

- **3a.** [3 marks]

Tuberculosis (TB) is an infectious disease caused by the bacterium *Mycobacterium tuberculosis*.

Outline the structures in *M. tuberculosis* that are not present in a human cell.

- **3b.** [7 marks]

Explain the production of antibodies when a patient is infected with the TB bacterium.

- **3c.** [5 marks]

Describe the risk to the human population of indiscriminate use of antibiotics.

- **4a.** *[4 marks]*

Draw a section of the Singer-Nicolson model of an animal cell membrane.

- **4b.** *[4 marks]*

Outline the principles used by scientists to classify organisms.

- **4c.** *[7 marks]*

Explain the movement of energy and inorganic nutrients in an ecosystem.

- **5a.** *[4 marks]*

Outline the stages in the production of mRNA by transcription.

- **5b.** *[4 marks]*

Describe the functions of proteins in cell membranes.

- **5c.** *[7 marks]*

Explain how natural selection can lead to speciation.