1. Why does an electron microscope have a much higher resolution than a light microscope?

   ☐ electrons have a much shorter wavelength than light

   ☐ it magnifies more times

   ☐ it uses more lenses

   ☐ electrons are bigger than light

2. What is the main function of mitochondria?

   ☐ storage – holding water and ions

   ☐ photosynthesis – trapping light energy

   ☐ respiration – releasing energy as ATP

   ☐ lipid synthesis – making membranes

3. A key feature of a prokaryotic cell is that it:

   ☐ has no nucleus – its circular DNA lies free in the cytoplasm

   ☐ is larger than a eukaryotic cell

   ☐ has a nucleus holding linear DNA

   ☐ contains many mitochondria

4. Which equation gives magnification?

   ☐ image size × actual size

   ☐ image size ÷ actual size

   ☐ image size + actual size

   ☐ actual size ÷ image size

5. The tiny organelle that joins amino acids to build proteins is the _____.

   _____

6. Prokaryotes have larger 80S ribosomes, while the cytoplasm of eukaryotes has smaller 70S ribosomes.

   ☐ True ☐ False

7. How many micrometres (µm) are in 1 mm?

   _____ µm

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☐ True ☐ False

9. The small extra ring of DNA in a bacterium, separate from its main loop, is a _____.

   _____

10. At magnification ×5000, a structure measures 25 mm in the image. What is its actual size, in µm?

    _____ µm

1. **electrons have a much shorter wavelength than light**

   Shorter wavelength → higher resolution, so finer detail can be seen.

2. **respiration – releasing energy as ATP**

   Mitochondria are the site of aerobic respiration, producing ATP.

3. **has no nucleus – its circular DNA lies free in the cytoplasm**

   Prokaryotes have no nucleus and no double-membrane organelles; their DNA is circular and free.

4. **image size ÷ actual size**

   Magnification = size of image ÷ actual size (no units).

5. **ribosome**

   Ribosomes carry out protein synthesis; the nucleolus makes them.

6. **False**

   False. Prokaryotes have the smaller 70S ribosomes; the eukaryotic cytoplasm has 80S. Mitochondria and chloroplasts also contain 70S ribosomes.

7. **1000 µm**

   1 mm = 1000 µm (and 1 µm = 1000 nm).

8. **False**

   False. It is the other way round: rough ER has ribosomes on its surface and makes proteins; smooth ER has none and makes lipids.

9. **plasmid**

   Plasmids carry extra genes (e.g. antibiotic resistance) and can be passed between bacteria.

10. **5 µm**

    25 mm ÷ 5000 = 0.005 mm = 5 µm.

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