

6.3 Transcription and RNA Processing

Name: _____ Class: _____ Date: _____ **Total: 11 marks****KEY WORDS** introns 内含子 • exons 外显子 • transcription 转录 • messenger rna 信使

Objective

Build the skills to answer exam questions on **transcription and RNA processing**.**You must be able to:**

- describe **transcription** 转录 (DNA → mRNA) by RNA polymerase
- state the RNA processing steps (**cap**, **tail**, **splicing** 剪接)
- distinguish **introns** and **exons**

1 Worked examples

Study these first. Each one shows the method for a question type used later — follow the steps and you can do the Practice and Exam-style questions yourself.

■ Transcription

Transcription copies a gene from DNA into **messenger RNA (mRNA)**. **RNA polymerase** reads the DNA template and builds an mRNA strand with complementary bases (using **U** instead of T).

■ A worked transcript

Template 3'-TACGGA-5' transcribes to mRNA 5'-AUGCCU-3'.

■ RNA processing (in eukaryotes)

Before leaving the nucleus, the mRNA is processed: a **cap** and a **poly-A tail** are added for stability, and **introns** are removed by **splicing**, joining the **exons**.

■ Introns and exons

- **Exons** — coding parts, kept in the final mRNA.
- **Introns** — non-coding parts, spliced out.

2 Practice

Now apply the methods above.

2.1 What enzyme carries out transcription? [1]**2.2** Transcribe the template 3'-TACG-5' into mRNA. [2]**2.3** What is removed during splicing? [1]

3 Exam-style questions

3.1 During RNA processing, the parts removed from the pre-mRNA are the [1]

A	B
C	D

A exons**B** introns**C** caps**D** tails**3.2** A gene is transcribed and processed.

(a) State two modifications made to the mRNA. [2]

(b) Distinguish introns from exons. [2]

3.3 Explain why processing is needed before the mRNA leaves the nucleus. [2]