1 (a) The human kidney acts as an organ of excretion and an organ of osmoregulation.

(i) What is meant by the term **osmoregulation**?

(1)

.....

.....

(ii) Name one other organ in the human body that is an organ of excretion.

(1)

.....

(b) The table shows the concentration of two substances in blood plasma and in urine.

Substance	Concentration of each substance in grams per 100 cm^3	
	Blood plasma	Urine
proteins	8.0	0.0
glucose	0.1	0.0

(i) Name one substance that is found in urine.

(1)

.....

(ii) Explain how the kidney ensures that there is no protein in urine.

(3)

.....

.....

.....

.....

.....

.....

(iii) Explain why the body does **not** excrete glucose and how this is achieved by the kidney.

(3)

.....

.....

.....

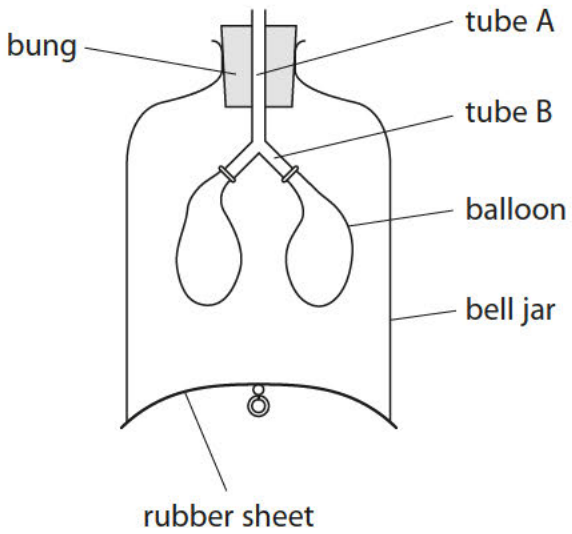
.....

.....

.....

(Total for Question = 9 marks)

2 The diagram shows a model that can be used to demonstrate how the lungs inflate.



(a) Suggest which part of the human thorax is represented by

(i) the balloons

(1)

.....

(ii) the rubber sheet

(1)

.....

(iii) tube A

(1)

.....

(iv) tube B

(1)

.....

(b) Describe and explain what happens to the balloons as the rubber sheet is pulled down.

(3)

(c) Explain why the model does not fully show the mechanism of breathing in the human thorax.

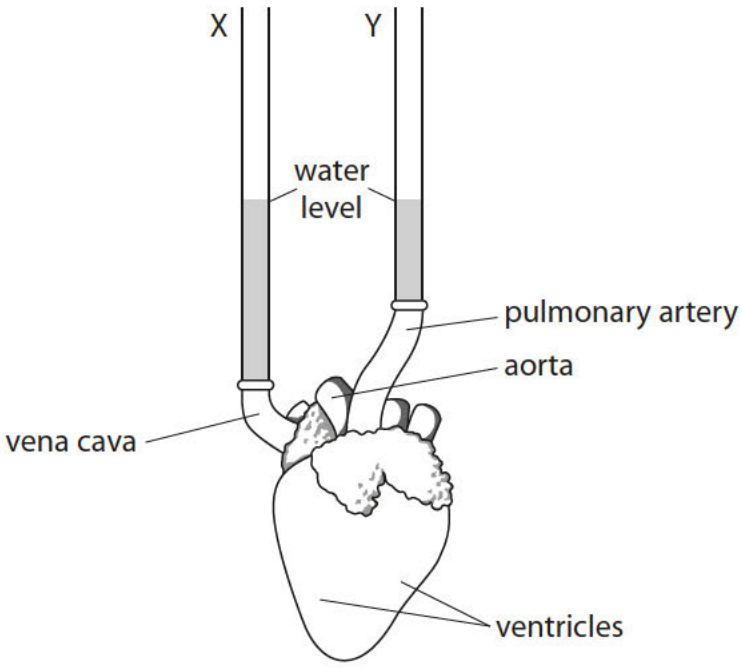
(2)

(d) Describe an experiment you could carry out to investigate the effect of exercise on breathing in humans.

(4)

(Total for Question = 13 marks)

3 The diagram shows a mammal heart with glass tubes, X and Y, securely attached to the vena cava and the pulmonary artery. Water was poured into tube X, and rose up tube Y until both tubes were filled to the level shown.



(a) When water was poured into tube X, two chambers in the heart were filled with water.

Name these two chambers.

(2)

1 .....

2 .....

(b) The ventricles were squeezed once by hand.

(i) Suggest what would happen to the level of water in tube X and in tube Y when the ventricles were squeezed.

(1)

.....

.....

(ii) Explain why no water came out of the aorta when the ventricles were squeezed.

(1)

.....

.....

(Total for Question = 4 marks)

4 (a) The table lists some structures that provide a large surface area for the diffusion of substances.

Complete the table by naming the organ in which each structure is found.
The first one has been done for you.

(3)

Structure	Organ
spongy mesophyll	leaf
alveolus	
nephron	
villus	

(b) What is meant by the term **diffusion**?

(2)

(c) The nephron is involved in the removal of substances from the blood.

Describe how substances are removed from the blood into the nephron.

(2)

(Total for Question = 7 marks)