**Question 36 (18 marks)**

Amoebic meningitis is a serious disease that leads to inflammation of the brain and can cause death. It’s caused by the *Naegleria fowleri* amoeba, pictured below.



The *Naegleria fowleri* amoeba grows in warm, untreated water and flourishes in temperatures between 25°C and 40°C. It can be found in stagnant water such as lakes, neglected swimming pools and water hoses.

Amoebic meningitis infection happens if water containing the *Naegleria fowleri* amoeba is forced up the nose, via jumping or diving into the water. The amoeba can then make their way to the brain by attaching to and migrating along the olfactory sensory neurons, where it then causes inflammation and destroys brain tissue. You cannot get infected from swallowing contaminated water.

Some of the symptoms of a *Naegleria fowleri* amoeba infection include fever, vomiting, sore throat, stiff neck and seizures.

1. Looking at the diagram of the amoeba shown above, identify two reasons why it cannot be considered a virus. (2 marks)

* *Possesses a nucleus, viruses do not have a nucleus (1)*
* *Possesses flagella, which viruses do not have. (1)*

1. Identify a protective reflex someone with a *Naegleria fowleri* amoeba infection would experience and explain how this reflex would occur. (3 marks)

* *Vomiting (1)*
* *The contraction of the muscles of the abdomen and the diaphragm (1) causes the contents of the stomach to be expelled. (1).*

1. State why an infection cannot occur if someone swallows water with the amoeba in it.

(1 mark)

* *Stomach acids destroy the amoeba (1)*

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