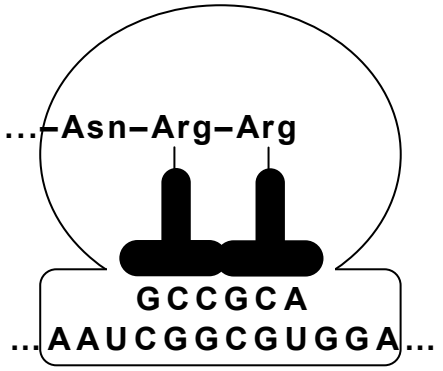
-- Question --

1 The diagram below illustrates the process of translation.



a How many amino acids are coded by the segment of mRNA shown in the diagram? With reference to the features of the genetic code, explain your answer. (3 marks)

b The last three bases on the mRNA is UGA.

i Write down the corresponding bases on the template strand of DNA. (1 mark)

ii Explain why there is no tRNA corresponding to the codon UGA. (2 marks)

c Both the codons CGG and CGU code for the amino acid arginine (Arg).

i Write down the corresponding bases on the template strand of DNA. (2 marks)

ii Suggest a term that can be used to describe the genetic code for this feature. (1 mark)

d In genetic engineering, a plasmid (a ring of DNA in bacteria) is extracted from a bacterium and a human gene is inserted in the plasmid. The plasmid is then introduced into a bacterium for the synthesis of human proteins. With reference to the feature of genetic code, explain why expression of human genes in bacteria is possible. (2 marks)

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-- Answer --

a	Four amino acids are coded by the segment of mRNA shown.		1m
	The genetic code is a triplet code		1m
	that reads in a non-overlapping manner.		1m
b	**i**	ACT	1m
	ii	UGA is a stop codon. It marks the end of a gene.	1m
		It does not code for any amino acid.	1m
c	**i**	GCC	1m
		GCA	1m
	ii	Degenerate	1m
d	The genetic code is universal.		1m
	The same triplet code codes for the same amino acid in humans and bacteria.		1m

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