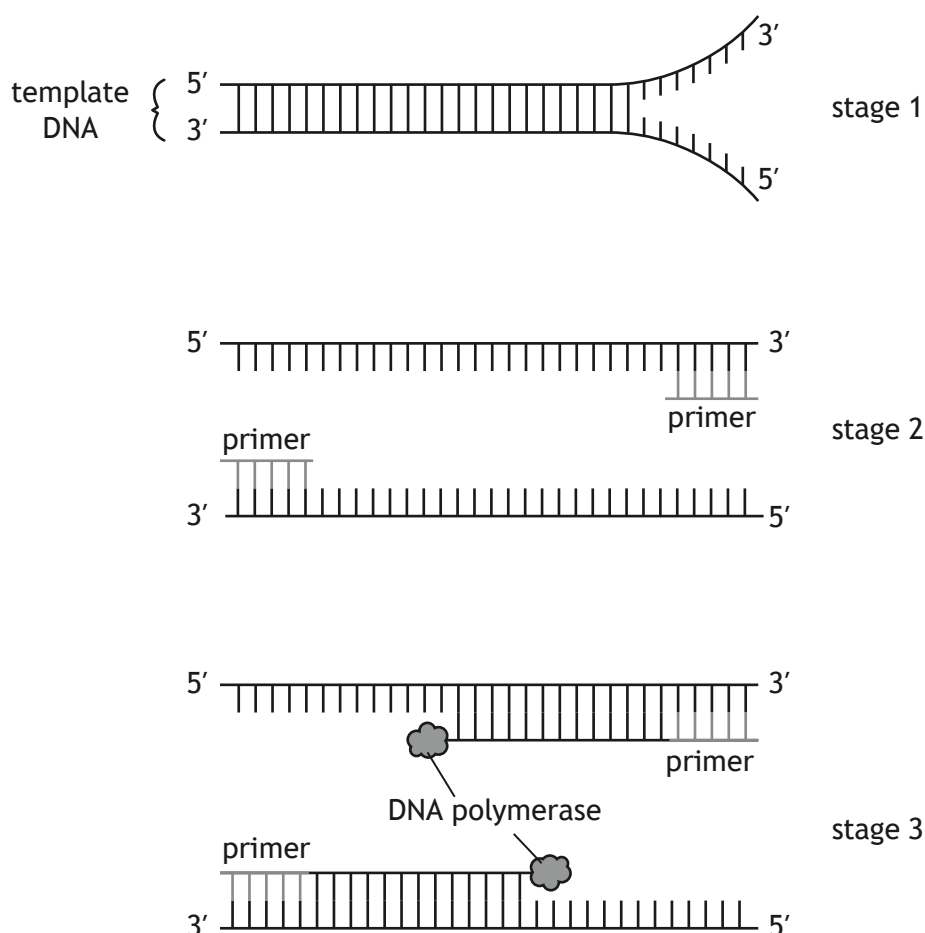


Total marks — 95
Attempt ALL questions
Questions 5 and 15 contain a choice

1. The diagram shows the stages that take place in a complete cycle of the polymerase chain reaction (PCR) being used to amplify human DNA.



- (a) Name the part of a nucleotide found at the 3' end of a DNA strand. 1
- _____
- (b) (i) State a temperature required for stage 3 to occur. 1
- _____ °C
- (ii) Describe the role of DNA polymerase in stage 3. 1
- _____



1. (continued)

- (c) (i) Explain why the enzyme ligase is **not** required in PCR.

1

- (ii) Explain why DNA polymerase extracted from human cells would **not** be suitable for PCR.

1

- (d) The table shows the contents of a reaction tube used in PCR.

Content of reaction tube	Volume (μL)
Distilled water	15.8
Buffer	2.4
Nucleotides	1.7
Magnesium chloride	2.1
Primers	2.0
DNA polymerase	0.4
Template DNA	0.6

Calculate the percentage of the contents of the reaction tube that is DNA polymerase.

1

Space for calculation

_____ %

- (e) The original sample used contained 70 DNA molecules.

Calculate how many copies of DNA there would be after 8 cycles of PCR.

1

Space for calculation

