# Applecross Senior High School

**3AB Biology**

# Test 2: Homeostasis

# Part 1 – Multiple Choice (25 marks)

## Mark the most correct response on the answer sheet provided

1. The reason plants growing in hot climates reduce the amount of photosynthesis during the hottest part of the day is
   1. the stomata close so no carbon dioxide can diffuse into the air spaces in the leaf.
   2. there is no water available for respiration.
   3. high temperature inactivate the enzymes used during photosynthesis.
   4. the guard cells become too turgid at high intensities of light.
2. A plant which has leaves with a very thick cuticle would have some survival advantages in the
   1. tropical rain forest
   2. desert
   3. coastal plain
   4. mountain ranges
3. For animals living in freshwater excretion of water is a necessity because;
   1. their cells cannot retain high concentrations of water.
   2. water will always go from a high concentration of salts to a lower concentration.
   3. water in the external environment has a higher concentration of dissolved salts than what is found inside their cells.
   4. their body cells naturally gain water because of their relatively high salt concentration.
4. Most birds excrete their toxic waste in the form of
   1. urea
   2. ammonia
   3. urine
   4. uric acid

**The following table indicates daily heat losses by a human adult in a temperate climate**

|  |  |
| --- | --- |
| **Method of heat loss** | **Amount (kilojoules)** |
| Conduction/radiation | 7700 |
| Evaporation from skin | 1800 |
| evaporation from lungs | 800 |
| warming air in lungs | 300 |
| urine/faeces | 200 |
| **Total daily loss** | **10 800kJ** |

1. Which method shown in the above table would increase the most if the air temperature was to rise?
   1. conduction/radiation
   2. evaporation from the skin
   3. evaporation from the lungs
   4. urine/faeces
2. Which of the following two adaptations would be most likely for an animal living in Antarctica?
3. large, round shape.
4. sparse, light coloured fur.
5. active during daylight hours.
6. excretion of uric acid crystals.
   1. (i) and (ii)
   2. (i) and (iii)
   3. (iii) and (iv)
   4. (ii) and (iv)
7. In endothermic animals how is metabolic rate related to body size?
   1. As size increases so too does the metabolic rate per gram of body mass.
   2. As size decreases the metabolic rate per gram of body mass increases.
   3. As size increases the metabolic rate decreases overall.
   4. Metabolic rate is constant per gram of body mass regardless of size.

Use the following graph to answer question 8. The graph shows the body temperature of an insect in different situations and the air temperature.

1. From the time period of 20 to 30 minutes the insect was in a shaded area. The fact that it’s body temperature dropped is due to the fact that the insect is
   1. exothermic
   2. endothermic
   3. homeothermic
   4. ectothermic.
2. At what time did the insects’ body temperature reach 37°C ?
   1. 20 minutes
   2. 21 minutes
   3. 23 minutes
   4. 25 minutes
3. During the breakdown of proteins ammonia is produced. In mammals this compound is converted into urea for excretion because
   1. urea is easier to excrete.
   2. ammonia is toxic to cells.
   3. ammonia is not soluble in water.
   4. urea can be recycled.

The graph below shows the rate of oxygen consumption of a marsupial at different air temperatures.

1. The data graphed above indicates that;
   1. a high rate of oxygen consumption can cause a rise in body temperature.
   2. the marsupial cannot survive at air temperatures lower than 10oC.
   3. in cold weather marsupials reduce the energy they use.
   4. energy is used up by the marsupial to maintain a constant body temperature.
2. Receptors are an important part of the homeostatic mechanism. The function of a receptor is to;
   1. Interpret information received from its environment and sends it to the modulator / transmitter.
   2. Receive information and communicate with the modulator or / transmitter.
   3. Respond to a stimulus from the effector.
   4. Create a stimulus which is sent to the effector.
3. Which of the following correctly matches the state of the guard cells to the opening or closing of the stomatal pores?
   1. If guard cells are flaccid, stomatal pores are kept open.
   2. If the osmotic pressure in guard cells is higher than the surrounding epidermal cells then stomatal pores will be open.
   3. If the osmotic pressure in guard cells is lower than the surrounding epidermal cells then stomatal pores will be open.
   4. If guard cells are turgid, stomatal pores are kept closed.

Question 14 and 15 refer to the following information.

A group of biology students conducted an experiment to investigate how different environmental conditions affected the amount of water used by a plant. The students used a potometer to measure the cumulative amount of water used (in millilitres) by a twig from the plant over a 12 minute period. A different twig was used in each condition. Readings of the cumulative amount of water used were taken every two minutes. The results are shown in the table below.



1. The average rate of water used by the twig in normal room conditions was about:
   1. 0.52 ml/min
   2. 0.27 ml/min
   3. 0.66 ml/min
   4. 3.10 ml/min
2. The reliability of the experiment could be improved by using
   1. More twigs
   2. More environmental conditions
   3. A different potometer
   4. Different experimenters
3. Which of the following organisms would you expect to normally produce the most dilute urine?
   1. man
   2. bird
   3. salt water fish
   4. fresh water fish

The following information refers to question 17 and 18.

In the hot, dry and sparsely vegetated Mohave Desert in California live two species of ground squirrel: the antelope ground squirrel and the Mohave ground squirrel. These two species are similar in many ways, and have been classified into the same genus. Both species live in burrows at night-time and are active above ground during the daytime, when they feed on small amounts of plant and insect life that is available.

1. Which of the following behaviour patterns is least expected in a desert animal?
   1. Feeding in the daytime
   2. Resting in burrows
   3. Eating insects
   4. Becoming inactive in the hotter, drier months
2. The Mohave ground squirrel, unlike the antelope ground squirrel, spends seven of the driest months, from August to March, in an inactive state in its burrow. From March to August, when conditions are more favourable, it becomes active again, coming up to feed in the daytime. During these five months the squirrels put on weight and store fat in their bodies. The advantage of this period of inactivity to the Mohave ground squirrel is that it
   1. Helps it to conserve energy.
   2. Helps it to conserve water.
   3. Reduces competition with the antelope ground squirrel.
   4. All of the above.
3. Kangaroo rats usually eat only dry seeds. They do not drink water. They survive because
   1. They do not excrete their nitrogenous waste dissolved in water
   2. Their tissues contain a low percentage of water
   3. No water is lost during breathing
   4. Sufficient water for their needs is produced during the breakdown of food.
4. Land animals can have a problem maintaining water balance in arid environments. Which of the following components can a mammal use to control water loss?
   1. Water vapour during breathing
   2. Dry urea pellets in the faeces
   3. Urine volume and concentration
   4. Sweating
5. Part of a sequence of steps that occur after an increase in the levels of carbon dioxide in the blood of a mammal is shown in the diagram below.



This sequence is an example of

* 1. Positive feedback, as it involves the autonomic nervous system
  2. Positive feedback, as it involves an increase in the levels of carbon dioxide
  3. Negative feedback, as it involves an effect that is opposite to the stimulus
  4. Negative feedback, as it involves changes in the carbon dioxide levels and breathing rate

1. The diagram below shows the recessed stomata on the underside of a plant leaf which lives in a hot dry climate.



The effect of the recessed stomata is to:

* 1. Assist in cooling off the leaf
  2. Create a humid micro-environment outside the stomata
  3. Create an area of low humidity outside the stomata
  4. Create a cool micro-environment inside the leaf

1. An animal cells in a hypotonic solution is likely to:
   1. Swell and burst (lyse)
   2. Shrivel and sink
   3. Become turgid
   4. Become flaccid or soft
2. Which of the following would most accurately show the relationship between the variables shown in an endothermic animal?
   1. Heat gain = heat loss + heat production
   2. Heat gain = heat loss
   3. Heat production = heat loss
   4. Heat gain + heat production = heat loss
3. A baby suckling on its mother’s breast causes a sequence of changes which brings about a further release of its mother’s milk. This could be best describes as:
   1. A negative feedback loop
   2. A feedback loop
   3. A positive feedback loop
   4. A homeostatic feedback