

Edexcel

A-Level

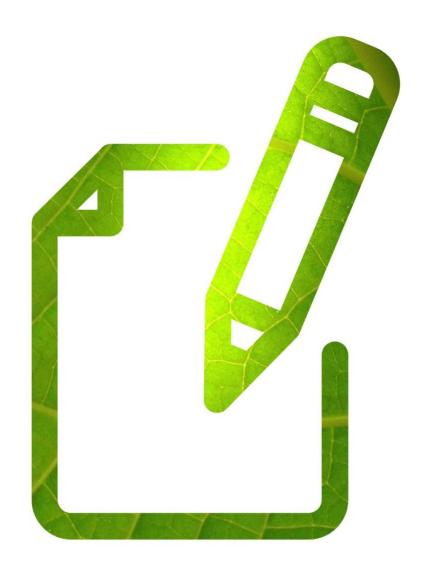
BIOLOGY

Biological Molecules

Proteins 4

Time allowed **35 minutes**

QUESTION PAPER



Score /29

Percentage %

1	Histamine and the proteins interferon and lysozyme are involved in the non-specific responses to infection.		
	(a) (i)	Describe how the production and action of interferon differs from the production and action of lysozyme.	(3)
	(11)	(ii) Suggest why the protein structure of lysozyme is important to the way in which it acts against pathogens.	(4)



(b		ollowing a bite by an insect, the area around the bite may show signs of flammation as histamine is released.	
	(i)	Explain why an insect bite, which breaks the surface of the skin, may lead to inflammation around the injury.	(2)
			(3)
	(ii)	In order to reduce inflammation, a cream containing antihistamines might be applied to the skin, around an insect bite.	
		Suggest why applying this cream might be better than taking tablets containing antihistamines.	(2)
			(3)
		(Total for Question 1 = 13 ma	rks)



2	The sequence of amino acids in a polypeptide chain is determined by the sequence of bases in DNA. This sequence of bases is used as a template to synthesise messenger RNA (mRNA).	of
	(a) Describe the structure of an amino acid.	(2)
	(b) Describe how mRNA is synthesised.	(4)



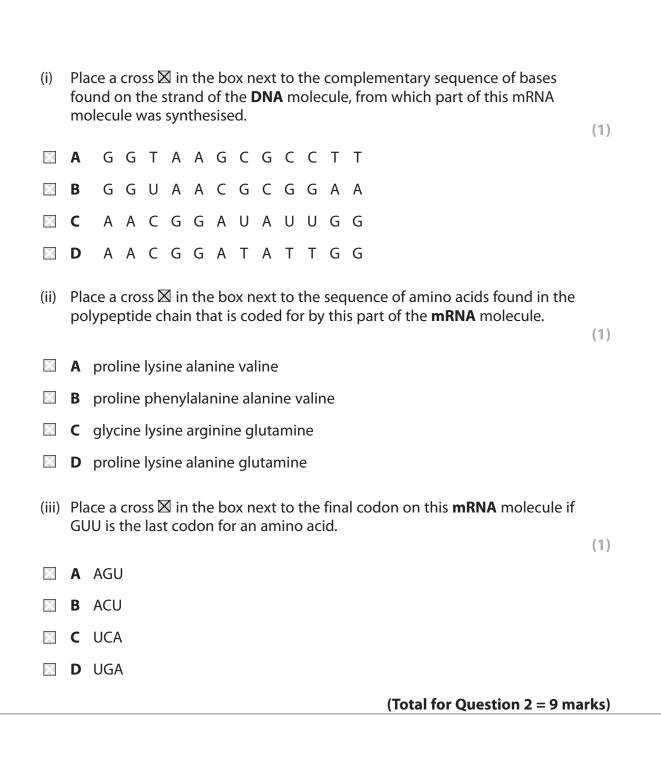
(c) The table below shows the amino acids coded for by the codons on **mRNA**.

Three-letter codons of mRNA and the amino acids specified by the codons			
AAUAsparagine	CAU _ Histidine	GAU Asparatic acid	UAU UAC Tyrosine
AAALysine	CAA	GAA GAG Glutamate	UAA UAG Stop
ACU ACC ACA ACG	CCU CCC CCA CCG Proline	GCU GCC GCA GCG	UCU UCC UCA UCG
AGUSerine	CGU CGC Arginine	GGU GGC GGA Glycine	UGU Cysteine
AGA Arginine	CGA CGG	GGA GIVENIE	UGA— Stop UGG— Tryptophan
AUU – AUC – Hsoleucine AUA –	CUU – CUC – Leucine	GUU- GUC Valine	UUU— Phenylalanine
AUG —Methionine	CUG _	CHG - GHG-	UUA UUG Leucine

The diagram below shows part of a messenger RNA molecule.









3	The questions below refer to some important biological molecules. Place a cross (⋈) in the most appropriate box that describes the structure or role of these biological molecules.		
	(a) Dis	accharides can be split by	(1)
	⊠ A	hydrolysis of glycosidic bonds	(1)
	⊠ B	condensation of glycosidic bonds	
	⊠ C	hydrolysis of ester bonds	
	⊠ D	condensation of ester bonds	
	(b) Am	ylose is an example of a	(1)
	⊠ A	monosaccharide	(=)
	⊠ B	disaccharide	
	⊠ C	polysaccharide	
	⋈ D	trisaccharide	
	(c) The	role of starch is to	(1)
	⊠ A	be a source of energy to plants	(")
	⊠ B	store energy in all living organisms	
	⊠ C	store energy in plants	
	■ D	store energy in animals	
	(d) Pro the	teins are polymers of amino acids joined by peptide bonds formed between	(1)
	⊠ A	R groups	(1)
	⊠ B	R group and the amino group	
	⊠ C	R group and the carboxyl group	
	⋈ D	carboxyl group and the amino group	



(e) The three-dimensional structure of a protein is held together by		
⊠ A	peptide, hydrogen and ionic bonds	(1)
⊠ B	hydrogen, ester and ionic bonds	
⊠ C	disulphide bridges and ester bonds	
■ D	disulphide bridges, hydrogen and ionic bonds	
(f) DN	A consists of mononucleotides joined together by bonds between	(1)
⊠ A	two pentose sugars	
⊠ B	one ribose sugar and one phosphate group	
⊠ C	one deoxyribose sugar and one phosphate group	
⊠ D	two phosphate groups	
(g) Water is described as a dipolar molecule because it has a		
⊠ A	positively charged hydrogen end and a negatively charged oxygen end	
⊠ B	positively charged hydrogen end and a positively charged oxygen end	
⊠ C	negatively charged hydrogen end and a negatively charged oxygen end	
⊠ D	negatively charged hydrogen end and a positively charged oxygen end	
(Total for Question 3 = 7 marks)		

