

8.2 Cell Respiration

Question Paper

Course	DP IB Biology
Section	8. Metabolism, Cell Respiration & Photosynthesis (HL Only)
Topic	8.2 Cell Respiration
Difficulty	Medium

Time allowed: 20
Score: /10
Percentage: /100

Question 1

Which row best describes an oxidation reaction?

	Hydrogen	Oxygen	Electrons	Energy
A	Loss	Gain	Loss	Released
B	Gain	Gain	Loss	Absorbed
C	Gain	Loss	Loss	Released
D	Loss	Gain	Loss	Absorbed

[1 mark]

Question 2

Which of the following best shows the reduction of NAD?

- A. $\text{NAD} + \text{H}_2 \rightarrow \text{NADH} + \text{H}^+$
- B. $\text{NAD}^+ + \text{e}^- + \text{H}^+ \rightarrow \text{NADH} + \text{H}$
- C. $\text{NAD} + 2\text{H} + 2\text{e}^- \rightarrow \text{NADH}$
- D. $\text{NAD}^+ + 2\text{e}^- + 2\text{H}^+ \rightarrow \text{NADH} + \text{H}^+$

[1 mark]

Question 3

Which statements correctly describe phosphorylation and dephosphorylation reactions?

- I. The phosphorylation of ADP is an endergonic reaction.
- II. The dephosphorylation of ATP is an endergonic reaction.
- III. The phosphorylation of ADP is a hydrolysis reaction.
- IV. The dephosphorylation of ATP is a hydrolysis reaction.

- A. I and II
- B. II and III
- C. I and IV
- D. II and IV

[1 mark]

Question 4

Which row shows the products of glycolysis?

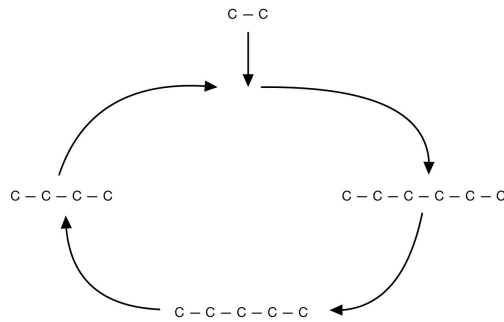
	ATP	Pyruvate	Glucose	Reduced NAD
A	4	2	0	2
B	2	2	2	2
C	2	1	1	2
D	2	2	0	2

[1 mark]

Question 5

The diagram below shows a simplified Krebs cycle.

How many times does decarboxylation occur during the Krebs cycle?



- A. Once
- B. Twice
- C. Three times
- D. Four times

[1 mark]

Question 6

Which of the following is true of oxidative phosphorylation?

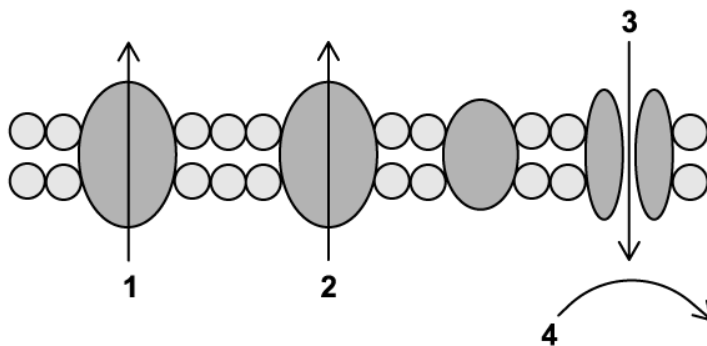
- I. It is the last stage of aerobic respiration.
- II. It takes place on the inner mitochondrial membrane.
- III. It involves chemiosmosis.
- IV. It involves the electron transport chain.

- A. I, II, and IV
- B. II and IV
- C. I, II, and III
- D. I, II, III, and IV

[1 mark]

Question 7

The diagram below represents a simplified version of the electron transport chain and chemiosmosis.



Which row correctly describes the events labelled 1–4 above?

	1	2	3	4
A	Protons move across the cristae into the intermembrane space	Protons move across the cristae into the intermembrane space	Protons are pumped through ATP synthase	ADP is phosphorylated
B	Protons move across the cristae into the matrix	Protons move across the cristae into the matrix	Protons are pumped through ATP synthase	ATP is phosphorylated
C	Protons move across the cristae into the intermembrane space	Protons move across the cristae into the intermembrane space	Protons diffuse through ATP synthase	ADP is phosphorylated
D	Protons move across the cristae into the intermembrane space	Protons move across the cristae into the intermembrane space	Protons diffuse through ATP synthase	ATP is phosphorylated

[1 mark]

Question 8

Chemiosmotic theory was proposed by Nobel Prize winner Peter Mitchell in the 1960s, leading to what is considered to be a paradigm shift.

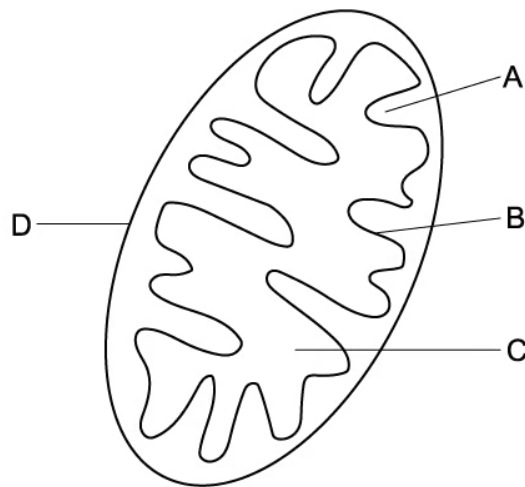
Which of the following correctly defines the term **paradigm shift**?

- A. A significant change to the set of ideas that underpin scientific thinking.
- B. When a new discovery leads to advances in scientific knowledge.
- C. The acceptance of novel and radical ideas.
- D. The acceptance of Darwin's theory of evolution by natural selection.

[1 mark]

Question 9

The diagram below shows a mitochondrion.



Where in this organelle is ATP synthase found?

[1 mark]

Question 10

Which row correctly shows the features of a mitochondrion that can be observed and labelled on a drawing using a transmission electron microscope (TEM)?

	Mitochondrion shape	RNA and DNA	Cristae	Intermembrane space
A	Yes	Yes	Yes	Yes
B	Yes	No	Yes	No
C	Yes	Yes	No	Yes
D	Yes	No	Yes	Yes

[1 mark]