

Higher Combined version — Higher Tier (★) included; Separate-only (◆) removed.

**Q1. Write the formula for calculating magnification.**

[1 mark]

---

---

**Q2. A cell is 0.04 mm actual size. Its image is 24 mm long. Calculate the magnification.**

[2 marks]

---

---

---

★ HIGHER TIER

**Q3. ★ Compare the use of light and electron microscopes for studying cells.**

[3 marks]

---

---

---

---

---

---

---

**Total: 6 marks**

**Q1 (1 mark)**

*Write the formula for calculating magnification.*

- Magnification = Image size ÷ Actual size [1]

**Q2 (2 marks)**

*A cell is 0.04 mm actual size. Its image is 24 mm long. Calculate the magnification.*

- Magnification =  $24 \div 0.04$  [1]
- =  $\times 600$  [1]

**Q3 (3 marks) [★ HT]**

*★ Compare the use of light and electron microscopes for studying cells.*

- Light: max  $\sim \times 1500$ , resolution  $\sim 200$  nm, can view living cells [1]
- Electron: much higher magnification/resolution, dead samples only, complex preparation [1]
- Electron microscope can resolve organelle detail (ribosomes, cristae) not visible with light [1]