



**SCHOLARSHIP EXAMINATION**

**BIOLOGY**

**2015**

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*Time: 30 minutes*

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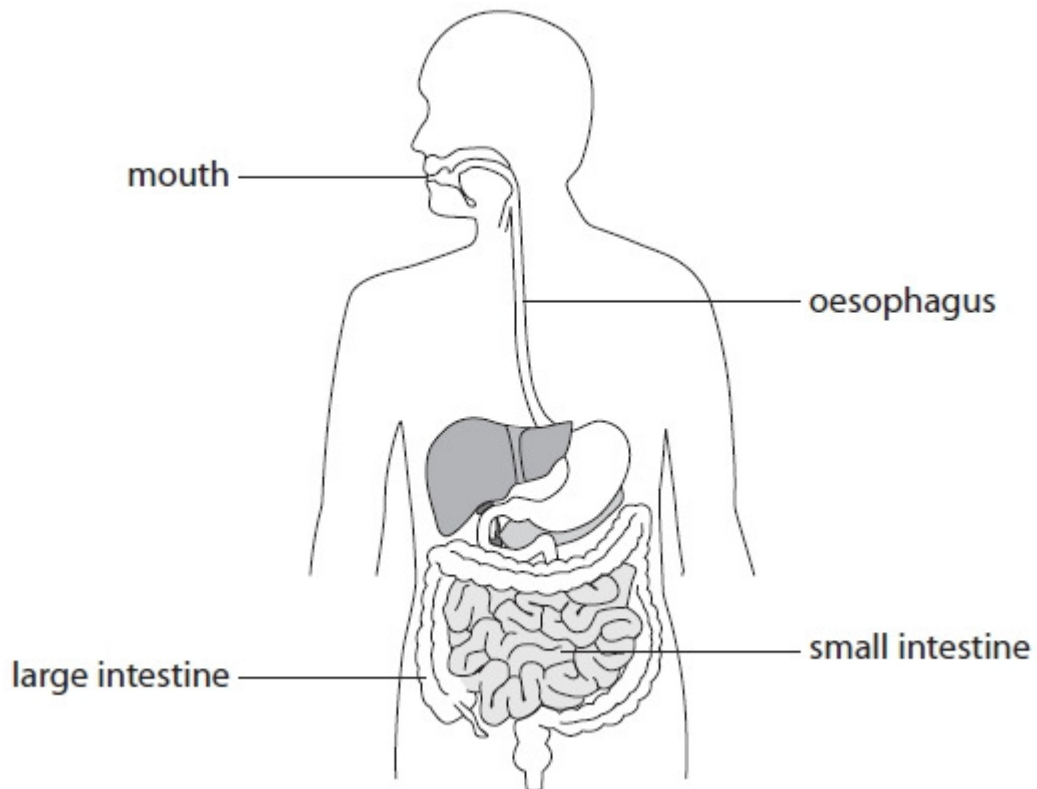
**Name:** .....

**School:** .....

Q1.

### A healthy digestive system

The diagram shows the digestive system of a human.



(a) Describe the role of the mouth in digestion.

(2)

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(b) Villi are structures in the small intestine.




(i) Which **one** of the statements about villi is true?

Place a cross (☒) in the box next to your answer.

(1)

- A Glucose is the only substance absorbed by villi
- B Three types of enzyme are absorbed by villi
- C The capillary network in the villi have a large surface area
- D The walls of the villi are thicker to absorb more food

- (ii) Coeliac disease can cause a loss of microvilli.  
The table shows how the structure of villi affects the surface area of the small intestine.

structure	diagram	surface area compared to small intestine as a tube
small intestine as a tube with no villi or microvilli		1
small intestine with villi but no microvilli		30
small intestine with villi and microvilli		600

A person with coeliac disease has no microvilli in their small intestine.  
Explain why this person would find it hard to exercise.  
Use information from the table to help you.

(3)

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- (c) Fibre in food is not digested.

Fibre makes up most of the solid material in the contents of the small intestine.  
The recommended daily allowance (RDA) for fibre is between 18g and 30g.  
Suggest why the muscles in the intestines of someone who eats much less fibre per day than the RDA may have trouble moving food through the small intestine.

(2)

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(d) Describe how probiotics containing *Bifidobacteria* are thought to improve the health of the digestive system.

(2)

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**(Total for question = 10 marks)**

**Q2.**

(i) State the type of blood vessel that carries blood to the heart.

(1)

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(ii) Explain how blood is prevented from flowing backwards in the heart.

(2)

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**Q3.**

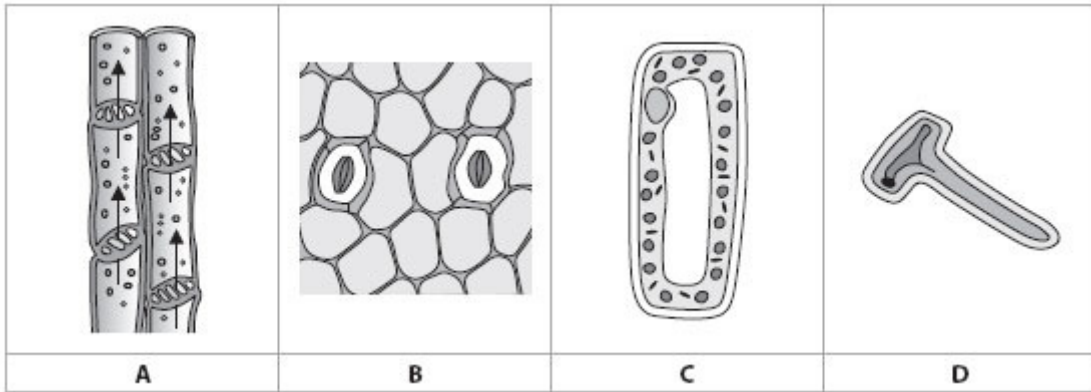
The digestive system is made up of a number of different organs.  
Define the term **organ**.

(1)

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**Q4.**

The diagrams show different structures found in a plant.



(i) Complete the sentence by putting a cross (  ) in the box next to your answer.  
Stomata are shown in structure

(1)

- A
- B
- C
- D

(ii) Explain how structure C is adapted for photosynthesis.

(2)

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Q5.

**Water and mineral uptake by plants**

(a) Complete the sentences by putting a cross (☒) in the box next to your answer.

(i) Plants absorb water from the soil.

The plant cells that absorb water from the soil are called

(1)

- A root hair cells
- B palisade cells
- C stomata cells
- D xylem cells

(ii) These cells absorb water by a process known as

(1)

- A active transport
- B osmosis
- C photosynthesis
- D transpiration

(b) Plants also absorb mineral ions from the soil.

Use words from the box to complete the sentences.

(3)

active transport	leaves	xylem
photosynthesis	phloem	roots

Plants absorb mineral ions from the soil through their ..... by a process called .....

The mineral ions are then transported up the stem through ..... vessels.

(c) Magnesium and nitrates are two mineral ions that are absorbed by plants.  
The table shows the amount of magnesium ions and nitrate ions in the tips of sunflower and wheat plants.

type of plant	mineral ion content / arbitrary units	
	magnesium ions	nitrate ions
sunflower	0.730	0.147
wheat	0.225	0.226

(i) Compare the mineral ion content in the tips of these two plants.

(2)

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(ii) Magnesium is used by plant cells to make chlorophyll.  
Describe the function of chlorophyll in plant cells.

(2)

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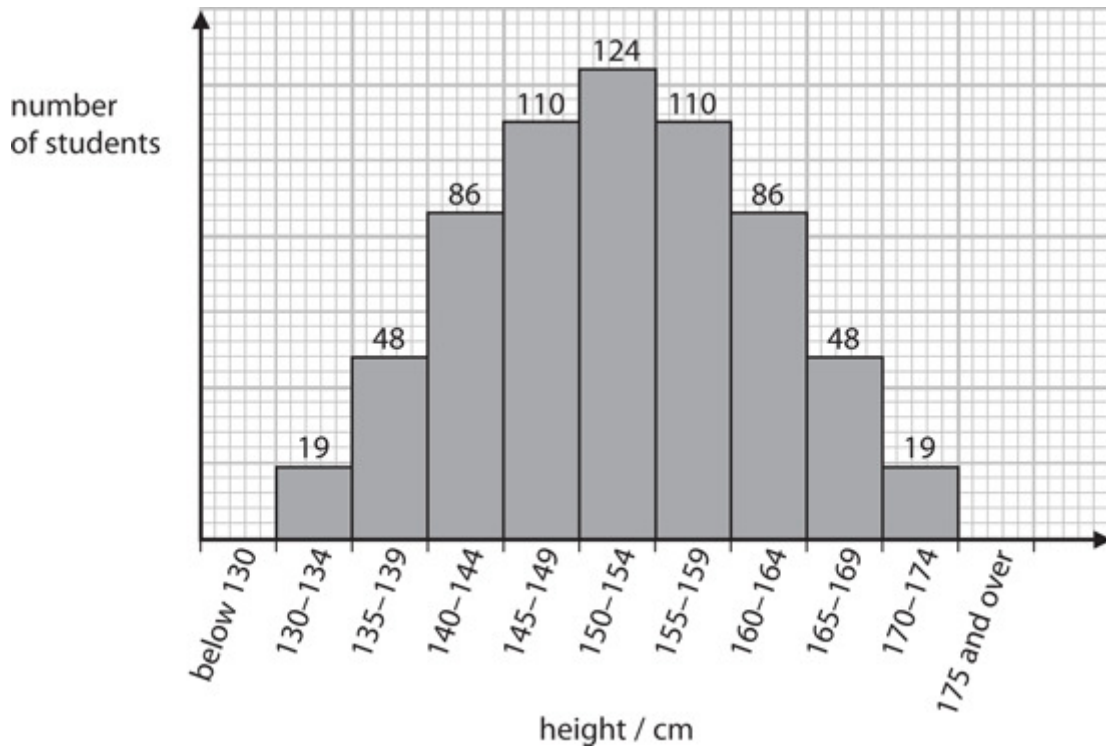
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**Q6.**

The graph shows the variation in height.



(i) Complete the sentence by putting a cross (☒) in the box next to your answer.  
The range in heights of the students is due to

(1)

- A environmental influences only
- B genetic influences only
- C environmental and genetic influences
- D neither environmental nor genetic influences

(ii) Describe the variation in height of these students, as shown in the graph.

(3)

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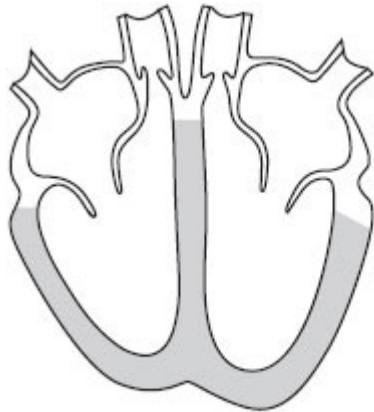
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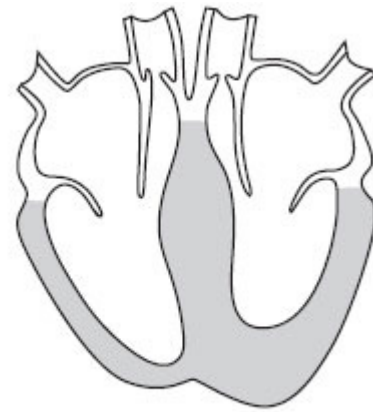


**Q7.**

The diagrams below show a healthy heart and a heart with a condition known as hypertrophic cardiomyopathy (HCM).



healthy heart



hypertrophic cardiomyopathy

A symptom of HCM is that contraction of the heart muscle is more difficult.  
Suggest the effects HCM may have on an athlete during competitive sport.

(2)

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**Q8.**

Blood is described as a tissue.  
State the meaning of the term **tissue**.

(1)

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**Q9.**

Smoking tobacco is the cause of 9 out of 10 cases of lung cancer.

(i) Complete the sentence by putting a cross (☒) in the box next to your answer.  
The active compound in cigarette smoke that causes lung cancer is

(1)

- A carbon dioxide
- B carbon monoxide
- C nicotine
- D tar

(ii) One part of cigarette smoke acts on receptor sites in the brain.  
Explain why it can be very difficult to give up smoking.

(2)

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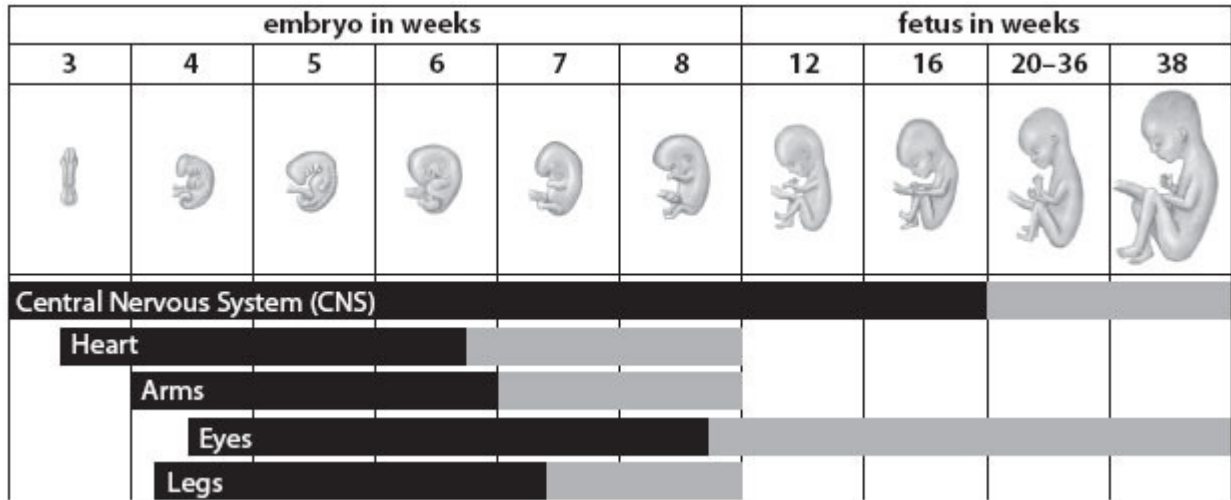
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**Q10.**

Fetal alcohol syndrome occurs when a pregnant woman drinks large quantities of alcohol. The diagram shows the development of the embryo and fetus during its time in the uterus. The bars show the time period during which fetal alcohol syndrome can cause an abnormality in a specific body part. The darker the bar, the more likely an abnormality will occur in that body part.



(i) Describe a long-term effect of alcohol abuse.

(2)

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(ii) Discuss the ethics of allowing alcoholics to have an organ transplant.

(2)

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