Solutions

Each answer shows the steps, then the **result**.

2.1

- RNA polymerase

2.2

- mRNA 5′-AUGC-3′

2.3

- Introns

2.4

- tRNA carries a specific amino acid and its anticodon base-pairs with the matching mRNA codon
- rRNA is a structural and catalytic part of the ribosome

3.1 B

- introns

3.2

(a)

- Any two: adding a 5’ cap, adding a poly-A tail, splicing out introns

(b)

- Exons are the coding parts kept in the mRNA; introns are non-coding parts spliced out

3.3

- Processing (cap, tail, splicing) stabilizes the mRNA and removes non-coding introns, so the mature mRNA can be exported and correctly translated

3.4

(a)

- alternative splicing

(b)

- different combinations of exons are kept in the mature mRNA (here exon 3 is left out of Y)
- so the mRNAs code for different sequences of amino acids, giving different proteins

(c)

- the intron’s bases are translated, adding wrong amino acids or an early stop codon, so the protein is likely to be altered and non-functional

3.5 A

- RNA polymerase moves along the template $3' \to 5'$, adding nucleotides to the $3'$ end of the growing RNA