Name of the Student:_____
Max. Marks : 23 Marks **Time : 23 Minutes**

Q1.

(a) Give the **two** types of molecule from which a ribosome is made.

1 _____

2 _____

(2)

(b) Complete the table to give **four** structural differences between a DNA molecule and an mRNA molecule.

	DNA structure	**mRNA structure**
1		
2		
3		
4		

(4)
(Total 6 marks)

Downloaded from www.merit-minds.com

Q2.

(a) What is a gene?

_____

_____

(1)

(b) Describe how the production of messenger RNA (mRNA) in a eukaryote cell is different from the production of mRNA in a prokaryote cell.

_____

_____

_____

_____

_____

_____

(2)

(c) Scientists produced a short, single-stranded, artificial nucleic acid, called PNA. The PNA binds to a small section of DNA.

The scientists introduced PNA into cells and discovered that these cells produced less mRNA than cells that did not contain PNA.

Suggest how PNA affected the transcription of the section of DNA.

_____

_____

_____

_____

_____

_____

(2)

(d) Describe the role of ATP in the process of translation in protein synthesis.

_____

_____

_____

_____

_____

_____

(2)

Downloaded from www.merit-minds.com

(Total 7 marks)

Q3.

(a) Complete the following definitions.

The genome is _____

_____

_____

The proteome is _____

_____

_____

(2)

Recombinant DNA technology can involve the transfer of fragments of human DNA into bacteria. The bacteria are then used to produce human proteins.

(b) Give **two** reasons why bacteria are able to use human DNA to produce human proteins.

1 _____

_____

_____

2 _____

_____

_____

(2)

(c) Suggest and explain **one** reason why bacteria might **not** be able to produce every human protein.

_____

_____

_____

_____

_____

_____

(1)

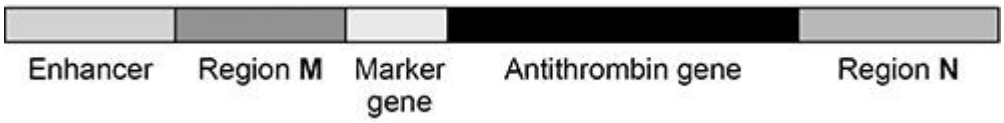
Antithrombin is a protein. Antithrombin prevents blood from clotting too much.

Some people have a deficiency of antithrombin in their blood, so they need to inject the protein.

Genetically modified goats are used to produce this protein. The human antithrombin gene is transferred into goat embryos. The adult goats then make human antithrombin protein.

Downloaded from www.merit-minds.com

The diagram below shows an example of a DNA fragment that can be transferred into the cells of goats.



(d) The enhancer stimulates region **M**.

Name regions **M** and **N** shown in above diagram.

Region **M** _____

Region **N** _____

(2)

(e) Explain the purpose of the marker gene.

_____

_____

(1)

(f) The enhancer only stimulates region **M** in the milk-producing glands of a goat.

Suggest **two** explanations for the importance of the enhancer being included in the DNA fragment transferred.

1 _____

_____

_____

_____

2 _____

_____

_____

_____

(2)

(Total 10 marks)

Downloaded from www.merit-minds.com