Question 1
Complete the following by typing in your answers.

a) Autotroph means self-feeding. Why are plants also known as autotrophs?

b) Why are plants also known as producers?

c) Write the word equation for photosynthesis.

Question 2
a) Why are plants unable to use nitrogen directly from the atmosphere?

b) Nitrogen-fixing bacteria convert nitrogen gas into soluble nitrates. What does ‘fixing’ mean?

c) Explain why certain bacteria have a vital role in the nitrogen cycle and thus, for life support on earth.

Question 3
Prokaryotes have cells without a membrane around the nucleus. Which kingdom(s) do prokaryotic organisms belong to?
Question 4

Eukaryotic cells have a distinct membrane-bound nucleus. Which kingdom(s) do eukaryotic organisms belong to?

Question 5

The source of oxygen used during aerobic respiration is the same for plants and animals.

Do you agree with this statement? Explain your answer.

Question 6

Complete the following questions.

a) At what time of the day would the living cells of a plant stem use up oxygen and produce carbon dioxide? Explain your answer.

b) What other parts of a plant would carry out respiration and at what time of the day?

Question 7

Why are there only four trophic levels?
Question 8
How does a pyramid of numbers differ from a pyramid of biomass?

Question 9
At which trophic level would you place decomposers in a pyramid of biomass?
Question 1
Look at the diagrams of marine and freshwater fish. (Pictures from WestOne Services)

**Marine fish:**

**Freshwater fish:**

In terms of the fish and their surrounding environment, where will the salt concentration be high and where will it be low? Explain.

Question 2
Use your knowledge of osmosis to briefly explain the following statement.

“Some marine fish, such as sharks, maintain a water balance between body fluid and sea water by retaining high levels of urea in their blood”.

Question 3
Would you describe photosynthesis as an exergonic (downhill) or an endergonic (uphill) reaction? Explain your answer.

Question 4
What can you infer about the relationship between body mass and metabolic rate?
Question 5
Complete the table that compares anaerobic and aerobic respiration

<table>
<thead>
<tr>
<th></th>
<th>Anaerobic respiration</th>
<th>Aerobic respiration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Amount of ATP produced per molecule of glucose</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Products (other than ATP) in plant cells</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Products (other than ATP) in animal cells</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Where in the cell this process occurs</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Question 6
a) Briefly describe the role of ATP in living cells

b) Name the cellular process which produces energy in the form of ATP.

c) From which organic compound is energy usually released and repackaged as ATP?

Question 7
Inorganic phosphate is vital in the diets of all living things. Briefly explain how phosphate enters living systems and why it is considered vital.
**Question 8**

a) Which part of a plant controls the stomatal opening?

b) What state would the guard cells be in when the stomatal pore is closed?

c) What environmental conditions would cause the stomatal pore to close?

**Question 9**

Plants that grow in hot, dry areas differ in a number of ways from plants found in cooler, moister places. For example, it has been observed that some plants in arid areas have hairs on the leaf surface, which are not present on the leaves of related plants growing in cooler temperatures.

a) What does this observation suggest?

b) How do you suppose each of these structures - hairs, bladders or rolling leaves - might increase the plant's chance of survival?

**Question 10**

a) Describe the relationship between the size of an animal and its SA:VOL ratio.

b) What is the relationship between the size of an organism and the rate at which materials will be exchanged between the internal and external environment?