

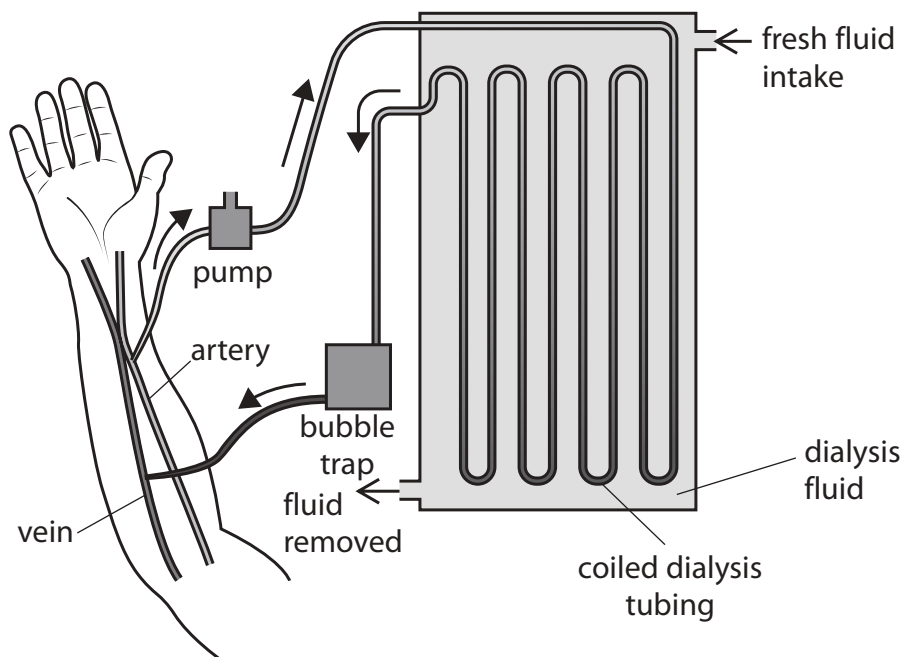
Answer ALL questions

Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

- 1 Read the passage below. Use the information in the passage and your own knowledge to answer the questions that follow.

Treating Kidney Disease

Chronic kidney disease affects approximately 12% of the world's population and many people are unable to obtain treatment. One method of treating chronic kidney disease is by dialysis. The diagram shows how kidney dialysis is done.



- During dialysis, blood is taken from an artery in the arm and is pumped through a dialyser. In the dialyser, the blood passes through a long, coiled dialysis tube made of a thin partially permeable membrane. The tube is surrounded by dialysis fluid. The dialysis fluid contains glucose and ions at concentrations normally found in blood plasma, but does not contain urea. The urea passes from the blood into the dialysis fluid. The temperature in the dialyser is kept at 40 °C. After passing through the dialyser, the blood is returned to a vein in the arm. Kidney dialysis can take up to three hours and must be done three times a week.

- Scientists have now designed a new bioartificial kidney. This artificial kidney is a combination of engineering and living cells. This artificial kidney has a haemofilter made from artificial membranes that filter the blood. The substances filtered out of the blood then pass through a device called a bioreactor. This bioreactor absorbs useful substances back into the blood. The bioreactor is made of living nephron cells that are grown from stem cells. These cells are separated from the patient's blood by a silicon membrane to prevent the immune system rejecting them. Bioartificial kidneys are the same size as a human kidney and will be fitted inside the body to replace a kidney. The bioartificial kidney can react to changes in the body in the same way as a normal kidney.

