

Mock 1.

Please read the answers carefully you have 2 hours to complete.
Each multiple choice question or right or wrong answer is worth one
mark all other questions have marks allocated to them in brackets.

1. In which cavity is the heart situated?

- Abdominal cavity
- Pelvic Cavity
- **Thoracic Cavity**
- Cranial Cavity

2. The muscle layer of the heart is called the:

- **Myocardium**
- Endocardium
- Pericardium
- Parietal pericardium
- **The right ventricle of the heart pumps blood to the:**

- a) **Lungs**
- b) Left ventricle
- c) Rest of the body
- d) Right Ventricle

3. Pulmonary arteries transports:

- a) Oxygenated blood

b) Deoxygenated blood

c) Lymph

d) A and B.

4. **Carbon dioxide is removed by:**

a) Blood

b) Lungs

c) Kidneys

d) Skin

5. **Where is the body's thermoregulatory centre?**

a) Medulla Oblongata

b) Hypothalamus

c) Frontal Lobe

d) Brain Stem

6. Define homeostasis and describe in detail blood glucose regulation and thermoregulation (14 marks)

Homeostasis maintain the internal environment within defined parameters.

Glucose regulation after eating food blood glucose levels will rise this will be detected by the specialized cells in the Islets of Langerhans in the Pancreases. If blood glucose levels rise the beta cells will secrete the hormone insulin this will travel via the blood stream and aid in the uptake of glucose into the cells alpha cells will reduce the amount of glucagon secreted. Excess glucose is transported to the liver to be converted into glycogen to be used when blood glucose levels are low. When blood glucose levels have reached normal levels negative feedback readjusts the levels of insulin secreted.

If blood glucose levels are low this will be detected by the specialized cells in the Islets of Langerhans in the pancreas and the alpha cells will release the hormone glucagon a hormone which will travel via the blood stream and will stimulate the liver to convert glycogen to glucose less insulin will be released by the beta cells if blood glucose levels continue to be low the body will convert other biological substances to glucose such as fatty acids and glycerol. Once blood glucose levels have returned to the set point negative feedback readjusts the levels of insulin and glucagon.

7. Describe the circulation of blood around the heart and body (10 marks)

Blood enters the heart through two large veins – the posterior (inferior) and the anterior (superior) vena cava – carrying deoxygenated blood from the body into the right atrium.

Blood flows from the right atrium into the right ventricle through the tricuspid valve/ AV valve. When the ventricle is full, the tricuspid valve shuts to prevent blood flowing backwards into the atrium.

Blood leaves the heart through the pulmonary valve into the pulmonary artery and flows to the lungs.

The pulmonary vein carries oxygen-rich blood from the lungs into the left atrium.

Blood flows from the left atrium into the left ventricle through the open bicuspid / AV valve. When the ventricle is full, the AV valve shuts to prevent blood from flowing backwards into the atrium.

Blood leaves the heart through the aortic valve into the aorta and to the rest of the body. ^{ARTERIOLES} Blood flows from the aorta to the arteries, to the capillaries, venules and veins before returning to the right side of the heart.

8. Describe gas exchange in the lungs (5 marks)

Gas exchange is the delivery of oxygen from the lungs to the bloodstream, and the elimination of carbon dioxide from the bloodstream to the lungs. It occurs in the lungs between the alveoli and a network of tiny blood vessels called capillaries, which are located in the walls of the alveoli.

The walls of the alveoli share a membrane with the capillaries in which oxygen and carbon dioxide move freely between the respiratory system and the bloodstream through a process called simple diffusion. Oxygen molecules attach to red blood cells, which travel back to the heart. At the same time, the carbon dioxide molecules in the alveoli are blown out of the lungs with the next exhalation.

9. What is the formula for cellular respiration (2 marks)



10. Describe the electric circuit of the heart (4 marks)

SA Node AV Node Right and left bundle branches, Purkinje fibres bundle of His

11. What is the formula for cellular respiration?

12. What is the formula for blood pressure? $BP = CO \times TPR$

13. What effects cardiac output?

HR and SV

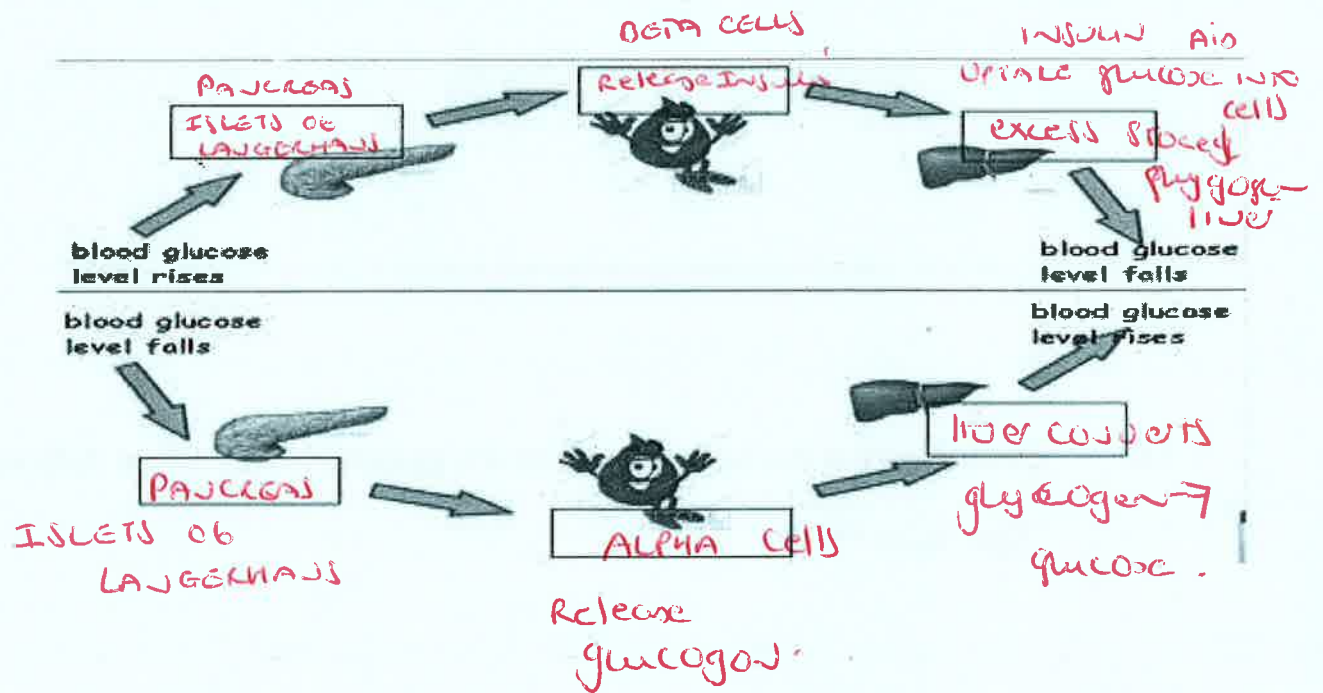
14. During strenuous exercise describe how the body alters the blood pressure (marks)

During strenuous exercise the aorta and the carotid sinus detect a change on the stretch receptors in the arteries within the baroreceptors. This information is then sent via nerve to the cardio regulatory centre within the medulla, which responds by initiating mechanisms help to increase blood pressure. ^{ADRENALINE RELEASED FROM SA NODE IN THE HEART & ADRENALS} The sympathetic nervous system increases heart rate stimulate the heart muscle to pump with more force. More blood is required in the legs & limb muscles so blood is diverted to them by vasoconstriction of blood flow to the gastrointestinal tract and vasodilating flow to the limbs. Once exercise has stopped the body's parasympathetic neurone releases acetylcholine from the sinoatrial node slowing heart rate down to lower the blood pressure.

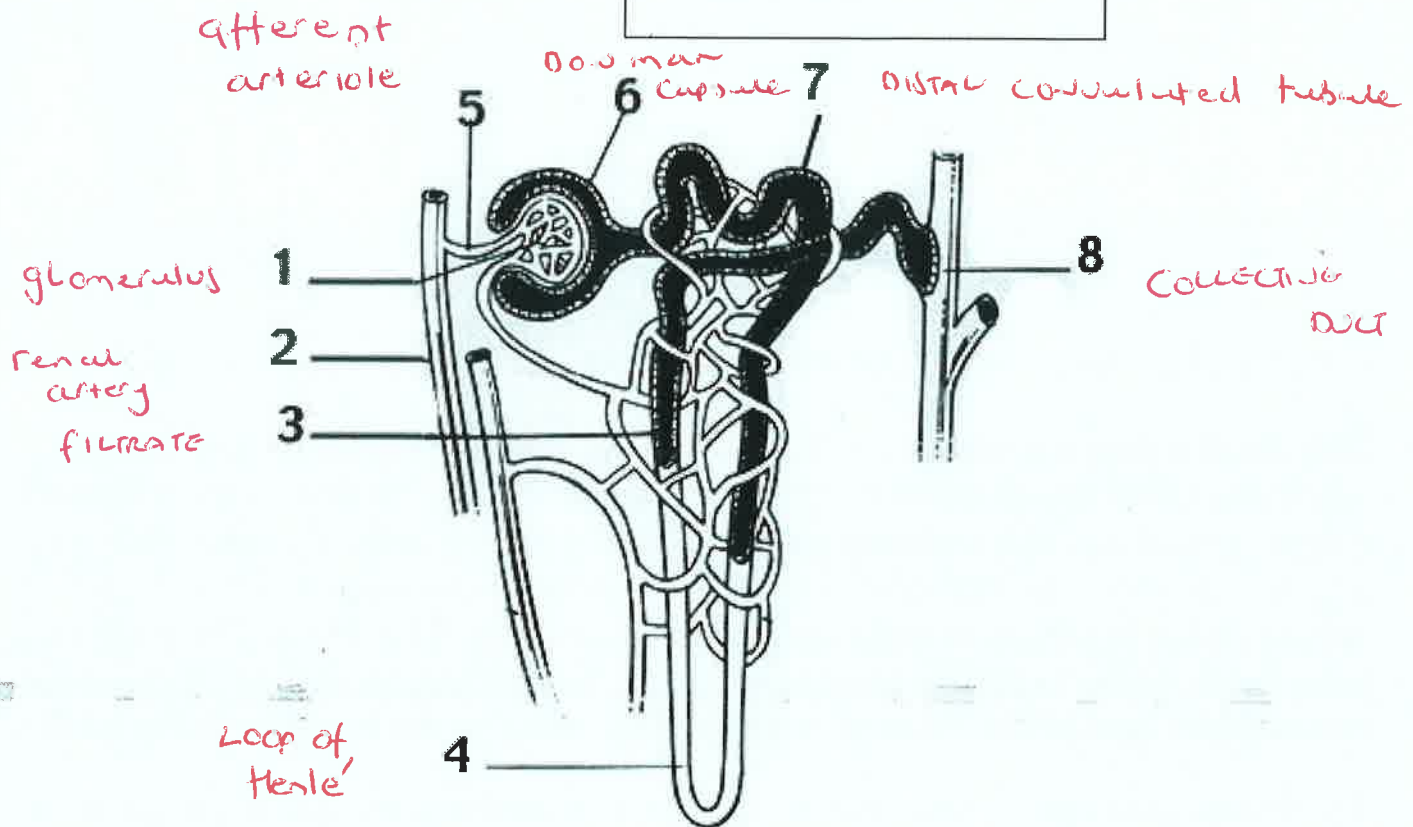
15. Describe how the body maintains its glucose levels within defined parameters

See overview.

Glucose Regulation



Please Label the following diagram of a nephron. (8 marks)



16.

17. What are the three different layers of the heart called. (3 marks)

Epicardium

Myocardium

Endocardium

18. Why is it important for the body to maintain a Ph. of between 7.35 and 7.45 (3 marks)
Ph goes outside parameters cell death and denaturing of enzymes occurs and the body will become toxic.

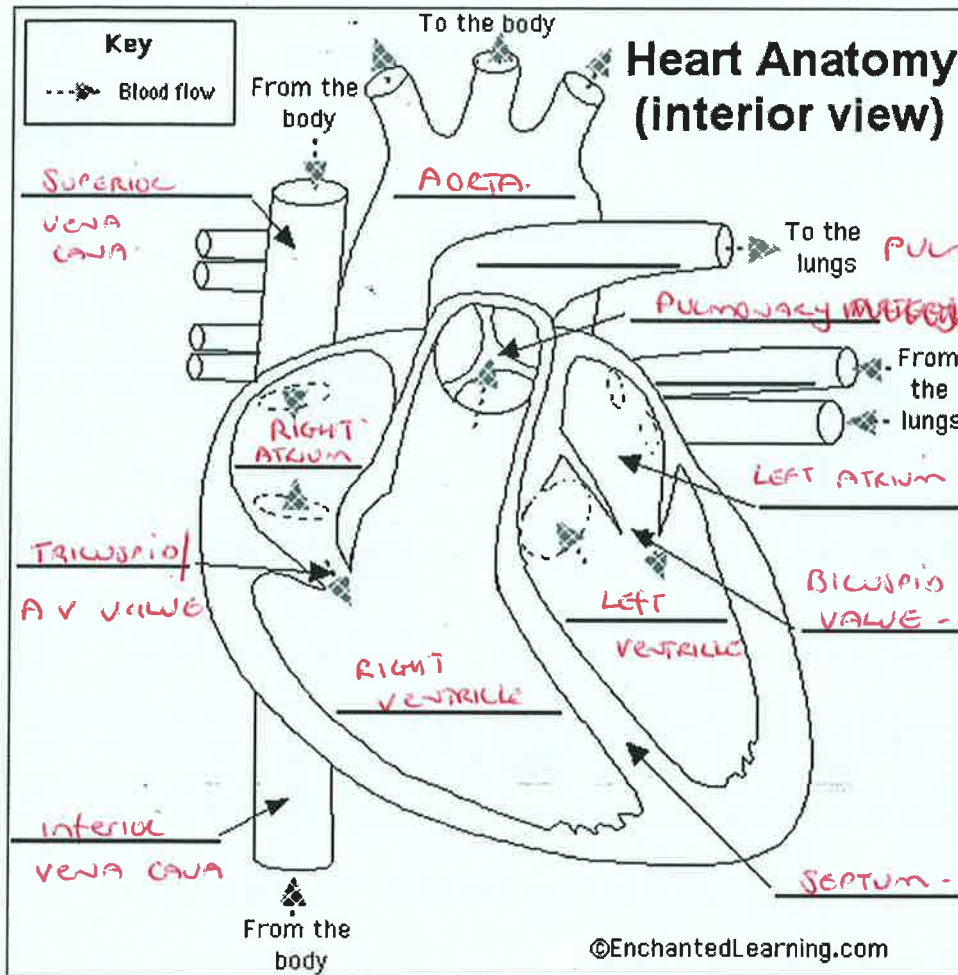
- Describe how the functional unit of the kidney filters the blood and produces urine. (10 m

Dirty blood enters the kidney via the renal artery. The artery splits up into a ball of capillaries called the glomerulus. The Blood is under high pressure (coming from the pumping heart and also because the blood vessel leading away from the glomerulus smaller diameter) The high pressure forces all small molecules out of the holes in the capillary walls leaving only large molecules like proteins in the blood. The small molecules enter the Bowman's capsule (now called glomerular filtrate) and travel into the proximal convoluted tubule where glucose is reabsorbed back into the blood by active transport.

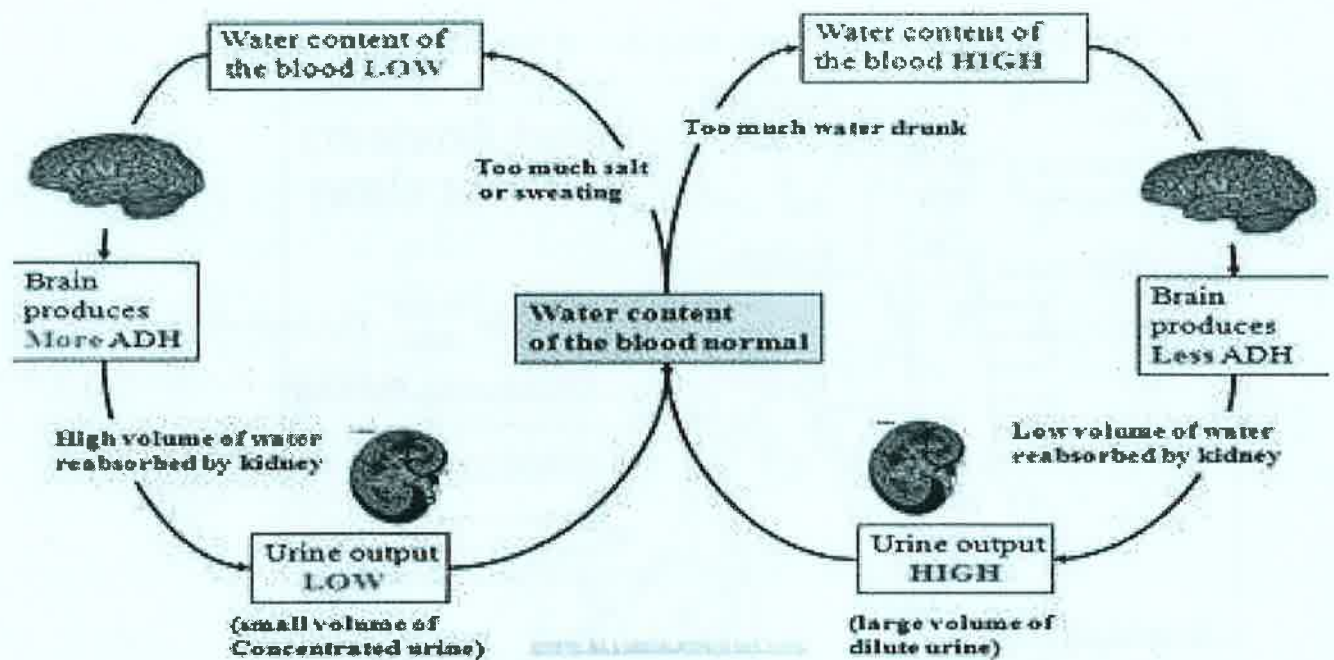
The filtrate travels down through the loop of Henlé where water is reabsorbed by osmosis.

The filtrate then enters the distal convoluted tubule where minerals, amino acids and useful substances are reabsorbed back into the blood. The remaining fluid containing excess salts and excess water passes into the collecting duct. The distal convoluted tubules from several other nephrons join up to form the collecting duct. The collecting ducts from the other nephrons join to form the ureter, which leads to the bladder. The fluid is stored in the bladder ready for excretion. The urine travels down the urethra to the outside.

- Please label the following diagram of the heart (15 marks)



- Describe how the body controls water levels in the body (5 marks)



- The following sentences are about the blood system. Please fill in the blanks.

Capillaries have thin walls which are ONE. cell thick. This allows nutrients from digested food to **diffuse/ move** through and reach the cells of organs. Capillaries are very **small/one cell thick**. and so blood flow through an organ is slowed down and blood pressure is **lower**

(Total 4 marks)

- TRUE OR FALSE? Are the following statements true or false?**

The left side of the heart is more muscular than the right. True

The cardiac cycle is a sequence of events occurring in one minute. True

The sinoatrial (SA) node is located in the left atrium. False right

Systole refers to relaxation of the heart chambers. False diastole *correct*

Cardiac muscle cells are best described as voluntary striated muscle tissue. Non Voluntary Stri:

false NON VOLUNTARY STRIATED muscle Tissue.

All arteries carry oxygenated blood and all veins transport deoxygenated blood. **False** pulmonary artery, pulmonary veins

- What factors effect blood pressure (5 marks)

Diet, salt content, weight, drinking smoking, drug use, stress, exercise.

- What are the modifiable and non-modifiable causes of heart disease? (10 marks)

Modifiable, type 2 diabetes, obesity, diet, obesity, drinking smoking, drugs

Non modifiable age, sex, ^{more} genetics ethnic group, type one diabetes

- What are the consequences of high blood pressure (5 marks)

Stroke, heart disease, eye sight conditions, kidney damage, death, aneurysm.

death

What is hypertension and hypotension and what systolic and diastolic readings are associated with both. (4 marks) Hypertension high blood pressure hypotension low blood pressure high . 140/90

100 90/60

7 140/90

- Describe osmoregulation and thermoregulation in detail (15 marks)

see diagram

When your internal temperature changes, sensors in your central nervous system (CNS) send messages to your hypothalamus. In response, it sends signals to various organs and systems in your body. They respond with a variety of mechanisms.

Sweating: Your sweat glands release sweat, which cools your skin as it evaporates. This helps lower your internal temperature.

Vasodilation: The blood vessels under your skin get wider. This increases blood flow to your skin where it is cooler — away from your warm inner body. This lets your body release heat through heat radiation.

Vasoconstriction: The blood vessels under your skin become narrower. This decreases blood flow to your skin, retaining heat near the warm inner body.

Thermogenesis: Your body's muscles, organs, and brain produce heat in a variety of ways. For example, muscles can produce heat by shivering.

Hormonal thermogenesis: Your thyroid gland releases hormones to increase your metabolism. This increases the energy your body creates and the amount of heat it produces.