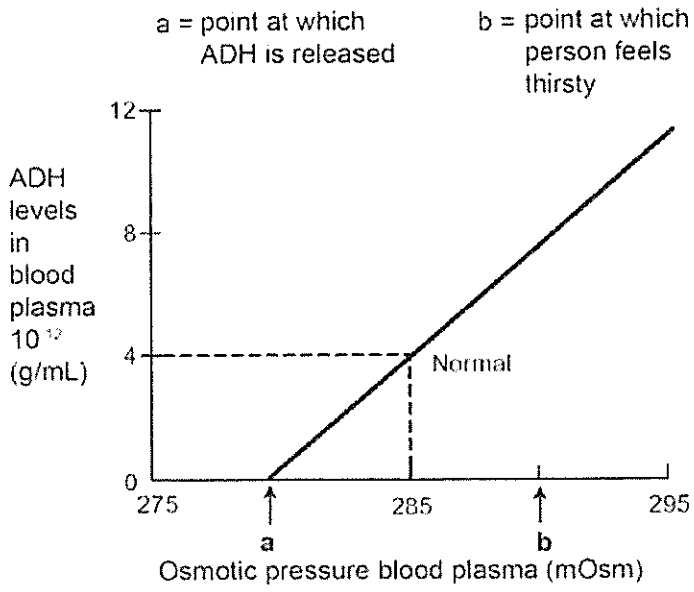
1. Part (a) of this question refers to the graph below showing a physiological response of the human body.

The effect of blood plasma osmotic pressure on plasma ADH concentration



The unit mOsm stands for milliosmole or one thousandth of an osmole.

a. Given the information in the graph, describe what would be occurring in the kidney to regulate blood fluid composition at a blood plasma osmotic pressure of 285 mOsm. (2 marks)

b.

i. Describe how the line would change if the person had consumed a significant amount of alcohol (Consider angle and position). (1 mark)

ii. Why does this change occur? (1 mark)

c. An Olympic cyclist is taking part in a scientific study into the effect of exercise on various body systems during high altitude cycle training. Her blood plasma osmotic pressure was checked using a blood sample taken after she exercised strenuously for 30 minutes. It was measured at 293 mOsm.

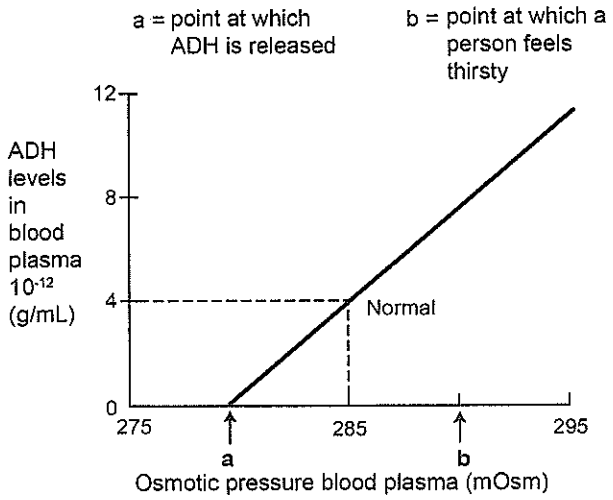
i. Describe **two** processes that would occur in her body during this exercise to cause this change in blood plasma osmotic pressure. (2 marks)

ii. The cyclist felt thirsty after completing the exercise. In which part of the brain is the centre that triggers the thirst mechanism? (1 mark)

Question 37 **(10 marks)**

Part (a) of this question refers to the graph shown below.

The effect of blood plasma osmotic pressure on plasma ADH concentration



The unit mOsm stands for milliosmole or one thousand of an osmole.

(a) Given the information in the graph, describe what would be occurring in the kidney to regulate blood fluid composition at a blood plasma osmotic pressure of 285 mOsm.
(2 marks)

Description	Marks
Any 2 of the following:	
• Increase in ADH conc • Distal convoluted tubules/ collecting duct would be more permeable to water • Water being reabsorbed back into the capillaries/ renal capillaries	1–2
	Total 2

(b) Water intoxication is a condition in which too much water is present in the body. Complete the table below, outlining the effect of water intoxication on the body fluids.
(3 marks)

Description		Marks
Changes in bodily fluids	**Effect of water intoxication**	
Would blood plasma osmotic pressure be above or below normal?	Below	1
Are the intercellular fluids dilute or concentrated?	Dilute	1
Would urine output be increased or decreased?	Increased	1
		Total 3

(c) Claire is taking part in a scientific study into the effect of exercise on various body systems. Her blood plasma osmotic pressure was checked using a blood sample taken after she exercised strenuously for 30 minutes. It was measured at 292 mOsm.

(i) Describe **two** processes that would have occurred in her body during exercise to cause this change in blood plasma osmotic pressure. (2 marks)

Description	Marks
Sweating	1
Increased expiration/ breathing rate	1
	Total 2

(ii) Claire felt thirsty after completing the exercise. In which part of the brain is the centre that triggers the thirst mechanism? (1 mark)

Description	Marks
Hypothalamus	1
	Total 1

(iii) How would the information travel from the structure identified in Part (ii) and where would it be processed to make Claire feel that she needed to drink water? (2 marks)

Description	Marks
Nerve impulse/ electrochemical impulse/ nervous transmission/action potential/nerve fibres	1
Cerebrum/ cerebral cortex	1
	Total 2