Biology Leaving Certificate Higher Level

Past Exam Questions on:

Respiration

Q14 (b&C) 2013

(b) Write notes on each of the following topics. You are required to make a minimum of **three** points concerning **each** topic. Marks will **not** be given for word diagrams alone.

(i) Metabolism.

(ii) Krebs Cycle.

(iii) ADP.

(c) (i) Explain the term *fermentation*.

(ii) Name an organism that is used in industrial fermentation.

(iii) To which kingdom does this organism belong?

(iv) Name a compound which is used as a carbon source in the fermentation referred to in part (ii).

(v) In industrial fermentations bioprocessing with immobilised cells is sometimes used.

1. Explain the terms *bioprocessing* and *immobilised*.
2. Give an advantage of using immobilised cells.
3. Name the compound from which the immobilising beads are formed in the laboratory.
4. Give the general name for the vessel used for such reactions.

Q 12 (c) 2012

(c) Write a brief note on **each** of the following items in relation to respiration.

(i) Glycolysis.
(ii) Acetyl Co-enzyme A.
(iii) Adenosine triphosphate.
(iv) Electron transport chain. **(24)**

Q 6 2011

6. Cellular respiration may occur in one stage or two stages.

(a) Give **two** differences, other than location, between Stage 1 and Stage 2.

(i) _____

(ii) _____

(b) Where in a cell does Stage 1 occur?

_____

(c) What term is used to describe respiration in which only Stage 1 occurs?

_____

(d) Name a chemical end product of the type of respiration referred to in (c).

_____

(e) In Stage 2 of respiration electrons pass along an electron transport chain, releasing energy. In what molecule is this energy stored in the cell?

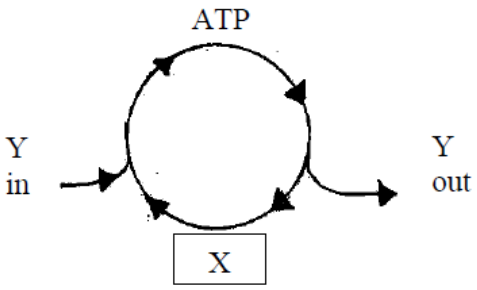
_____

(f) To what are these electrons transferred at the end of the electron transport chain?

_____

Q12(a) & (b) 2009

12. (a) ATP and NAD / $NADP^+$ play important roles in cell activities.



The ATP Cycle

(i) Name the substance X, formed by the loss of a phosphate group.
(ii) The ATP cycle is kept going by Y. What is Y?
(iii) Suggest a role for NAD / $NADP^+$ in cell activities.

(9)

(b) (i) What name is given to the first stage of respiration?
(ii) The first stage ends with the formation of pyruvate (pyruvic acid).
In **anaerobic** conditions, what is produced from this pyruvate:
1. In muscle cells?
2. In yeast cells?
(iii) If conditions are **aerobic**, pyruvate next passes to an organelle in which the second stage of respiration takes place. Name this organelle.
(iv) In this organelle pyruvate is broken down to CO_2 and a two-carbon compound. Name this two-carbon compound.
(v) This two-carbon compound passes directly into a series of reactions in the second stage of respiration.
Name this series of reactions **and** give **one** product, other than electrons, of these reactions.
(vi) The electrons released from the above reactions pass along a transport chain and in the process energy is released.
1. To what use is this energy put?
2. At the end of the transport chain what happens to the electrons?

(27)

Q5 2008

5. (a) Write a balanced equation on the line below to represent aerobic respiration.

(b) The first stage of respiration takes place in the cytosol. What is the cytosol?

(c) Does the first stage of respiration release a small or large amount of energy?

(d) What is fermentation?

(e) Where in the cell does the second stage of aerobic respiration take place?

(f) Is oxygen required for the second stage of aerobic respiration?

(g) Suggest a situation in which some cells in the human body may not be able to engage in the second stage of aerobic respiration

Q 11(a)&(b)2007

11. (a) (i) For what is ATP an abbreviation?

(ii) What is the role of ATP in cells? **(9)**

(b) (i) What name is given to the first stage of respiration?

(ii) Where in a cell does this first stage take place?

(iii) To what substance is glucose normally converted in this first stage of respiration?

(iv) Is oxygen required for this conversion?

(v) Name a compound to which the substance that you have named in (iii) may be converted, in the absence of oxygen.

(vi) In aerobic respiration, the product of the first stage moves to the mitochondrion. Outline subsequent events in the total breakdown of this product. **(27)**

Q 4 2005

4. (a) What is the first stage process of respiration called? .....

(b) In this first stage there is a release of ATP as glucose is converted to another substance.

Name this other substance .....

(c) To what is the substance you have named in (b) converted under anaerobic conditions in:

1. Yeast?.....

2. A human muscle cell? .....

(d) Under aerobic conditions the substance that you have named in (b) is converted to an acetyl group and in the process a small molecule is released.

Name this small molecule. .....

(e) The acetyl group now enters a cycle of reactions.

What name is given to this cycle? .....

(f) Where in the cell does this cycle take place? .....

Q 11 2005

11. (a) (i) Distinguish between aerobic and anaerobic respiration.
(ii) Write a balanced equation to summarise aerobic respiration. **(9)**

(b) Answer the following questions in relation to the <u>first stage of respiration.</u>

(i) Where in the cell does this stage occur?
(ii) During this stage a small amount of energy is released. Explain the role of ADP in relation to this released energy.
(iii) What is the final product of this stage under aerobic conditions?
(iv) If conditions in the cell remain aerobic the product you have named in (iii) is used for the second stage of respiration. Where does this second stage take place?
(v) If conditions in a human cell (e.g. muscle) become anaerobic the product named in (iii) is converted to another substance. Name this other substance.
(vi) When the substance named in (v) builds up in the blood, a person is said to be in oxygen debt. This debt must eventually be paid. Suggest how the debt is paid.

(24)

(c) If yeast cells are kept in anaerobic conditions alcohol (ethanol) and another substance are produced.

(i) Describe, with the aid of a diagram, how you would keep yeast under anaerobic conditions in the laboratory.
(ii) Name a carbohydrate that you would supply to the yeast as an energy source.
(iii) Give an account of a chemical test to demonstrate that alcohol (ethanol) has been produced. Include the initial colour and final colour of the test.
(iv) What is the other substance produced under anaerobic conditions?
(v) Alcohol (ethanol) production is an example of fermentation. How would you know when fermentation has ceased?
(vi) Why does fermentation eventually cease? **(27)**