|  |  |  |
| --- | --- | --- |
| Test part | Possible mark | Your mark |
| Multiple choice | 10 |  |
| Short answer | 38 |  |
| Extended answer | 7 |  |
| Total | 55 |  |

HUMAN BIOLOGICAL SCIENCE. YEAR 12. 2012.

Protein Synthesis and Immunity Topic Test.

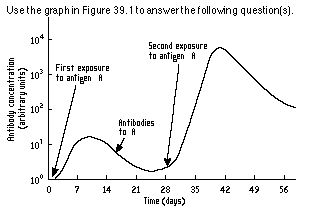
***Multiple choice answer sheet.***

**Use a ball point or ink pen to mark an X** on the letter that represents the best answer from the choice of answers . Marks are not deducted for wrong answers.

|  |  |
| --- | --- |
| Question | Answer |
| 1 | A B C D |
| 2 | A B C D |
| 3 | A B C D |
| 4 | A B C D |
| 5 | A B C D |
| 6 | A B C D |
| 7 | A B C D |
| 8 | A B C D |
| 9 | A B C D |
| 10 | A B C D |

1. The antibodies that a baby receives from its mother are an example of:
2. Natural passive immunity.
3. Artificial passive immunity.
4. Natural active immunity.
5. Artificial active immunity.
6. Vaccination using attenuated antigens is an example of:
7. Natural passive immunity.
8. Artificial passive immunity.
9. Natural active immunity.
10. Artificial active immunity.

Use this diagram to answer questions 3 and 4.



3. Why does the antibody concentration between 21 and 28 days **not** drop back to zero?

1. Memory T cells carry antibodies able to respond to antigen A.
2. Killer T cells carry antibodies able to respond to antigen A.
3. Memory B cells carry antibodies able to respond to antigen A.
4. Plasma B cells carry antibodies able to respond to antigen A.

4. The response to antigen A at 28 days would result in:

1. A rapid response and little or no symptoms of infection.
2. A reduction in T cells, but an increase in B cells.
3. Similar symptoms as seen in days 0 to 14.
4. A new set of antigens being produced.

*The next question refers to the graph below of the concentration of antibodies in the blood of two patients over time after exposure to a particular disease.*



5. On the basis of the information provided in this graph,

a. patient 1 was immune to the disease they were exposed to.

b. patient 2 was probably exposed to and recovered from this disease in the past.

c. neither person would have developed memory cells on exposure to this disease.

d. the symptoms of patient 1 would have been far less severe.

6. Bob Caught a bad cold. He stayed home and rested. After a week he fully recovered, without any use of medication. This is an example of:

1. Natural passive immunity.
2. Artificial passive immunity.
3. Natural active immunity.
4. Artificial active immunity.

7. Transcription during protein synthesis can be described as:

a. the copying of the template for making a protein form DNA to RNA.

b. The movement of tRNA from the nucleus to the cytoplasm.

c. The joining of Amino acids into specific sequences.

d. the combination of different peptide chains to form polypeptide chains.

8. Translation during protein synthesis can be described as:

a. the copying of the template for making a protein form DNA to RNA in the cytoplasm of the cell.

b. The movement of tRNA from the nucleus to the cytoplasm.

c. The joining of Amino acids into specific sequences at the ribosome to produce peptide chains. A template held on mRNA allows the correct sequencing of the amino acids.

d. The movement of mRNA from the nucleus to the cytoplasm.

9. For a specific gene:

a. The promoter region of DNA is located just before the structural gene.

b. The promoter region of DNA is located just after the structural gene.

c. The promoter region of DNA is located just before the inhibiter region.

d. The promoter region of DNA is located just after the point where the RNA polymerase disconnects after transcription.

10. Which of the following DOES NOT show a nitrogen base sequence for a strand of DNA?

a. AATTCTAGGTAG

B. TTCCGTAGCTGA

c. TTCGUCTCGATC

d. ACGTTACGCGCG

Short answer questions

1. Write definitions for the words in the table below.

|  |  |
| --- | --- |
| Word | Meaning |
| Antigen |  |
| Antibody |  |

(2 marks)

1. The following is a sequence of nitrogenous bases found in part of a human cell.

AUGGCCUCGAUAACGGCCACCAUG

(i) What type of substance do these bases belong to? (1 mark)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(ii) How many amino acids could this piece code for? (1 mark)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(iii) Name the process by which mRNA is formed in the nucleus. (1 mark)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(iv) Give two ways the structure of a DNA differs from that of an RNA molecule.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (2 marks)

3. List and briefly explain three different ways that antibodies can act to neutralize antigens. Diagrams may be used where appropriate.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(6marks)

4. A type of leucocyte that matures in the Thymus is involved in the body’s specific immune response.

What occurs to sensitize these leucocytes to a specific antigen?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(2 marks)

Once sensitized what types of cells do these particular leucocytes develop into? State the function of each.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(8 marks)

5. Complete this table.

|  |  |
| --- | --- |
| Structure | Function |
| Structural gene |  |
| Promoter region |  |
| RNA polymerase |  |
| mRNA |  |
| Codon |  |
| Anticodon |  |

(6 marks)

6. Complete the following steps in protein Translation.

In the cytoplasm are a kind of RNA molecule that are only 3 bases long . They are called \_\_\_\_\_\_\_\_\_ RNA . One end of these RNA molecules has a special site to which only one kind of \_\_\_\_\_\_ \_\_\_\_\_\_ can be attached. The other end of each of these RNA molecule carries a unique code which identifies it. The code is written in the usual code of a nucleic acid sequence of bases. Each amino acid carrying molecules has its own three letter code.

With the strand of \_\_\_\_\_\_\_\_ RNA bound to the ribosome and acting as a \_\_\_\_\_\_\_\_\_\_\_\_, the base pairs again are attracted to their partners. This time the attraction is between the complementary bases of the \_\_\_\_\_\_\_\_\_\_RNA and the \_\_\_\_\_\_\_\_\_ RNA. A sequence of three nucleotides in RNA bound to the ribosome, codes for each amino acid. This sequence is called a \_\_\_\_\_\_\_\_\_. There is one \_\_\_\_\_\_\_\_\_\_ for each of the twenty amino acids. The \_\_\_\_\_\_ RNAs carrying amino acids attach to the \_\_\_\_\_\_\_\_\_\_RNA by means of *base-pairing* between the \_\_\_\_\_\_\_\_\_ RNA and the \_\_\_\_\_\_\_\_\_\_\_ RNA “anticodons”. Each \_\_\_\_\_\_\_\_ RNA then donates its amino acid, in the proper order, to the growing chain of amino acids that will become a \_\_\_\_\_\_\_\_\_\_\_\_\_ chain. Special bonds called \_\_\_\_\_\_\_ bonds join the amino acids together. The \_\_\_\_\_\_\_\_\_\_\_ chains formed will in turn form \_\_\_\_\_\_\_\_\_\_\_\_\_ chains and finally \_\_\_\_\_\_\_\_\_\_\_\_\_\_.

(9 marks)

EXTENDED ANSWER QUESTION

1. Describe how the antibody mediated response to antigens occurs. Use diagrams where appropriate.

(7 marks)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_