

## Monday 17 January 2022 – Morning

## Level 3 Cambridge Technical in Health and Social Care

**05831/05832/05833/05871** Unit 4: Anatomy and physiology for health and social care

**Time allowed: 2 hours**

**C442/2201**

No extra materials are needed.



Please write clearly in black ink.

Centre number

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Candidate number

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First name(s)

Last name

Date of birth

D	D	M	M	Y	Y	Y	Y
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## INSTRUCTIONS

- Use black ink.
- Write your answer to each question in the space provided. If you need extra space use the lined pages at the end of this booklet. The question numbers must be clearly shown.
- Answer **all** the questions.

## INFORMATION

- The total mark for this paper is **100**.
- The marks for each question are shown in brackets [ ].
- Quality of extended response will be assessed in questions marked with an asterisk (\*).
- This document has **20** pages.

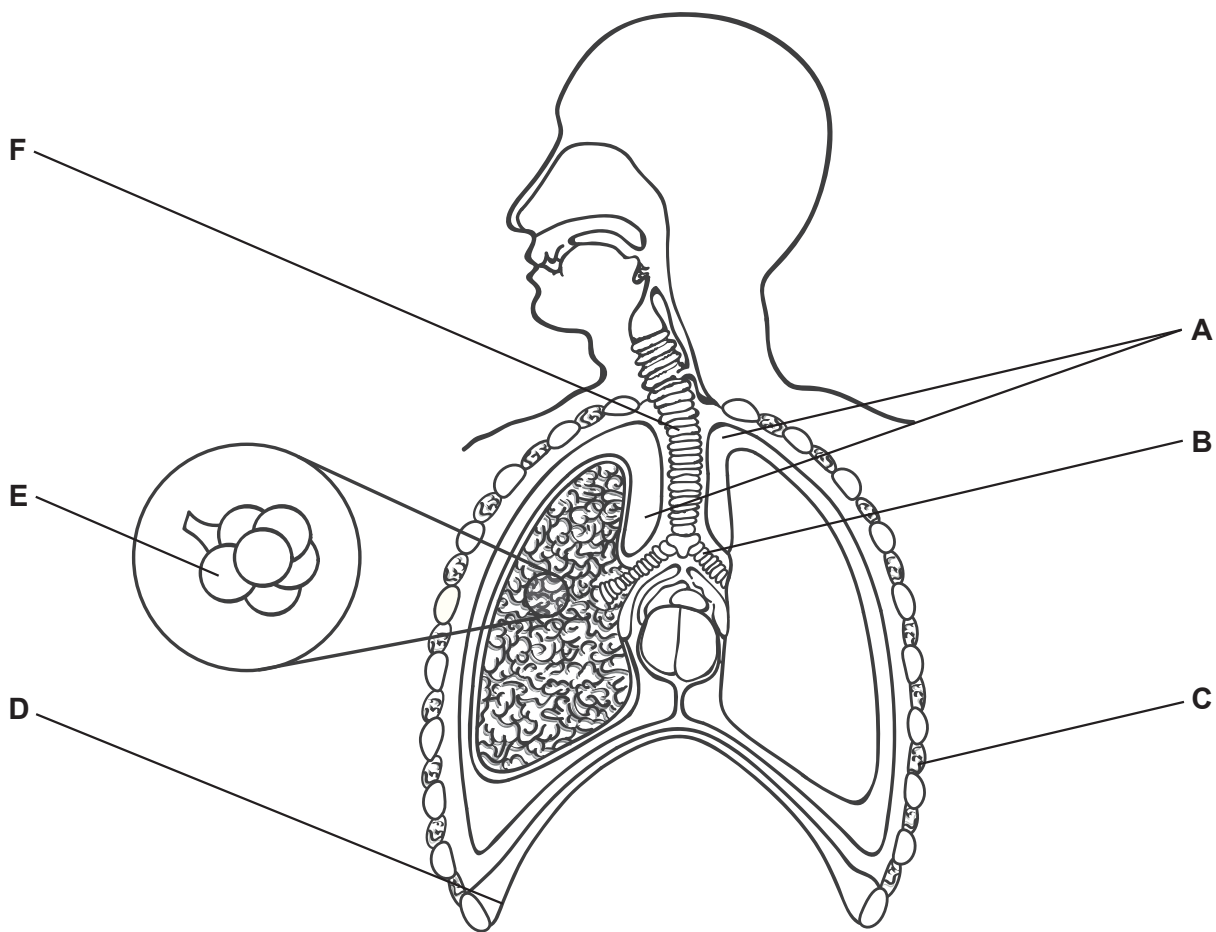
## ADVICE

- Read each question carefully before you start your answer.

FOR EXAMINER USE ONLY	
Question No	Mark
1	/26
2	/28
3	/19
4	/13
5	/14
<b>Total</b>	<b>/100</b>

Answer **all** the questions.

1 The diagram below shows the structure of the respiratory system.



(a) (i) Complete the table below using letters from the diagram.

The last row has been done for you.

Structure	Letter
Alveolus	.....
Bronchus	.....
Diaphragm	.....
Intercostal muscle	.....
Pleural cavity	<b>A</b>

[4]

- (a) (ii) The pleural cavity contains fluid for lubrication which allows the lungs to move easily.
- Choose **two** other structures from the table in **1(a)(i)** and describe their function.

Structure .....

Function .....

[1]

Structure .....

Function .....

[1]

- (b)\*** Cellular respiration is a set of reactions that takes place inside cells to provide energy.

There are two types of cellular respiration:

- Aerobic respiration
- Anaerobic respiration

Compare aerobic and anaerobic respiration.

..... [6]

- (c) Alex, 10, has cystic fibrosis. There is no cure for cystic fibrosis, but Alex has regular hospital appointments to receive support and advice that helps him manage his condition.

(i) Describe the biological cause of cystic fibrosis.

.....

.....

.....

..... [2]

(ii) Identify **one** effect of cystic fibrosis on the respiratory system.

.....

..... [1]

(iii) Suggest **one** way of helping Alex manage his condition.

.....

..... [1]

- (d) As well as affecting the respiratory system, cystic fibrosis may also affect liver function.

Complete the table below by deciding whether each statement about functions of the liver is True (T) or False (F).

Statement	True or False
The liver breaks down alcohol by a process called deamination.	.....
The liver produces bile.	.....
The liver produces the toxic waste, urea.	.....
The liver stores vitamins.	.....

[4]

(e)\* Cirrhosis is a disease of the liver.

Discuss the biological causes of cirrhosis and the possible effects of cirrhosis on the body.

[6]

## 2 The eye is part of the sensory system.

- (a) Complete the passage about the structure and function of the eye by choosing the most appropriate word(s) from the list below.

<b>ciliary muscle</b>	<b>conjunctiva</b>	<b>humours</b>	<b>iris</b>	<b>lens</b>
<b>macula</b>	<b>optic nerve</b>	<b>pupil</b>	<b>retina</b>	

The front of the eye is covered by the ..... , a thin membrane that protects the surface. Light enters the eye through the cornea and passes through the opening in the middle of the eye called the ..... . The amount of light that enters the eye is controlled by the ..... and light is focussed on the retina by the ..... which can change shape. The ..... is the part of the retina which has many photoreceptor cells that help to produce a detailed image. The image is converted into electrical impulses which are carried to the brain by the ..... .

[6]

- (b) There are many malfunctions of the eye. One of these affects the lens causing blurred or cloudy vision.

- (i) Identify **this** eye malfunction.

..... [1]

**(ii)\*** There are several different treatments available for different eye malfunctions.

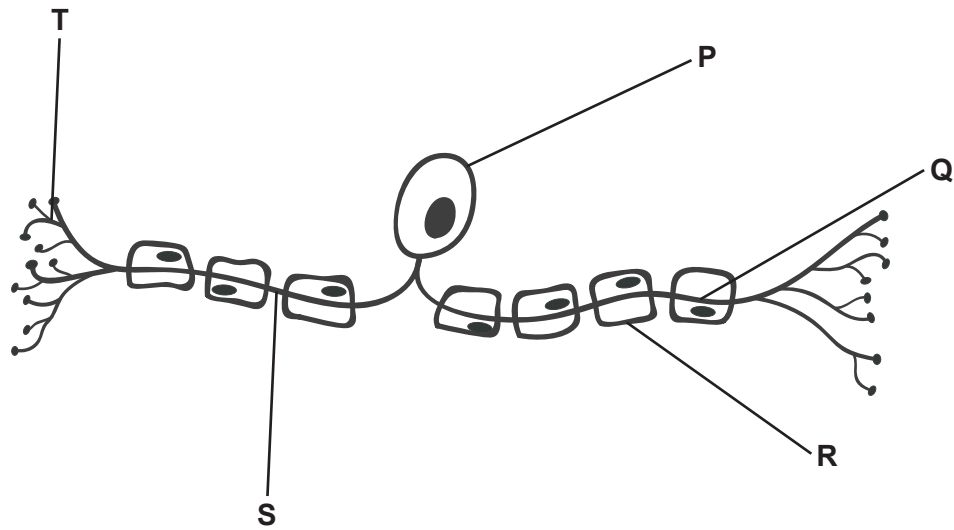
Identify **one** malfunction of the eye and explain the treatment for it.

You may use the malfunction identified in **(b)(i)** or another of your choice.

[6]

- (c) Sensory neurons transmit electrical impulses from sensory organs such as the ear to the brain.

The diagram below shows the basic structure of a sensory neuron.



- (i) Complete the table below using letters from the diagram to identify the components of the sensory neuron.

Structure	Letter
Axon	.....
Cell body	.....
Myelin sheath	.....
Node of Ranvier	.....

[4]

- (ii) When an electrical impulse gets to the end of the sensory neuron it must cross a gap to pass on to the next sensory neuron.

Name the gap between sensory neurons.

..... [1]

- (d) The musculoskeletal system contains joints which occur where two or more bones come together such as the fixed joint.

- (i) Identify **one** other type of joint found in the body.

..... [1]



(ii)\* Explain how the action of muscles around the joint identified in **2(d)(i)** results in movement.

[6]

(e) Complete the table below by deciding whether each statement about malfunctions of the musculoskeletal system is True (T) or False (F).

Statement	True or False
Bone density scans are used to monitor osteoporosis.	.....
Osteoarthritis can be caused by injury to a joint.	.....
Osteoporosis can be caused by loss of cartilage in joints.	.....

**[3]**

**3 (a)\*** Homeostasis is important in regulating conditions in the body.

The statements below are examples of homeostasis.

- Keeping the water content of cells constant
- Controlling the concentration of glucose in the blood
- Maintaining the body temperature at 37 °C

Explain the principles of homeostasis. You can either use **one** of the examples above or another example you have studied.

[6]

**(b)** Malfunctions can occur that affect the control and regulatory systems of the body.

Choose from the list of malfunctions below to answer the following questions.

You can use each malfunction once, more than once or not at all.

**diabetes**

**stroke**

**multiple sclerosis**

**nephrotic syndrome**

**(i)** Name **one** malfunction that can be caused by damage to the kidneys.

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

**(ii)** Name **one** malfunction that can be caused by high blood pressure.

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

**(iii)** Name **two** malfunctions with symptoms that include loss of balance and coordination.

1 .....

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

**(iv)** Name **one** malfunction that is an autoimmune disease.

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



**4** The heart is part of the cardiovascular system.

- (a)** Complete the passage about the structure of the heart by choosing the most appropriate word(s) from the list below.

You can use each word once, more than once, or not at all.

<b>aorta</b>	<b>artery</b>	<b>atrium</b>	<b>bicuspid</b>	<b>semi-lunar</b>
<b>tricuspid</b>	<b>vein</b>	<b>vena cava</b>	<b>ventricle</b>	

The heart consists of four chambers. Blood enters the right side of the heart through a blood vessel called the ..... and leaves the heart to go to the lungs via the pulmonary ..... The valve between the two chambers on the right side of the heart is called the ..... valve and prevents backflow of blood into the right ..... After it has been oxygenated in the lungs, blood returns to the heart and is pumped out of the main blood vessel called the ..... to the rest of the body.

**[5]**

- (b)** The cardiac cycle is controlled by electrical activity in the heart.

Which statement about the control of the cardiac cycle is correct?

Put a tick (✓) in the box next to the correct statement.

The atrioventricular node (AVN) is known as the pacemaker.

☐

The atrioventricular node (AVN) delays the electrical impulse.

☐

The Purkyne fibres pass the electrical impulse from the atria to the ventricles.

☐

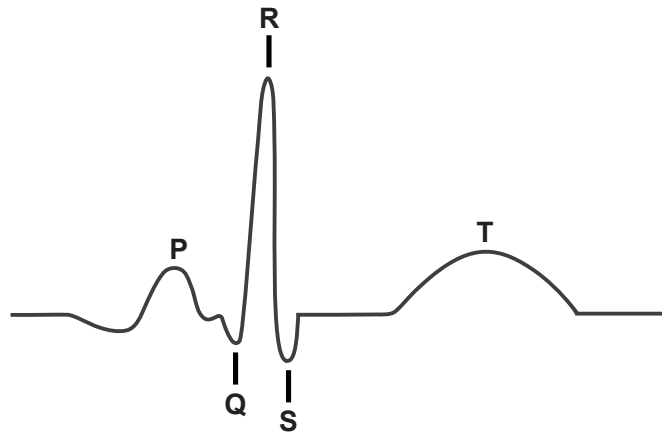
The sinoatrial node (SAN) receives the impulse from the atrioventricular node (AVN).

☐

**[1]**

- (c) An electrocardiogram (ECG) shows the electrical activity in the heart during the cardiac cycle.

The diagram below shows the ECG trace of a healthy heart with waves **P**, **Q**, **R**, **S** and **T** labelled.



Use the letters in the diagram to identify the part of the ECG trace where the following are happening inside the heart.

Each letter may be used once, more than once, or not at all.

- (i) The ventricles are relaxing.

..... [1]

- (ii) The atria are contracting.

..... [1]

- (iii) The ventricles are contracting.

..... [1]

- (d) As blood passes through capillaries, tissue fluid is formed. Fluid moves out of the blood at the arterial end of the capillary and some fluid drains back into the blood at the venous end.

Outline **two** roles of blood proteins and **two** roles of hydrostatic pressure in the movement of fluid into and out of blood capillaries.

**Blood proteins:**

1 .....

.....

2 .....

.....

**Hydrostatic pressure:**

1 .....

.....

2 .....

.....

[4]

**5** The small intestine is a component of the digestive system.

**(a)** Choose **one** adaptation that does **not** help the intestine wall to absorb nutrients.

Adaptation	Tick (✓) the one that is <b>not</b> a correct adaptation.
It has a small surface area.	
It has lacteals.	
It has microvilli.	
It has villi.	

[1]

**(b)\*** Ben, an active 35-year-old man, has recently been diagnosed with Coeliac disease.

Coeliac disease is a malfunction of the digestive system that prevents nutrients being absorbed correctly in the small intestine.

Discuss the symptoms of Coeliac disease and the impact it may have on Ben's lifestyle.

[8]

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.....

.....

.....

.....

.....

**(c)** Complete the table about components of the digestive system.

Use components from the list below.

You can use each component once, more than once or not at all.

**buccal cavity**

**large intestine**

**oesophagus**

**rectum**

**salivary glands**

**small intestine**

**stomach**

Statement	Component
Links the large intestine to the anus.	.....
Produces fluid that makes food easy to swallow.	.....
Produces hydrochloric acid.	.....
Reabsorbs water and ions from digested food.	.....
Stores faeces.	.....

**[5]**

**END OF QUESTION PAPER**

### ADDITIONAL ANSWER SPACE

If additional answer space is required, you should use the following lined pages. The question numbers must be clearly shown – for example, 1(b)\* or 2(b)(ii)\*.

[illegible]





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