OCR
Oxford Cambridge and RSA

Monday 20 May 2024 – Afternoon

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
C442/2406

C442/2406

No extra materials are needed.

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Please write clearly in black ink. **Do not write in the barcodes.**

Centre number | | | | | | Candidate number | | | | |

First name(s) _____

Last name _____

Date of birth | D | D | M | M | Y | Y | Y | Y |

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 **24** pages.

ADVICE
- Read each question carefully before you start your answer.

1 Blood is contained in the blood vessels of the cardiovascular system.

(a) Choose from the terms below to answer the following questions about the composition of blood and its functions.

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

erythrocyte	**lymphocyte**	**monocyte**
neutrophil	**plasma**	**platelet**

(i) Which is the liquid part of the blood?

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

(ii) Which is a cell that transports oxygen in the blood?

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

(iii) Which is the largest type of white blood cell that helps to prevent infection?

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

(iv) Which is a cell fragment important in the clotting of blood?

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

(b) Which **one** of the following is a correct statement about the role of hydrostatic pressure in the formation of tissue fluid?

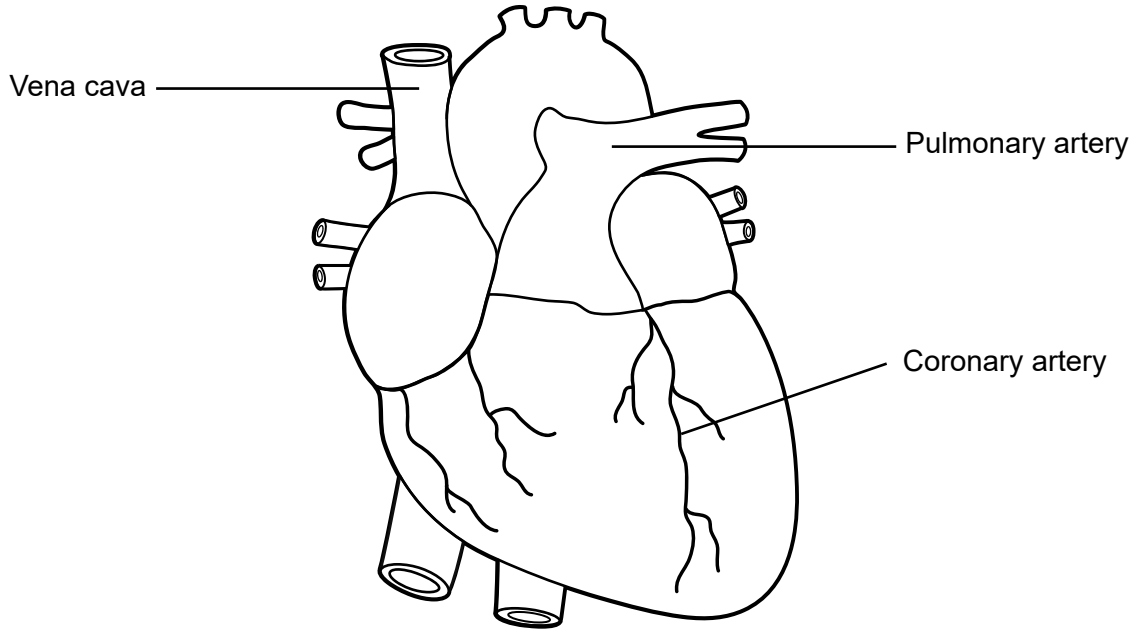
Put a tick (✓) in the box next to the correct statement.

Statement	Tick (✓) **one** only
Forces blood proteins out of capillaries into surrounding tissues.	
Forces water and dissolved substances into capillaries from the surrounding tissues.	
Forces water and dissolved substances into surrounding tissues.	

[1]

(c) The heart pumps blood around the body.

The diagram shows the structure of the heart with three blood vessels labelled.



(i)* Describe the roles of these blood vessels.

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..... **[6]**

(ii) The heart has an electrical conduction system that controls the cardiac cycle.

Match each of the structures of the heart with its role in the cardiac cycle by drawing a line between the boxes.

Structure	**Role**
Atrioventricular node (AVN)	Initiates contraction of heart muscle and is also known as the 'pacemaker'.
Purkyne fibres	Delays impulses to allow time for atria to empty blood into the ventricles.
Sinoatrial node (SAN)	Specialised cardiac muscle that transmits impulses through ventricle walls.

[3]

(d) Heart rate is controlled by a component of the nervous system.

Which **one** of the following is a component of the nervous system that controls heart rate?

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

Component	Tick (✓) **one** only
Autonomic nervous system	
Central nervous system	
Spinal cord	

[1]

(e) The heart supplies blood to the brain. Taylor suffered a stroke when the blood supply to their brain was reduced.

(i) Give **one** explanation for how the blood supply to Taylor's brain may have been reduced.

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

(ii) Outline possible effects of the stroke on Taylor's body.

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..... **[4]**

(f)* Discuss the strengths and weaknesses of treatments available to help Taylor recover from the stroke.

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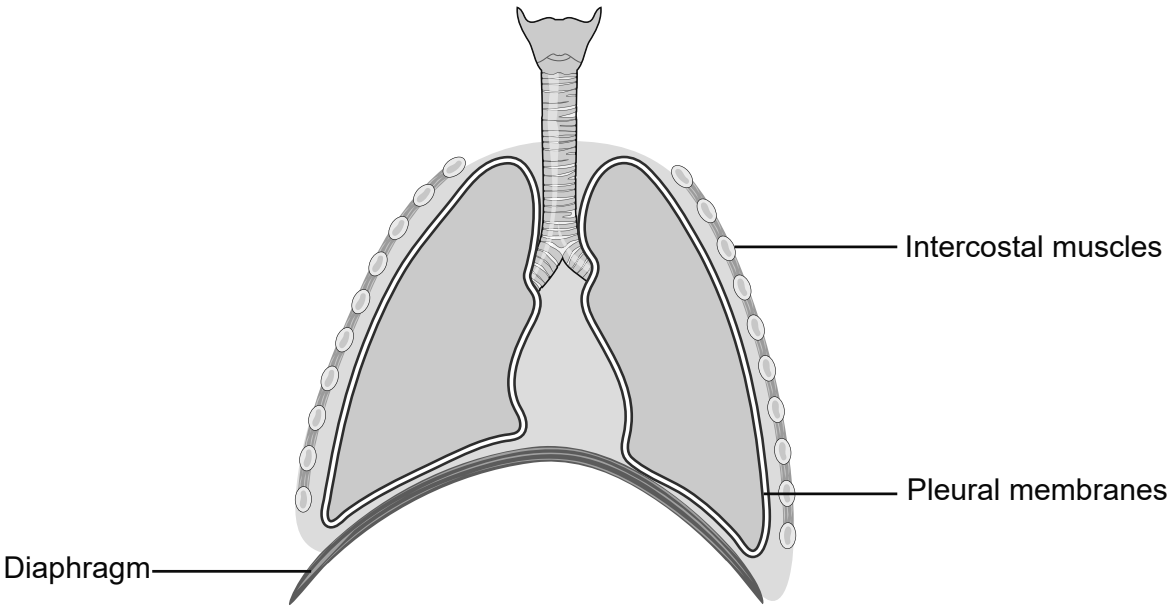
..... **[8]**

2 Inspiration (breathing in) and expiration (breathing out) is carried out by the respiratory system.

The diagram below shows the respiratory system with three of the structures labelled.



(a)* Explain the roles of these structures in inspiration and expiration.

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..... **[6]**

(b) Aerobic and anaerobic are types of respiration.

The table below contains statements about aerobic and anaerobic respiration.

Complete the table below by deciding whether each statement is correct for either **aerobic only**, **anaerobic only** or **both** types of respiration.

Put a tick (✓) in **one** box for each row.

The first row has been done for you.

Statement	Aerobic only	Anaerobic only	Both
Occurs inside cells			✓
Produces ATP			
Produces lactic acid			
Uses oxygen			

[3]

(c) Zac has cystic fibrosis, a malfunction of the respiratory system.

(i) Describe **two** symptoms caused by the effects of cystic fibrosis on Zac's lungs.

1 .....

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2 .....

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[2]

(ii) State **one** treatment available for cystic fibrosis **and** describe how it could improve Zac's condition.

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

(d) Cystic fibrosis can also affect the digestive system.

Complete the table by choosing words or sentences, from the list given below, to match structures in the digestive system with their role in digestion.

Bile duct	**Churns the food to break it up**	**Large intestine**
Oesophagus	**Opens to allow removal of faeces**	**Pancreatic duct**
Small intestine	**Stores faeces until they are removed**	

Structure	**Role**
Anus	....
.....	Allows a digestive fluid to flow from gall bladder to the small intestine.
.....	Reabsorbs water from digested food and prepares waste products for removal.
Rectum	....
.....	Completes digestion and is the site of absorption of nutrients.

[5]

(e) Irritable bowel syndrome (IBS) and coeliac disease are malfunctions of the digestive system.

(i)* Discuss the similarities and differences between the causes and effects on the digestive system of these malfunctions.

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..... **[8]**

(ii) Describe **two** impacts of IBS on lifestyle.

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[2]

Turn over for the next question

3 Synovial joints are part of the musculoskeletal system.

The table below contains statements about some of the components of a synovial joint and their functions.

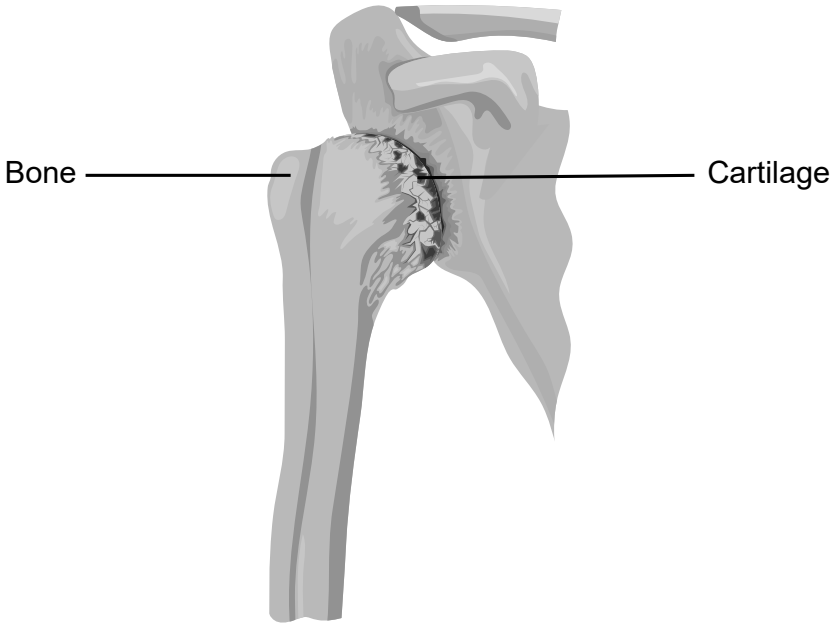
(a) Complete the table by deciding whether each statement is **True (T)** or **False (F)**.

Statement	**True (T) or False (F)**
Bones provide a framework for the attachment of muscles.	.....
Ligaments attach muscles to bones.	.....
Muscles can only pull when they contract.	.....

[3]

(b) Heidi has arthritis in the shoulder.

The diagram below shows a shoulder joint with arthritis.



(i) Identify the type of synovial joint in the shoulder.

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

(ii)* Explain the possible risk factors **and** biological causes for Heidi's arthritis.

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..... **[6]**

(c) Heidi is concerned about developing osteoporosis as she ages.

(i) Name the component of the synovial joint that would be affected by osteoporosis.

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

(ii) Describe **two** methods that can be used to monitor the development of osteoporosis.

1 .....

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2 .....

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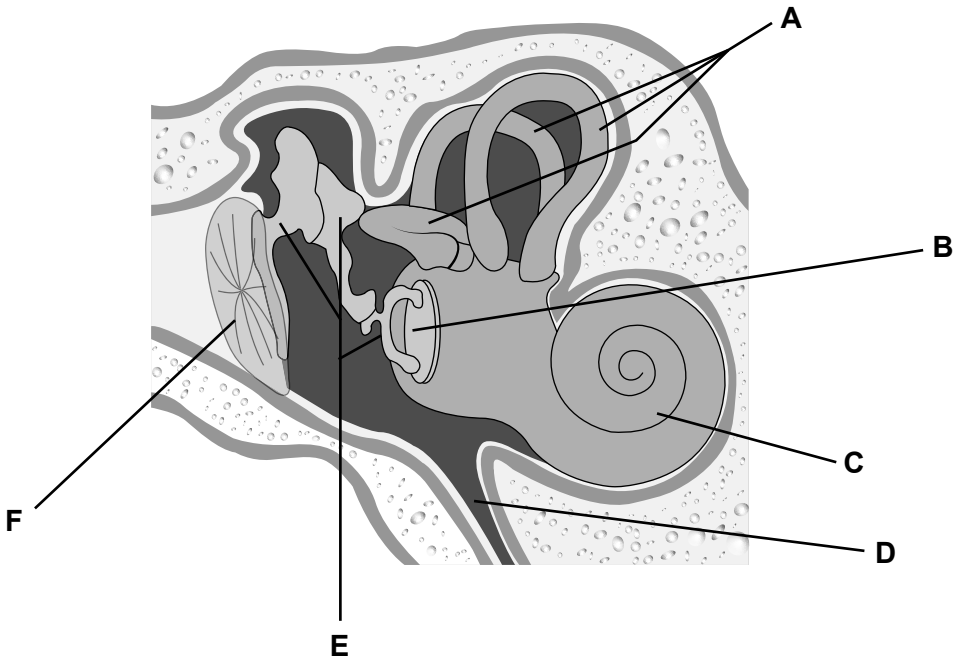
[2]

4 The ear is part of the sensory system.

The diagram below shows some of the structures in the ear.



(a) Complete the table below by selecting the correct letter that identifies the structures of the ear from the descriptions.

The first row has been done for you.

Description	**Letter**
A coiled tube that contains jelly-like fluid.	**C**
A thin membrane that transmits vibrations to the middle ear.	.....
A tube that helps to keep the pressure of the middle ear the same as outside the ear.	.....
Fluid-filled tubes that help with balance.	.....
Small bones that transmit vibrations.	.....

[4]

(b) Hearing loss may occur suddenly or develop over a period of time.

(i)* Explain the possible causes **and** effects of hearing loss.

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..... **[6]**

(ii) Describe **two** treatments for hearing loss.

1 .....

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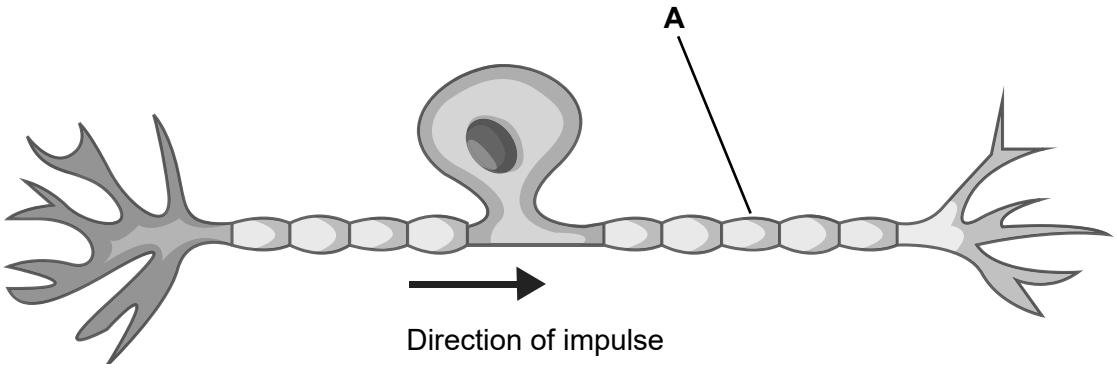
[2]

(c) Transmission of nerve impulses throughout the body is carried out by specialised nerve cells or neurons.

The diagram shows the structure of a neuron.



(i) Identify the type of neuron shown in the diagram.

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

(ii) Part of the neuron, labelled **A** on the diagram, carries the impulse from the cell body to the next cell.

Identify the part of the neuron that completes this function.

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

5 The kidney is part of the regulatory system.

(a) Complete the passage about the kidney by choosing the most appropriate word(s) from the list below.

bladder	**calyx**	**cortex**	**medulla**
renal artery	**renal vein**	**urethra**	

The ..... is the inner region of the kidney that contains nephrons to carry out the kidney functions. Urea is removed from the blood and the filtered blood leaves the kidney via the ..... .

The urine formed passes through special chambers each known as a ..... and then passes through the ureter to the ..... for storage. The stored urine leaves the body at intervals through the ..... .

[5]

(b) The kidney removes urea from the blood, but it is produced by a different organ in the body.

Which **one** of the following organs produces urea?

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

Component	Tick (✓) **one** only
Gallbladder	
Liver	
Pancreas	

[1]

(c) Kidney nephrons carry out the main functions of the kidney.

The table below shows some of the components of a kidney nephron.

Choose from the list of components to complete the table about the structure of a kidney nephron.

Bowman's capsule **collecting duct** **convoluted tubule**

glomerulus **loop of Henle**

Description	Component
A small ball of capillaries where blood enters for filtration.	.....
Part of the nephron tubule where glucose is reabsorbed back into the blood.	.....
Part of the nephron tubule where most of the water is reabsorbed.	.....
Part of the nephron tubule where ultrafiltration occurs.	.....

[4]

(d)* Alex has nephrotic syndrome, a malfunction of the kidneys.

The symptoms of nephrotic syndrome include:

- high levels of urine produced
- increased risk of infection
- oedema (swelling caused by fluid in body tissues).

Explain the biological causes of nephrotic syndrome that can lead to these symptoms.

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END OF QUESTION PAPER

EXTRA ANSWER SPACE

If you need extra space use these lined pages. You must write the question numbers clearly in the margin.