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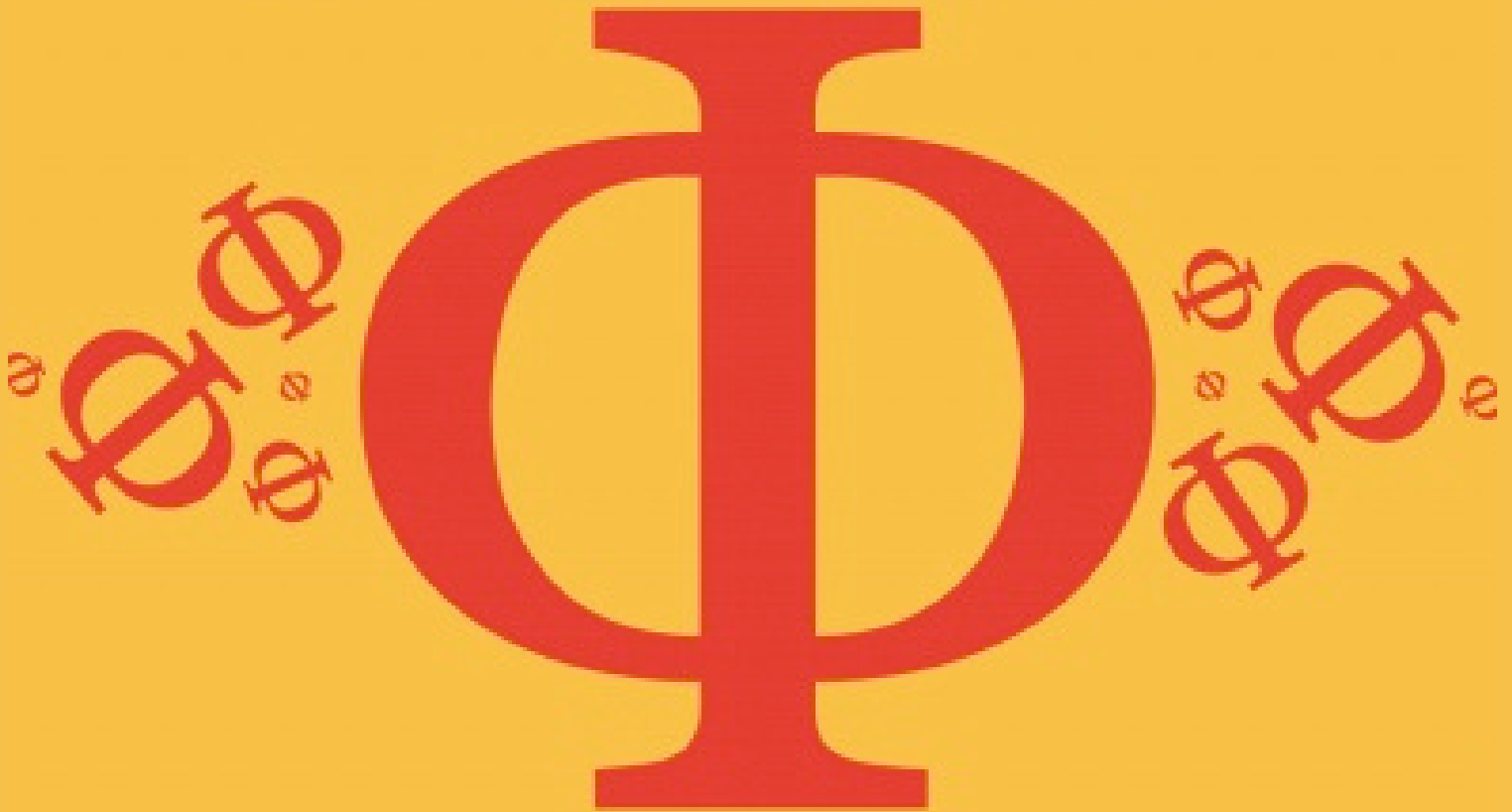
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2.6 Transcription & Translation

Hard



BIOLOGY

IB HL

2.6 Transcription & Translation

Question Paper

Course	DP IB Biology
Section	2. Molecular Biology
Topic	2.6 Transcription & Translation
Difficulty	Hard

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Time allowed: 10
Score: /5
Percentage: /100

Question 1

The following steps are involved in the process of replicating DNA by polymerase chain reaction (PCR).

1. The temperature is increased to 72°C to allow *Taq* polymerase to bind to DNA
2. A new complementary strand of DNA is produced
3. The temperature is raised to 95°C to cause denaturation of the DNA molecule
4. Primers attach to the ends of single strands of DNA by hydrogen bonding
5. The temperature is decreased to about 54°C

Which of the following represents the correct order of the steps?

- A. 1 → 3 → 4 → 5 → 2
- B. 3 → 5 → 4 → 1 → 2
- C. 1 → 3 → 5 → 4 → 2
- D. 3 → 4 → 5 → 1 → 2

[1 mark]

Question 2

A polypeptide has the following amino acid sequence:

histidine - glutamine - lysine - alanine - valine - histidine - valine

The table below gives the tRNA anticodons for each amino acid.

Amino acid	tRNA anticodons
histidine	CAU
valine	GUA
lysine	AAA
alanine	GCU
glutamine	CAG

A mutation causes the 18th base in the DNA sequence to be deleted.

Which of the following would represent the amino acid sequence after this deletion?

- A. histidine - glutamine - lysine - alanine - valine - histidine
- B. histidine - glutamine - lysine - alanine - valine
- C. histidine - glutamine - lysine - alanine - valine - glutamine
- D. histidine - glutamine - lysine - alanine - valine - histidine - valine

[1 mark]



Question 3

A polypeptide has the following amino acid sequence:

alanine – alanine – valine – lysine – valine – serine

The table below gives the base sequences for the DNA triplets of each amino acid.

Amino acid	DNA triplet
serine	TCG
valine	GTA
lysine	AAA
alanine	GCT
stop	TAA

A mutation in the DNA coding for this polypeptide chain caused the tenth nucleotide to change from an **A** to a **T**.

Which of the following would represent the amino acid sequence in the polypeptide after the mutation occurred?

- A. alanine – alanine – valine – lysine – valine – serine
- B. alanine – alanine – valine – stop – valine – serine
- C. alanine – alanine – valine
- D. alanine – alanine – valine – serine – valine – serine

[1 mark]

Question 4

Which of the following processes involve **both** DNA and RNA?

- I. Replication
 - II. Transcription
 - III. Translation
 - IV. Protein synthesis
- A. I and II
 - B. I, II and IV
 - C. III only
 - D. II and IV

[1 mark]



Question 5

A short section of mRNA that was produced after transcription occurred has the following base sequence:

AAACUUCUCAUAGAACGG

The following table shows the base sequence for codons and the corresponding amino acids that they code for.

		Second letter				
		U	C	A	G	
First letter	U	UUU } Phe UUC } UUA } Leu UUG }	UCU } UCC } Ser UCA } UCG }	UAU } Tyr UAC } UAA } Stop UAG } Stop	UGU } Cys UGC } UGA } Stop UGG } Trp	U C A G
	C	CUU } CUC } Leu CUA } CUG }	CCU } CCC } CCA } Pro CCG }	CAU } His CAC } CAA } Gln CAG }	CGU } CGC } CGA } Arg CGG }	U C A G
	A	AUU } AUC } Ile AUA } AUG } Met	ACU } ACC } ACA } Thr ACG }	AAU } Asn AAC } AAA } Lys AAG }	AGU } Ser AGC } AGA } Arg AGG }	U C A G
	G	GUU } GUC } Val GUA } GUG }	GCU } GCC } GCA } Ala GCG }	GAU } Asp GAC } GAA } Glu GAG }	GGU } GGC } Gly GGA } GGG }	U C A G

Which of the following would represent the correct amino acid sequence coded for by this section of mRNA?

- A. Lys - Leu - Pro - Asp - Gly - Ala
- B. Lys - Phe - Pro - Lys - Gly - Ala
- C. Lys - Leu - Leu - Asp - Glu - Arg
- D. Lys - Leu - Leu - Ile - Glu - Arg

[1 mark]