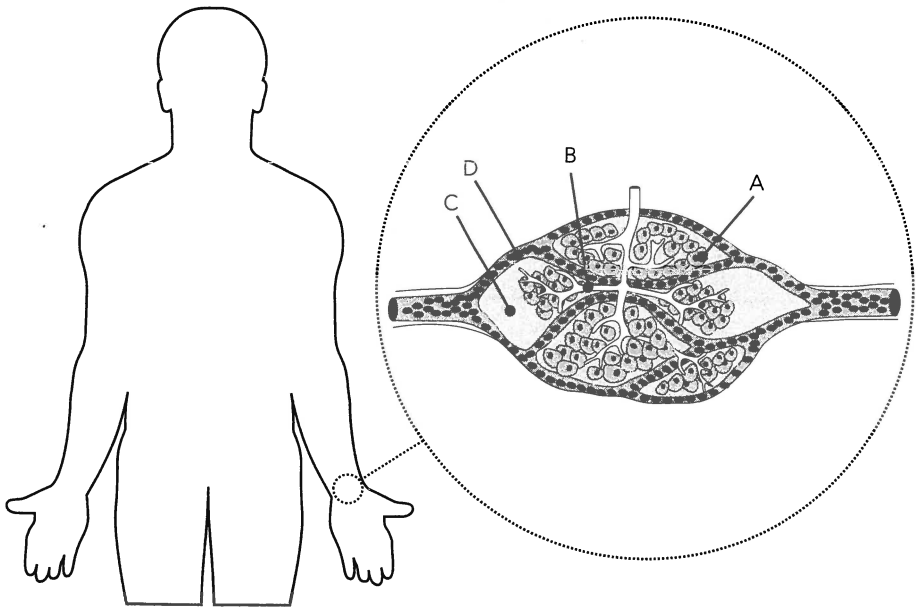
TRIAL TEST 4: HOMEOSTASIS

Time allowed:	**60 minutes**	**Section One –** Multiple Choice	30 marks
Total marks:	**100**	**Section Two –** Short Answer	50 marks
		Section Three – Extended Answer	20 marks

SECTION 1 – MULTIPLE CHOICE (30 MARKS)

Use the diagram below to answer questions 1 and 2.



1. (a) A refers to cells, B to a lymph vessel, C to intercellular fluid and D to plasma.
   (b) A refers to cells, B to intercellular fluid, C to intercellular fluid and D to plasma.
   (c) A refers to cells, B to intercellular fluid, C to interstitial fluid and D to tissue fluid.
   (d) A refers to cells, B to plasma, C to interstitial fluid and D to intracellular fluid.

2. Homeostasis refers to the situation in which:
   (a) the internal environment is maintained at relatively constant levels.
   (b) the internal and external environments stay constant.
   (c) the internal environment changes in response to the rate of respiration.
   (d) the internal environment stays the same as the external environment.

3. Tissue fluid contains which of the following?
   (i) Water.
   (ii) Glucose, glycerol, amino acids, fatty acids.
   (iii) Vitamins, mineral ions.
   (iv) Oxygen, carbon dioxide.
   (v) Hormones.
   (vi) Wastes.
   (a) (i), (ii) and (iii).
   (b) (i), (ii), (iii) and (iv).
   (c) (i), (ii), (iii), (iv) and (v).
   (d) all of the above.

4. The main control centre of blood pressure is:
   (a) the pituitary gland.
   (b) the somatic nervous system.
   (c) the cerebellum.
   (d) the medulla.

5. Symptoms of hypothermia include:
   (i) increased heart rate.
   (ii) increased shivering.
   (iii) confusion.
   (iv) lethargy.
   (v) increased breathing rate.
   (a) (i) and (ii).
   (b) (i), (ii) and (v).
   (c) (ii), (iii) and (iv).
   (d) all of the above.

6. A small sample of body fluid was collected and tested. It contained water, inorganic ions and urea. It is most likely to be:
   (a) plasma.
   (b) tissue fluid.
   (c) urine.
   (d) blood.

7. Most of the oxygen in your blood is:
   (a) dissolved in plasma.
   (b) chemically bound to haemoglobin.
   (c) carried as bicarbonate ions.
   (d) carried as oxide ions.

8. Homeostasis can be disrupted by:
   (a) changes in pH, temperature extremes, low blood sugar levels and infections.
   (b) high external temperatures, exercise, and melanin.
   (c) sneezing, high pH and high blood sugar levels.
   (d) thinning hair, low pH and low blood sugar levels and disease.

9. The respiratory centre is located in the:
   (a) hypothalamus.
   (b) brain stem.
   (c) cerebral cortex.
   (d) lungs.

10. Emphysema is a lung disease that is progressively more debilitating as sufferers find it harder and harder to breathe. This is because:
   (a) their lungs get bigger.
   (b) the alveoli get bigger, increasing the total surface area.
   (c) the alveoli get bigger, decreasing the total surface area.
   (d) blood flow is faster through the lungs so not as much oxygen is absorbed.

SECTION 2 – SHORT ANSWER (50 MARKS)

1. Write down the most appropriate word or phrase in the space below.

(i) Increase in the diameter of blood vessels in the skin.

_____

(ii) Amount of blood leaving the heart per minute.

_____

(iii) The organ that stores glycogen.

_____

(iv) The process that removes moisture from the surface of the skin.

_____

(v) Concentration of hydrogen ions in the body fluids.

_____

(vi) The part of the brain which monitors body temperature.

_____

(vii) Vessels that take in excess tissue fluid and return it to the circulatory system.

_____

(viii) The number of times the heart beats per minute.

_____

(ix) Constant emission of heat from the body.

_____

(x) The best conditions for metabolic reactions.

_____

[10 marks]

2. (a) What is a steady state system?

_____

_____

_____

[1 mark]

(b) List the parts of a feedback loop and describe what each part does.

[6 marks]

(c) Distinguish between positive and negative feedback. Give an example for each.

[4 marks]

(d) Which of the two feedback systems is most common in the body? Explain why.

[2 marks]

3. During exercise, blood flow to the muscle cells increases ensuring sufficient nutrients and oxygen are supplied to meet demands and wastes are removed.

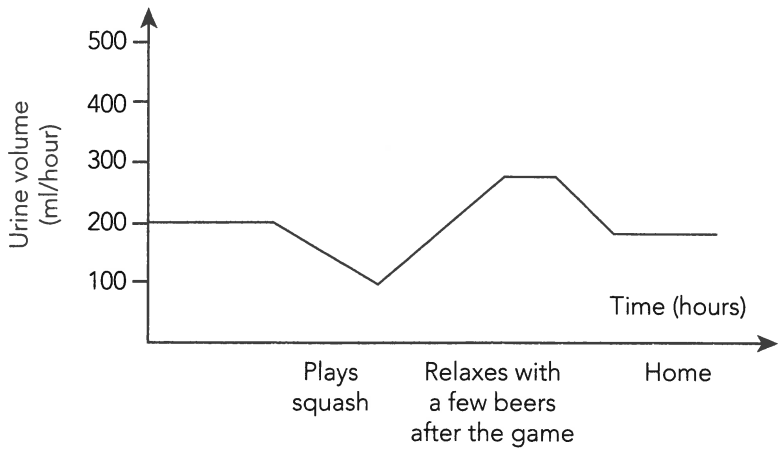
(a) What two aspects of the heart cause this increased blood flow?

[1 mark]

(b) What part(s) of the nervous system and endocrine system are involved in this change?

[2 marks]

(c) The following graph relates to the urine output of a squash player before and after playing a strenuous game on a hot night.



(i) What hormone controls urine output?

[1 mark]

(ii) Why has the urine output decreased during squash? (include hormonal control information)

[5 marks]

4. Many tissues of the body are sensitive to marked changes in blood glucose. For stability in functioning, it is essential it stays within quite restrictive limits. What homeostatic mechanisms ensure that the level of glucose in the blood remains at an optimum level?

[8 marks]

5. (a) Describe how breathing rate is controlled at rest by parts of the nervous system.

[3 marks]

(b) Describe how oxygen and carbon dioxide levels increase breathing rate.

[4 marks]

(c) Why is your breathing still deep and rapid after exercising? When does it return to the normal resting rate?

[3 marks]

SECTION 3 – EXTENDED ANSWER (20 MARKS)

Discuss the mechanisms your body uses to ensure that you maintain a constant temperature.

END OF TEST (100 MARKS)