6.2 Protein Synthesis

Question Paper

Course	CIE A Level Biology (9700) exams from 2022
Section	6. Nucleic Acids & Protein Synthesis
Topic	6.2 Protein Synthesis
Difficulty	Medium

Time allowed: **10**

Score: **/10**

Percentage: **/100**

Question 1

A piece of DNA was analysed to find the number of nucleotide bases in each of the polynucleotide strands. Some of the results are shown below

	number of nucleotide bases			
	A	T	G	C
Strand 1		30	22	
Strand 2		30	38	

What is the maximum number of amino acids that could be coded for by this DNA?

A 22

B 29

C 34

D 40

[1 mark]

Question 2

What is the correct sequence for the processes involved in the formation of a protein?

A transcription → peptide bonding → translation → ionic bonding

B transcription → translation → peptide bonding → hydrogen bonding

C transcription → peptide bonding → translation → hydrogen bonding

D translation → peptide bonding → transcription → ionic bonding

[1 mark]

Question 3

What terminates the formation of a polypeptide chain during protein synthesis in cells?

A when the ribosome reaches the end of the mRNA molecule

B when there are no more tRNA molecules

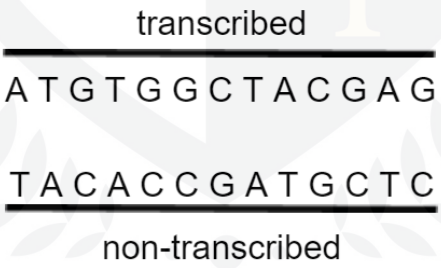
C when the ribosome reaches a stop codon on the mRNA

D RNA polymerase detaches the polypeptide chain from the ribosome

[1 mark]

Question 4

DNA is composed of two strands: the transcribed strand and the non-transcribed strand. Here is a section of DNA



What would the corresponding mRNA sequence be for this section of DNA?

A T A C A C C G A T G C T C

B A U G U G G C U A C G A G

C A T G T G G C T A C G A G

D U A C A C C G A U G C U C

[1 mark]

Question 5

If a polypeptide chain is comprised of 200 amino acids, it might be expected that the coding gene in the DNA would be comprised of 600 bases, however, in reality the DNA sequence is longer than this.

What is the reason for this difference?

A presence of introns and start/stop codons

B presence of exons and start/stop codons

C presence of introns

D presence of exons

[1 mark]

Question 6

A polypeptide has the amino acid sequence alanine–valine–lysine–serine–glycine.

The table gives some possible tRNA anticodons for each amino acid.

amino acid	tRNA anticodons	
serine	UCG	UCA
valine	GUA	GUC
lysine	AAA	AAG
alanine	GCU	GCG
glycine	GGA	GGC

Which sequence of bases on DNA could code for the polypeptide?

A GCUGUCAAAGUAUGA

B GCTGTCAAAAAGGAG

C GCUGUAAAGUCGUAA

D GCTGTAAAGTCGGGC

[1 mark]

Question 7

Which statements are correct about DNA replication, transcription and translation?

	DNA replication	transcription	translation
A	produces mRNA	occurs in the cytoplasm	tRNA involved
B	DNA polymerase involved	RNA polymerase involved	produces mRNA
C	is semi-conservative	produces mRNA	occurs at a ribosome
D	occurs in the nucleus	occurs in the nucleus	RNA polymerase involved

[1 mark]

Question 8

Which term best describes a section of DNA that codes for the synthesis of a polypeptide?

A protein

B gene

C exon

D triplet

[1 mark]

Question 9

Why does a silent mutation have no effect on the polypeptide chain?

A the dominant allele can compensate for the silent mutation

B a silent mutation does not cause a frameshift

C a silent mutation substitutes for a similar type of amino acid

D multiple codons can code for the same amino acid

[1 mark]

Question 10

Which enzymes are not needed for DNA transcription?

1 Helicase

2 DNA ligase

3 RNA polymerase

4 DNA polymerase

A 1, 2 and 3 only **B** 2 and 3 only **C** 2 and 4 only **D** 1 and 3 only

[1 mark]