

**Year 12 ATAR Human Biology**

**Stage 3 2019**

**Assessment Task 5**

**Test 2 – Homeostasis**

**Name:** ……………………………………..

**Teacher:** ………………………………….

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| --- | --- | --- |
| Part A | Multiple Choice Section | / 15 |
| Part B | Short Answer Section | / 28 |
| Part C | Extended Response Section | / 7 |
| TOTAL | | / 50 |
| PERCENTAGE | | % |

**PART A: MULTIPLE CHOICE – 15 MARKS**

**Mark your answers on the Multiple-Choice Answer Sheet provided.**

1. Most diabetics give themselves a daily dose of insulin, Taking too much insulin would have the effect of:

a. Decreasing blood glucose to dangerously low levels

b. Increasing blood glucose levels and causing kidney problems.

c. Not changing glucose levels

d. Increasing blood sugar levels via negative feedback

2. Which of the following are involved in regulating the rate of breathing?

i) Heart

ii) Medulla Oblongata

iii) Liver

iv) Carbon dioxide levels in the blood

v) Temperature of the blood

a. i and v

b. ii and v

c. ii and iv

d. I and iv

3. Shivering is an effective means of combating cold because it:

a. causes vasoconstriction which greatly reduces heat loss

b. changes posture and reduces heat loss via convection

c. causes the adrenal medulla to secrete adrenaline and noradrenaline, increasing metabolic rate

d. Generates heat by rapidly contacting skeletal muscles

4. Thermoreceptors are located in:

a. the skin and hypothalamus

b. the cerebral cortex and skin

c. the hypothalamus and cerebral cortex

d. the hypothalamus and medulla oblongata

5. Which of the following is NOT a response to a decrease in body temperature?

a. vasoconstriction

b. release of thyroxine

c. vasodilation

d. shivering

6. Breathing is controlled primarily by nerve centres situated in the:

a. cerebellum

b. medulla oblongata

c. hypothalamus

d. spinal cord

7. The receptors that sense blood sugar levels are sound in the:

a. islets of Langerhans

b. liver

c. hypothalamus

d. medulla oblongata

8. Glycogenesis refers to:

a. the conversion of glucose into glycogen

b. formation of glucose from glycogen

c. production of glycogen from carbohydrates

d. energy released from glucose through respiration

9. Sweating will cool the body best if the air is:

a. humid and windy

b. humid and still

c. dry and windy

d. dry and still

10. When carbon dioxide dissolves in the blood, the effect is to cause a chemical change in the composition of the blood. Which of the following occurs?

a. Increase in pH and increase in hydrogen ion concentration

b. Decrease in pH and increase in hydrogen ion concentration

c. Carbon dioxide bubbles form in the plasma

d. Increase in pH and decrease in hydrogen ion concentration

11. Cardiac output in calculated by

a. heart rate multiplied by pulse rate

b. blood pressure multiplied by heart rate

c. stroke volume multiplied by venous return

d. heart rate multiplied by stroke volume

12. After a meal high in carbohydrates, the concentration of glucose in the vein taking blood from the small intestines to the liver would be:

a. lower than before the meal

b. the same at all times in the blood stream

c. higher than before the meal

d. low as the glucose has already been converted to glycogen

13. Suffocation victims are usually given a mixture of 95% and 5% carbon dioxide of instead of pure oxygen. The reason for this is that carbon dioxide:

a. lowers blood pH to produce deeper breaths

b. stimulates the respiratory centre in the medulla oblongata to stimulate breathing

c. increases the rate at which gases are passed through the alveoli of the lungs

d. directly stimulates the diaphragm to increase breathing rate

14. Homeostasis is the mechanism by which the body maintains:

a. a dynamic physiological state within an unlimited range

b. a relatively stable internal environment, within limits

c. a static physiological state with no derivation from pre-set points

d. the lowest possible usage of energy

15. Which of the following would NOT occur if the blood pressure was to fall?

a. Vasoconstriction

b. Increased cardiac output

c. Vasodilation

d. Increase in activity of the sympathetic division

**End of Section A**

**PART B: SHORT ANSWERS – 28 MARKS**

**Write your answers in the spaces provided.**

1. An experiment in kidney function involved two groups of subjects. One group drank one litre of distilled water, the other group drank one litre of salty water (1% salt solution.) Blood plasma has a salt concentration of approximately 1%. The urine output from each group was measured every twenty minutes; from forty minutes before drinking the water until three hours after drinking it. He results are shown in the table below.

|  |  |  |
| --- | --- | --- |
| TIME (min) | Urine volume with  distilled water  (mL) | Urine volume with  1% salt solution  (mL) |
| 0 (start) | 21 | 20 |
| 20 | 20 | 20 |
| 40 (drink water) | 21 | 21 |
| 60 | 30 | 19 |
| 80 | 98 | 41 |
| 100 | 223 | 59 |
| 120 | 268 | 33 |
| 140 | 230 | 29 |
| 160 | 150 | 27 |
| 180 | 60 | 23 |
| 200 | 30 | 20 |
| 220 | 22 | 22 |

Explain the reason why there was such a difference in the urine volume produced by the two groups over the course of the experiment. You must discuss the homeostatic mechanisms involved in this process. 6 marks

2. Explain the following terms. 7 marks

a. Dynamic equilibrium

b. Positive feedback

c. Vasodilation

d. Water intoxication

e. Osmoreceptor

f. Gluconeogenesis

g. Sinoatrial node

3. Use the stimulus-response feedback model to explain how the body temperature is increased by vasoconstriction. Use the space below for any diagrams. 5 marks

4. Glucose from digestion enters the blood stream from the small intestine and is carried to the liver. Some remains in the blood as it exits the liver and is available for use by the cells, amounts of glucose above this level are removed from the blood. What are the possible ways the body could deal with this excess glucose. 5 marks

5. Breathing is involuntary function, but also can be controlled voluntarily to a certain extent. For example, we can hold our breath is we swim under water.

a. What part of the brain controls conscious control of breathing? 1 mark

b. What part of the brain controls involuntary control of breathing? 1 mark

c. If we hold our breath, we will eventually be forced to take a breath. Explain why this is so? 2 marks

d. Explain what hyperventilation is. 1 mark

**End of Section B**

**PART C: EXTENDED RESPONSE – 7 MARKS**

Homeostasis is the maintenance of the constant internal environment so that the cells can perform at their optimum level. However sometimes diseases or disorder can disrupt the homeostasis of the body. For one such disease or disorder that you have learned about, explain the cause, symptoms and treatment. You must relate it back to homeostasis and explain how it disrupts homeostasis.

**End of Section C**