



ANSWER BOOK

Prokaryotic cells and viruses: less machinery, same problems

Cells, microscopy and biological organisation · Unit B01

AQA 3.2.1.1 · OCR A 2.1.1 (g), 4.1.1 · Edexcel A Topic 6.5–6.7 · CAIE 1.2

5 questions · 16 marks

NAVY EDITION

SECTION A · Short, 1 to 2 marks

- A1** **A1** murein, also accepted as peptidoglycan. **A1** a plasmid, which is a small circle of DNA. [2]
-

SECTION B · Standard, 3 to 5 marks

- B1** **B1** a bacterium has one circular DNA molecule, whereas a eukaryote has several linear ones. **B1** bacterial DNA is not wound round histone proteins, whereas eukaryotic DNA is. **B1** bacterial DNA lies free in the cytoplasm in the nucleoid, whereas eukaryotic DNA is enclosed by a nuclear envelope. **B1** bacterial ribosomes are 70S and smaller, whereas the ribosomes in eukaryotic cytoplasm are 80S. [4]
- B2** **B1** a virus is acellular: it has no cytoplasm and no cell-surface membrane of its own. **B1** it has no ribosomes, so it cannot make any protein for itself. **B1** it has no enzyme system for respiration, so it has no metabolism and cannot release energy from food. **B1** it consists only of DNA or RNA inside a protein capsid with attachment proteins outside, sometimes within a lipid envelope taken from a host cell. [4]
- B3** **M1** number of divisions = 300 minutes divided by 30, giving 10 divisions. **M1** uses $N = N_0 \times 2^n$, so the calculation is 200×2^{10} . **A1** an answer of 204 800 bacteria. [3]
- B4** **B1** the attachment proteins of HIV normally bind to the CD4 receptor found on helper T cells. **B1** with the drug bound to them the attachment proteins can no longer bind that receptor, so the virus cannot get into the cell. **B1** influenza carries different attachment proteins, which the drug is not complementary to, so it does not bind them. [3]
-