.....

.....

.....[3]

**(c)** If the wound had extended above his diaphragm, explain why Alexis would have experienced some breathing difficulties until the wound healed.

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.....

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.....[5]

[Total: 10]

# ANIMAL NUTRITION P2 QUESTIONS 5090

**O/N12/22/Q1**

Fig. 1.1(a) shows a section through a person's head and throat. Fig. 1.1(b) shows the same person swallowing a bolus of food.

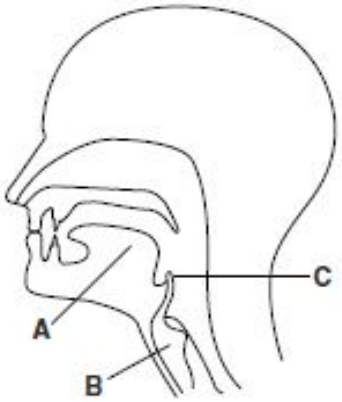


Fig. 1.1(a)

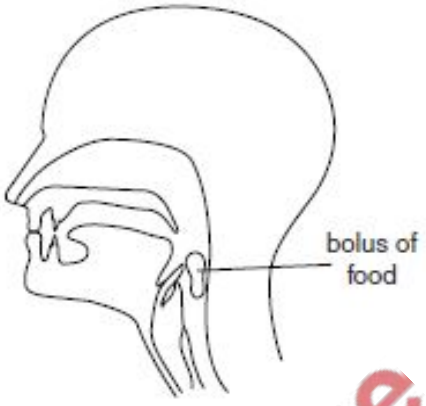


Fig. 1.1(b)

**(a)** Identify structures **A** and **B** shown on Fig. 1.1(a).

**A** .....

**B** ..... [2]

**(b)** Name the process that will carry the bolus to the stomach.

..... [1]

**(c)** Describe and explain what happens to structure **C** when the person swallows the bolus.

.....

.....

.....

.....[3]

**(d)** **(i)** Name a chemical process that may be taking place in the bolus.

.....

**(ii)** Describe and explain your answer to **(d)(i)**.

.....

.....

.....

.....[4]

[Total: 10]

# ANIMAL NUTRITION P2 QUESTIONS 5090

**M/J12/21/Q3(c and d)**

Fig. 3.1 shows some of the main regions of the alimentary canal in a person.

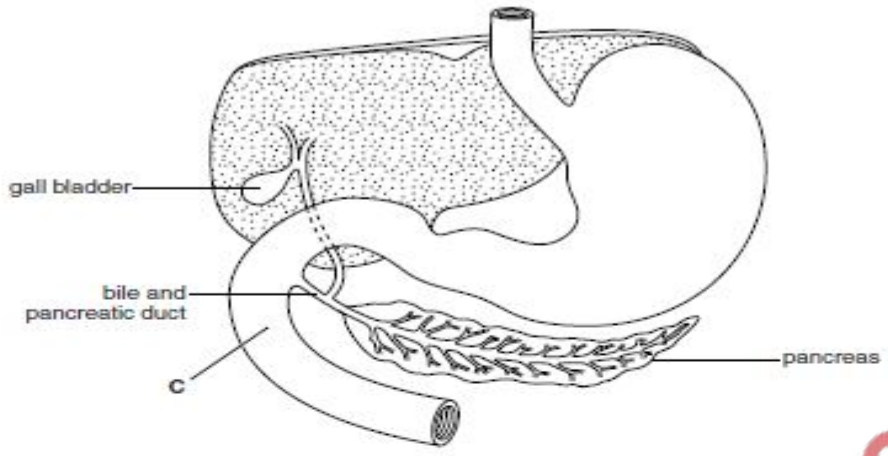


Fig. 3.1

**(c)** State the name of region **C**.

.....

[1]

**(d)** One effect of cystic fibrosis is that the bile and pancreatic duct becomes blocked with mucus. Suggest why a person whose bile and pancreatic duct is blocked may find it difficult to gain weight despite eating a balanced diet.

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..... [4]

[Total: 10]

# ANIMAL NUTRITION P2 QUESTIONS 5090

**M/J12/21/Q5**

**(a)** Fig. 5.1 shows the arrangement of teeth in the lower jaw of an adult person.

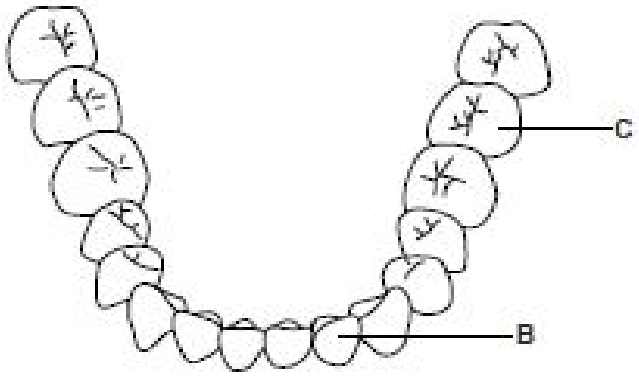


Fig. 5.1

Identify the types of teeth labelled **B** and **C** and state one function of each.

type **B** .....

function ..... [2]

type **C** .....

function ..... [2]

**(b)** During a single day two people ate the same amount of food containing a large amount of carbohydrate.

**Person D** ate the food in three equal portions at 7.00 am, 1.00 pm and 6.00 pm, following which he brushed his teeth using toothpaste before going to bed.

**Person E** ate the food in smaller portions more frequently during the day and did not brush her teeth before going to bed.

**(i)** List the chemical elements that make up carbohydrates.

..... [1]

**(ii)** If persons **D** and **E** continue their eating habits for several years, suggest in which person dental decay will occur first. Explain your reasoning.

person .....

explanation .....

.....

.....

.....

..... [3]

[Total: 6]

# ANIMAL NUTRITION P2 QUESTIONS 5090

**M/J12/22/Q2**

Fig. 2.1 shows some of the information on the packets of two breakfast cereals.

**Cereal C**

**Nutrition Information**

Typical value per 100 g

| | | |
|---|---|---|
| ENERGY | 1623 kJ | |
| PROTEIN | 13 g | |
| CARBOHYDRATE | 78 g | |
| of which sugars | 24 g | |
| starch | 54 g | |
| FAT | 1.5 g | |
| of which saturates | 0.5 g | |
| FIBRE | 2.5 g | |
| SODIUM | 0.4 g | |
| SALT | 1 g | |
| **VITAMINS:** | **(% GDA)** | |
| VITAMIN D | 7.4 µg | (147) |
| VITAMIN C | 88 mg | (147) |
| THIAMIN ($B_1$) | 2.1 mg | (147) |
| RIBOFLAVIN ($B_2$) | 2.4 mg | (147) |
| NIACIN | 26.5 mg | (147) |
| VITAMIN $B_6$ | 2.9 mg | (147) |
| FOLIC ACID | 294 µg | (147) |
| VITAMIN $B_{12}$ | 1.47 µg | (147) |
| **MINERALS:** | | |
| IRON | 16.2 mg | (73) |

**Cereal D**

**Nutrition Information**

Typical value per 100 g

| | | |
|---|---|---|
| ENERGY | 1600 kJ | |
| PROTEIN | 10 g | |
| CARBOHYDRATE | 68 g | |
| of which sugars | 20 g | |
| starch | 48 g | |
| FAT | 5 g | |
| of which saturates | 0.9 g | |
| FIBRE | 9 g | |
| SODIUM | 0.01 g | |
| SALT | 0.03 g | |
| **VITAMINS:** | **(% GDA)** | |
| THIAMIN ($B_1$) | 1 mg | (73) |
| RIBOFLAVIN ($B_2$) | 2.3 mg | (145) |
| NIACIN | 13.1 mg | (73) |
| VITAMIN $B_6$ | 2.9 mg | (145) |
| FOLIC ACID | 290 µg | (145) |
| VITAMIN $B_{12}$ | 0.73 µg | (73) |
| **MINERALS:** | | |
| IRON | 10.2 mg | (73) |

**Fig. 2.1**

**(a)** The Guideline Daily Amount (GDA) of energy for an average adult is 8 400 kJ.

**(I)** Calculate the percentage of this GDA a person would obtain by eating **one 25 g** serving of Cereal **D**. Show your working in the space provided.

Answer .....% [3]

**(II)** State how the daily energy requirement of a hard-working farmer would differ from the GDA described above.

..... [1]

(b) Cereal **D** is considered to be better for people suffering from constipation than Cereal **C**. Suggest a reason for this.

.....[1]

(c) Rickets is a condition that affects some children.

(i) Describe the symptoms of rickets.

.....

.....[2]

(ii) State which cereal, **C** or **D**, should be eaten by children to prevent rickets and explain your answer.

cereal .....

explanation .....

.....

.....[2]

[Total: 9]

# ANIMAL NUTRITION P2 QUESTIONS 5090

## Mark Scheme

; separates marking points

/ alternatives

() contents of brackets are not required but should be implied

R reject

A accept (for answers correctly cued by the question, or guidance for examiners)

Ig ignore (for incorrect but irrelevant responses)

AW alternative wording (where responses vary more than usual)

AVP alternative valid point (where a greater than usual variety of responses is expected)

ORA or reverse argument

underline actual word underlined must be used by candidate

+ statements on both sides of the

+ are needed for that mark

**O/N18/21/Q7**

7(a)(i) oesophagus / gullet ; 1

7(a)(ii) peristalsis ;

wave of / rhythmic + contraction ;

circular muscles ;

behind / pushing (food) ;

Ig longitudinal muscles

7(b)(i) higher than ; 1

7(b)(ii) liver ;

bile ;

pancreas ;

pancreatic juice / secretions / hydrogencarbonate ;

bile / pancreatic juice

+ alkaline / high pH ;

4 Ig gall bladder

# ANIMAL NUTRITION P2 QUESTIONS 5090

A any pH above 7

**M/J18/22/Q5**

5
**contains an organ which region or regions**
 produces an acidic secretion (R)
 contains villi R / S **;**
 digests protein R / S **;**
 produces insulin R **;**
 contains bronchi Q **;**
 secretes amylase P + R **;**
 ingests food P **;**

**M/J18/22/Q9**

9(a) **1** broken down / hydrolysed **;**
**2** (to) small / smaller / simpler **+** molecules **;**
**3** soluble / dissolve **;**
**4** (to enable) absorption **;**
**5** (by) diffusion / active transport **;**
**6** into **+** blood / capillaries **;**
**7** into **+** lymph/ lacteal **;**
**8** (to enable) assimilation **or** named small to named large molecule **;**

9(b) *(**either** liver **or** pancreas)*
**1** neutralisation **;**
**2** optimum **AW** pH for enzyme activity **or** avoid denaturation of enzymes **;**
*(liver **only**)*
**3** bile **;**
**4** emulsification **+** fats **or** large fat droplets into smaller droplets **AW ;**
**5** increased surface area **;**
**6** lipase **+** production **AW** of fatty acids **and** glycerol **;**
*(pancreas **only**)*
**7** production / release **+** enzymes **;**
**8** protease / trypsin / lipase/ amylase **;**
**9** named substrate **+** named products for a correct named enzyme **;**
**10** production of **+** alkali / hydrogencarbonate / bicarbonate **;**

**O/N17/21/Q1**

1(a) **B ;**
incisor **;**
biting / cutting / tearing / gripping **;**
**C ;**
molar **;**
chewing / crushing / grinding **;**
**6**
1(b)(i) sugar **;**
bacteria **;**
respiration **;**
acid **;**
plaque **;**
**2 A** named sugar, **Ig** sweets
1(b)(ii) reference to brushing **;**

flossing ;
fluoride ;
reference to dental check-ups ;
**2**
**A** fluorine

**O/N17/21/Q8**

8(a) active **+** more energy ;
reference to carbohydrates / fats ;
child **AW +** growth ;
reference to protein / calcium / vitamin D ;
(post-pubertal **AW**) female **+** iron ;
reference to menstrual loss of blood ;
old person **+** less growth / less active / no menstruation ;
reference to reduced need for correct named nutrient ;
**4** marks are linked in pairs
8(b) muscle **+** wall ;
contracts / churn / mechanical digestion ;
acid ;
optimum **AW** pH ;
enzyme ;
protease / pepsin ;
protein(s) ;
to amino acids / (poly)peptides ;
**6** answer must refer to the stomach and not other
parts of the alimentary canal

**O/N17/22/Q7**

7(a)(i) *(causes)*
**1** children ;
**2** lack / deficiency **AW +** calcium ;
**3** lack / deficiency **AW +** vitamin D ;
**4** lack of any reasonable named food containing calcium / vitamin D ;
**5** lack of sunlight ;
*(symptoms)*
**6** bones **+** soft / weak / bent / brittle / likely to fracture / do not develop properly ;
**7** teeth **+** soft / decay / do not develop properly **AW** ;
**8** bowed legs ;
**4**
7(a)(ii) *(causes)*
**1** lack / deficiency **AW +** vitamin C ;
**2** lack of any reasonable named food containing vitamin C ;
*(symptoms)*
**3** gums bleed ;
**4** teeth loose / fall out ;
**5** wound healing slow / poor ;
**6** joint pain ;
**7** shortness of breath ;
**8** rough **AW** skin / weak connective tissue / damaged **AW** epithelium ;
**4**
7(b) **1** small / soluble / dissolved ;
**2** not digested / not broken down / already in simplest form ;

# ANIMAL NUTRITION P2 QUESTIONS 5090

**3** diffusion **;**
**4** through **+** villi / capillary / cell membrane / partially **AW** permeable membrane **;**

**M/J17/22/Q2**

2(a)(i) assimilation **; 1**
2(a)(ii) (egestion)
line ending / letter written below rectum **+** labelled '**A**' / 'egestion' **;**
(ingestion)
line ending / letter written to left of or inside mouth **+** labelled '**B**' / 'ingestion' **;**
**2**
2(b) (component) protein **;**
(where absorbed) ileum / small intestine / villi / capillaries **;**
**2 R** amino acids
**Ig** any reference to fat
**A** jejunum
2(c) **1** reference to bile (salts) **;**
**2** (bile) not stored **;**
**3** less / slower **+** release (of bile) **;**
**4** less / slower **+** emulsification **AW ;**
**5** less / slower / not optimum **+** digestion (of fats) / (lipase) enzyme action **;**
**6** fewer fatty acids / less glycerol **+** produced / absorbed **;**
**7** incorrect pH / more acidic / less alkaline **+** in small intestine / duodenum **;**

**O/N16/21/Q4**

4(a)(i) 1000 / 1 **;**
$cm^3$
/ $dm^3$ **;**
**2 A** 1 litre / 1 $dm^3$ for 2 marks
**A** ml in place of $cm^3$, unit must match figure for second mark
4(a)(ii) malnutrition / deficiency disease **;**
lack of balanced diet **;**
reference to low / lack of energy (intake into body) **;**
(leads to) general lethargy **;**
reference to lack of fat or carbohydrate (for energy) **;**
reference to specified problem **;**
kwashiorkor / named symptom **+** lack of protein **;**
scurvy / named symptom **+** lack of vitamin C **;**
anaemia or described **+** lack of iron **;**
**4**
**A** muscle contraction / protein synthesis / cell division / active transport / growth / passage of nerve impulses / maintenance of a constant body temperature / mend or repair tissues

4(b)(i) sterile / not contaminated / no additives **;**
antibodies / hormones **;**
no need to warm / at correct temperature **;**
bonding between mother and child **;**
better proportions of nutrients **AW ;**
does not cost money **;**
supply / availability on demand **;**
**4**

4(b)(ii) lack of awareness of the
benefits **;**
mother unable / chooses not to breast-feed **;**
reference to advertising by bottle milk providers **;**
not available to do so (e.g. at work / child in care) **;**
infection / drug addiction / damaged nipples **;**
mother does not produce (enough) milk **;**
**1**
**Total: 11**

**M/J16/22/Q3**

3 (a) (i) mineral salts / fibre / roughage ; [1]
(ii) fat / lipid ; [1]

(b) constituent: water ;
reasons for importance:
solvent /
constituent of urine /
reference to chemical reactions /
constituent cells OR cyto-, protoplasm
OR blood /
temperature regulator OR sweating /
transporter /
osmoregulator AW /
prevents dehydration /
lubrication /
prevents constipation ;;
constituent: (named) vitamin ;
reasons for importance:
prevent deficiency disease AW /
reference to correct specified benefit
of any vitamin ;;
[1]
[max 2]
[1]
[max 2]
(c) little or no starch in diet / cannot digest
starch AW ;
relies on sugar or named sugar AW ;
(needs to) eat fruit / animals / fewer
plants ;
may rely on fat / protein (for energy) ;
[max 2]

**O/N15/21/Q6**

6 (a) molecules large + must be converted to smaller ;
insoluble + need to be converted to soluble / non-diffusible to
diffusible AW ;
to be absorbed ;
from (small) intestine / ileum ;
into blood / capillaries / lymph / lacteals ;
[max. 3]
A across intestine wall / into villi
(b) bile from + liver / gall bladder / bile duct ;

ref. emulsification ;
increased surface area ;
ref. provision of optimum pH / alkaline conditions ;
small intestine / duodenum ;
lipase ;
from pancreas ;
fatty acids ;
glycerol ;
[max. 7]

**O/N15/22/Q6**

6 (a) any named tooth ;
cut / tear food * ;
crush / grind / smash food * ;
ref. saliva(ry) ;
moistening / lubricating / softening ;
ref. action of tongue ;
ref. to (optimum) pH ;
(salivary) amylase ;
acts on starch ;
changing it to maltose ;
ref. terms mechanical / chemical + digestion ; [max 6]
*A chew / masticate / bite / break
up alone for one mark
R crush / cut + molecules
A reducing sugar
(b) ref. swallowing ;
peristalsis ;
oesophagus / gullet ;
wave of / rhythmic contraction AW ;
of circular muscles ;
behind / pushing + food / bolus ;
[max 4]
I references to longitudinal

**M/J15/21/Q6**

6 (a) villus / villi ;
small intestine / ileum ;
[2

(b) increased surface area ;
many / good supply +
capillaries / blood ;
lacteal ;
absorption ;
two marks for two correctly named
absorbed products ;;
one cell thick / thin walls ;
reduced distance / increased speed of
molecular movement AW ;
diffusion ;
active transport ;
goblet cells ;

mucus + lubricate AW ;
production / release + enzymes;
ref digestion + named products ;

**O/N14/21/Q5**

5 (a) Incisor / canine ; [1]
(b) blood vessels or named ;
nerves / nerve endings ;
[2]
(c) sugar ;
ref. bacteria ;
(converted) to acid ;
dissolves enamel ;
teeth not cleaned / build-up of plaque / tartar ;
weak enamel / ref. lack of Ca / F / vit. D ;
[max. 4]
(d) (i) reduction in tooth decay ; [1]
(ii) fluoride occurs naturally / addition in toothpaste ;
diet with less carbohydrate ;
better education / teeth cleaned more often ;
genetic differences / teeth less prone to acid attack ;
[max. 3]

**O/14//22/Q2**

2 (a) (i) oesophagus / gullet ; [1]
(ii) peristalsis ; [1]
(b) ref. protection / barrier / prevents damage / breakdown / digestion ;
of walls ;
acid / HC*l* ;
ref. protease ;
walls are made of protein ;
ref. lubrication ;
[max. 5]
(c) (i) heart not involved / no connection between E and the heart / AW ; [1]
(ii) less mucus in E ;
acid (from stomach) ;
(acid) damages the cells / walls ;
(acid) neutralised (by the medication) ;
[max. 2]
[Total: 10]

# ANIMAL NUTRITION P2 QUESTIONS 5090

**M/J14/22/Q8(a)**

(a) muscles ;
circular ;
contract ;
behind food ;
longitudinal ;
relax behind food / contract in front of food ;
pushing / forcing / squeezing (bolus / AW) ;
wave action / rhythmic ;
[6] R if mention of parts outside of alimentary canal,
e.g. trachea
R if mention of contraction of longitudinal muscles
behind food
Ig moving

**M/J14/22/Q9**

9 (a) (i) obesity ;
strain on skeleton / effect on joints ;
strain on heart / pumps harder / pumps faster ;
breathing difficulties ;
risk of diabetes ;
social implications / example, e.g. bullying, clothing ;
atheroma / AW ;
high blood pressure ;
heart disease / heart attack / other cardiovascular condition /
AW ;
[5]
R ref. in veins / on arteries
Ig blood vessels
A cholesterol
(ii)
poor muscle development ;
stunted / poor growth ;
heart failure ;
lack of / deficiency in one named protein,
e.g. haemoglobin / antibodies / enzymes / hormones / thrombin ;
AVP, e.g. reduced / deficient RBC production / poor wound
healing / poor tissue / cell / organ repair / blood clotting /
anaemia ;
[3] Reference to a negative effect required.

# ANIMAL NUTRITION P2 QUESTIONS 5090

**O/N13/21/Q3**

3 (a) water + any part of the alimentary canal after the oesophagus;
ions / minerals / named + ileum;
vitamins / named + ileum / colon
glucose + ileum
[max 2]
A small intestine for ileum
(b) fibre / roughage / cellulose / fruits / seeds / tomato skins / maize pericarps;
[1]
A any suitable named plant part
(c) products drawn in correct absorptive vessel –
All correct = 2 marks 2 correct = 1 mark ;;
all molecules totally digested ;
2 products correctly named ;
[max 4]
I any diagrams in the intestine
R any products drawn in both capillaries and lacteals
All bonds must be broken – a minimum of 3 products of each type required.
(d) (i) amino acids;
glucose/ other named monosaccharide;
vitamins / named;
ions / salts / minerals / named;
water;
[max 3]
(ii) in solution;
in blood / plasma;
by (hepatic) portal vein;
[max 2]



**M/J13/21/Q1**

1 (a) Carbohydrate;
Water;
roughage / fibre;
other named mineral / other named vitamin;
[max 2]
(b) (Environmental):
Drought;
Flooding;
Infertile land e.g. poor soil structure;
Natural disasters e.g. earthquakes/ very severe weather;
(Political):
Significant increase in population;
unequal distribution / supply of food;
poverty / economic breakdown;

war / political considerations;
[max 2]
Accept rain if qualified to suggest that
it is below the required level for crop
growth e.g. inadeguate rainfall
Ignore: tornadoes
(c) (i) Diseases:
Rickets;
Scurvy;
Kwashiorkor;
Marasmus;
beri-beri;
Symptoms:
stunted growth;
low body weight /death;
weak/brittle bones;
lowers immunity;
anaemia;
bleeding membranes;
fatigue;
obesity;
[max 3]
A any other relevant descriptions of
Symptoms

**M/J13/22/Q2**

2 (a) any 2 from:
#duodenum / small intestine*;
#ileum / small intestine*;
#colon / large intestine;
(# OR intestine for one mark)
kidney;
pancreas;
liver;
gall bladder;
spleen;
named blood vessel; Max 2
*credit (small intestine) once only.
(b) bacteria / virus / fungus / microoganism / pathogen;
(stomach contents) acid(ic) / ref. HCl;
(and/or) enzyme / protease;
destroys / kills / ref. wrong pH for growth (of microorganism or
colony implied);
Max 3
Ignore germs
(c) chest / thorax no longer airtight;
ref. intercostal muscles (damage or action);
diaphragm (damage or action);
correct volume / pressure reference;
air drawn in / out through hole;
lungs / alveoli damaged or infected;
insufficient / less air or oxygen in lungs / not properly inflated; Max 5
[Total: 10]

# ANIMAL NUTRITION P2 QUESTIONS 5090

**O/N12/22/Q1**

1 (a) A – tongue;
B – larynx/voice box; [2]
(b) peristalsis; [1]
(c) closes/covers;
trachea/windpipe/air passage/larynx/voice box/B;
helped by raising of larynx AW;
preventing the entry of food / preventing food going to lungs or respiratory system / prevents choking AW / allows food to enter oesophagus AW; [Max 3]
(d) (i) digestion / enzymatic action / hydrolysis;
& (ii) amylase;
(from) saliva / salivary glands;
starch;
to maltose;
neutralisation / ref. pH; [Max 4]
(each marking point allowed under (i) or (ii) )
[Total: 10]

**M/J12/21/Q3(c and d)**

(c) duodenum / small intestine; [1]
(d) reduction in enzymes / pancreatic juice entering duodenum;
correct ref. to (reduced) bile action;
less digestion / emulsification AW;
especially of fats;
fewer molecules to absorb / less absorption qualified;
and use for assimilation into larger molecules;
used in growth;
ref. less fat stored /AW; [4]
[Total: 10]

**M/J12/21/Q5**

5 (a) B incisor;
cutting / biting / nibbling R holding; [2]
C molar (R pre-molar / wisdom);
grinding / crushing / chewing R shearing; [2]
(b) (i) carbon + hydrogen + oxygen (A C H O); [1]
(ii) (person) E; [1]
(more frequent meals) allows more sugar build up on teeth;
no brushing to remove bacteria / sugar / plaque;
more acid contact with teeth;
ref. toothpaste is alkaline;
ref no / less neutralisation of acid; [2]
[Total: 8]
[Total: 50]

# ANIMAL NUTRITION P2 QUESTIONS 5090

**M/J12/22/Q2**

2 (a) (i) Mark as follows:
Award 2 marks for a correct answer with no working;;
Award 3 marks for a correct answer with any working;;;
Award 2 marks max. for correct working with no or wrong answer;;
Answer: 4.7(6)(%) (A 4.7 / 4.8);;
Examples of correct working are as shown below :
4
1600
/ OR 1600 ×
100
25
/ OR 400 (;)
8400
400
(;) [3]
(ii) higher (R ref. to higher GDA); [1]

(b) more or a high amount AW fibre / roughage; [1]
(c) (i) bones;
soft / weak / deformed / bent / ref. bandy legs ; [2]
(R bent 'legs' – that is the effect of the knee joint.)
(Mark the first effect in a list)
(ii) C;
vitamin D / uptake of calcium / calcium used by bones AW; [max. 2]