Practice Question Set For A-Level
Subject : Biology
Paper-1 Topic:1 Biological Molecules

Merit Minds
www.merit-minds.com
Exam Preparation and Free Resources

Name of the Student:_____
Max. Marks : 17 Marks **Time : 17 Minutes**

Q1.

(a) Describe how a phosphodiester bond is formed between two nucleotides within a DNA molecule.

_____

_____

_____

_____

_____

_____

(2)

(b) The two DNA strands of a particular gene contain 168 guanine bases between them. The relationship between the numbers of guanine bases (G), adenine bases (A), thymine bases (T) and cytosine bases (C) in these two strands of DNA is shown in the following equation.

$$G = 4(A + T) – C$$

Use this information and your understanding of DNA structure to calculate the maximum number of amino acids coded by this gene.

Show your working.

Answer _____

(2)

(c) Name the protein associated with DNA in a chromosome.

Downloaded from www.merit-minds.com

_____

(1)

(d) In the process of semi-conservative DNA replication, the two strands within a DNA molecule are separated. Each then acts as a template for the formation of a new complementary strand.

Describe how the separation of strands occurs.

_____

_____

_____

_____

_____

_____

(2)

(Total 7 marks)

Downloaded from www.merit-minds.com

Q2.

(a) Alpha-gal is a disaccharide found in red meat.

Alpha-gal is made of two galactose molecules. Galactose has the chemical formula $C_6H_{12}O_6$

Give the chemical formula for the disaccharide, alpha-gal, and describe how it is formed from two galactose molecules.

Formula _____

Description _____

_____

_____

_____

_____

(2)

(b) Some people eat red meat for many years without having any reaction, then have an allergic reaction to the alpha-gal in red meat.

An allergic reaction is caused by an immune response.

Draw a labelled diagram of an antibody **and** identify the specific alpha-gal binding site.

(3)

(c) A tick is a small animal that bites humans and feeds on their blood. This results in proteins from the tick saliva entering the human body.

Scientists have suggested one hypothesis for the allergic reaction to alpha-gal in red meat. They think that an earlier immune response to a tick bite can cause a person to have an allergic reaction to alpha-gal in red meat.

Suggest how **one** antibody can be specific to tick protein and to alpha-gal.

_____

_____

_____

_____

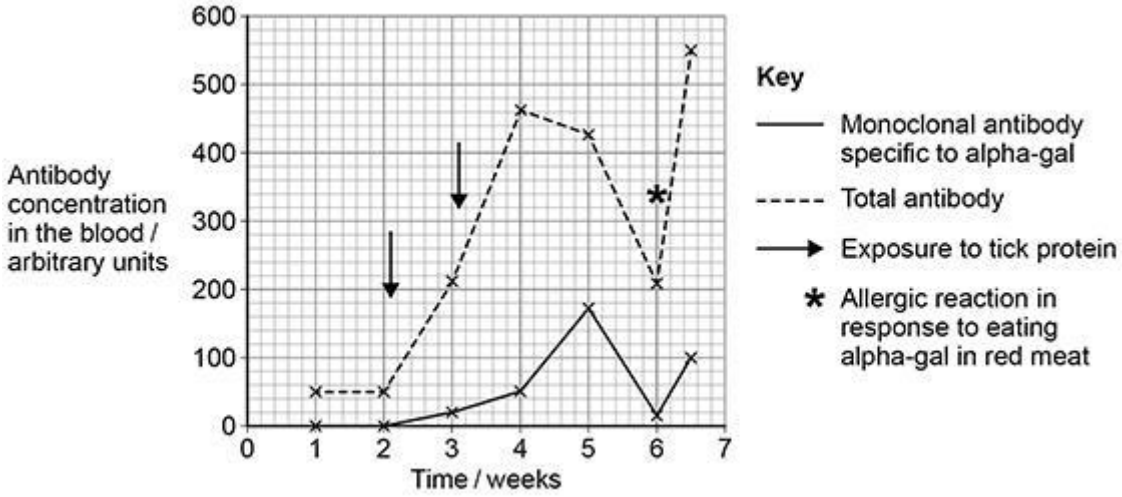
_____

Downloaded from www.merit-minds.com

(2)

(d) Scientists took blood samples from one man over several weeks and measured the concentration of antibody in the man's blood. During this time, the man had two tick bites and had an allergic reaction to alpha-gal in red meat.

The scientists' results are shown in the graph below.



The scientists' hypothesis was that an earlier immune response to tick protein causes the allergic reaction.

Consider whether the graph supports this hypothesis.

(3)

(Total 10 marks)

Downloaded from www.merit-minds.com