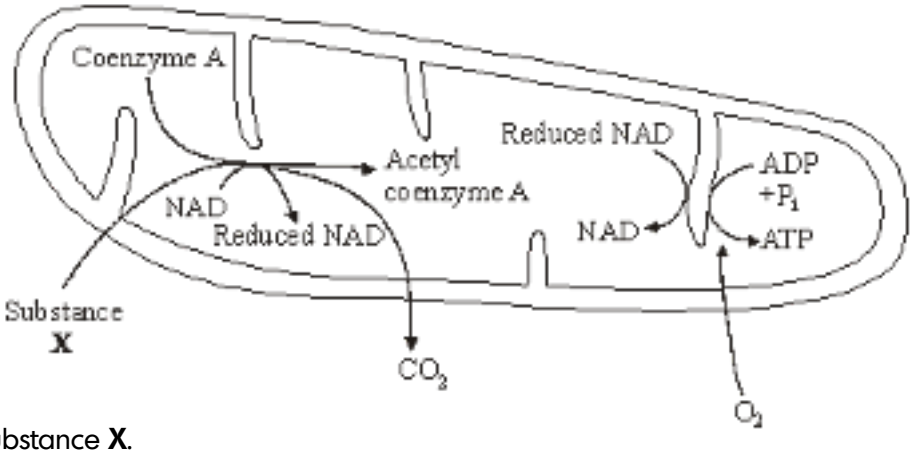
A: AEROBIC RESPIRATION

TT LIVE CLASS #4

Q1.

The diagram represents two of the stages of aerobic respiration that take place in a mitochondrion.



(a) Name substance **X**.

_____

(1)

(b) Which stage of aerobic respiration takes place inside a mitochondrion and is **not** represented on the diagram?

_____

(1)

(c) Explain why oxygen is needed for the production of ATP on the cristae of the mitochondrion.

_____

_____

_____

_____

_____

_____

(3)

(Total 5 marks)

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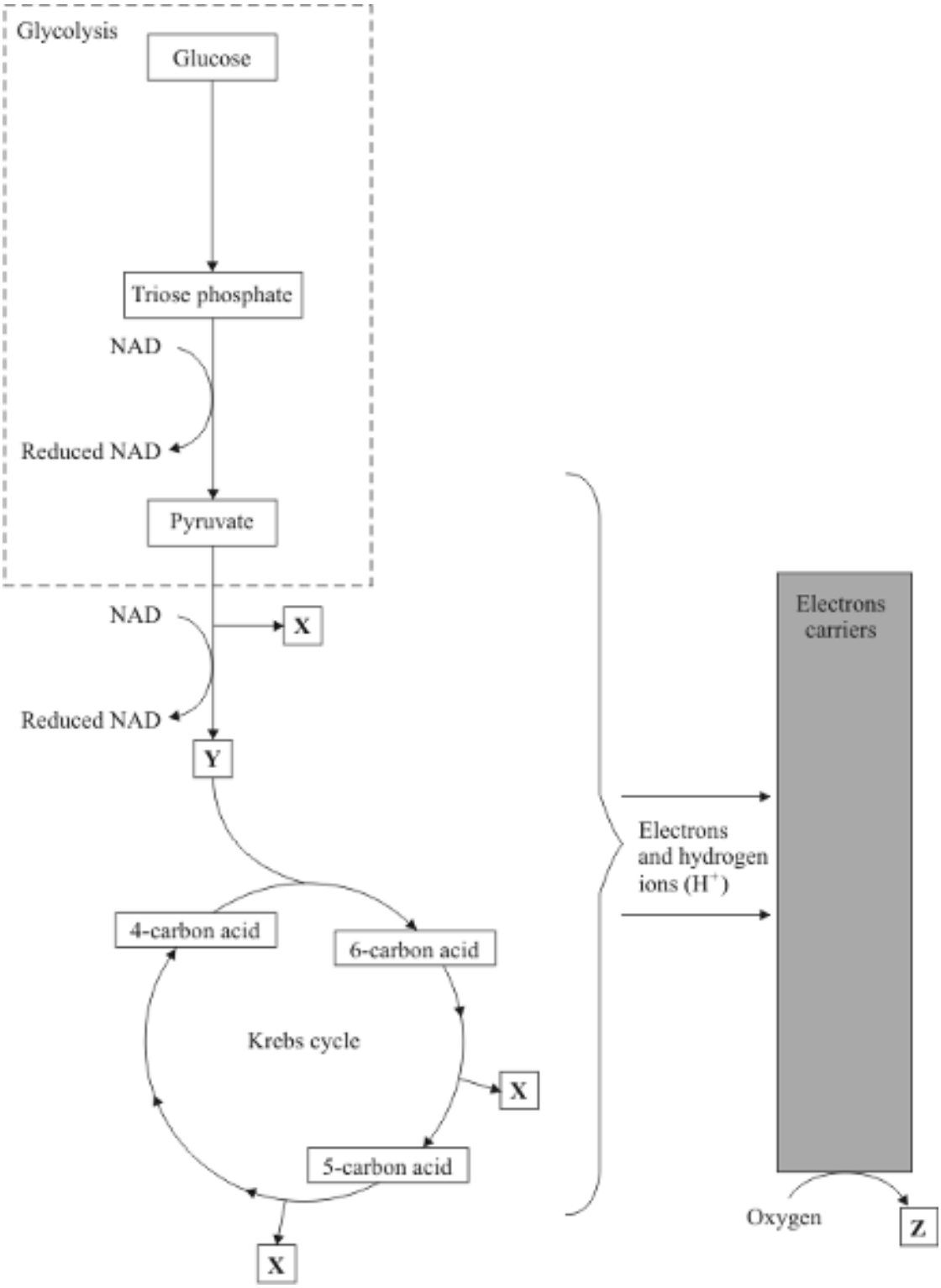
Q2.

The diagram gives an outline of the process of aerobic respiration.



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(a) Name substances **X**, **Y** and **Z**.

X _____

Y _____

Z _____

(3)

(b) Give the location of each of the following in a liver cell.

(i) Glycolysis _____

(ii) The Krebs cycle _____

(2)

(c) (i) Write the letter **A** on the diagram to show **one** step where ATP is used.

(ii) Write the letter **B** on the diagram at **two** steps where ATP is produced.

(3)

(d) Apart from respiration, give **three** uses of ATP in a liver cell.

1. _____

2. _____

3. _____

(3)

(Total 11 marks)

TT LIVE CLASS #4

Q3.

(a) The table contains some statements relating to biochemical processes in a plant cell. Complete the table with a tick if the statement is true or a cross if it is not true for each biochemical process.

Statement	Glycolysis	Krebs cycle	Light-dependent reaction of photosynthesis
NAD is reduced			
NADP is reduced			
ATP is produced			
ATP is required			

(4)

(b) An investigation was carried out into the production of ATP by mitochondria. ADP, phosphate, excess substrate and oxygen were added to a suspension of isolated mitochondria.

(i) Suggest the substrate used for this investigation.

_____

(1)

(ii) Explain why the concentration of oxygen and amount of ADP fell during the investigation.

_____

_____

_____

_____

(2)

(iii) A further investigation was carried out into the effect of three inhibitors, **A**, **B** and **C**, on the electron transport chain in these mitochondria. In each of three experiments, a different inhibitor was added. The table shows the state of the electron carriers, **W–Z**, after the addition of inhibitor.

Inhibitor added	Electron carrier			
	W	**X**	**Y**	**Z**
A	oxidised	reduced	reduced	oxidised
B	oxidised	oxidised	reduced	oxidised
C	reduced	reduced	reduced	oxidised

Give the order of the electron carriers in this electron transport chain.
Explain your answer.

Order _____ _____ _____ _____

Explanation _____

_____

_____

(2)

(Total 9 marks)

A: AEROBIC RESPIRATION

TT LIVE CLASS #4

Q1.

(a) pyruvate

1

(b) Krebs cycle

1

(c) ATP formed as electrons pass along transport chain
oxygen is terminal electron acceptor / accepts electrons from electron transport chain / electrons cannot be passed along electron transport chain if no O_2 to accept them
forms H_2O / accepts H^+ from reduced NAD / FAD / oxidises reduced NAD / FAD

3

[5]

Q2.

(a) X = Carbon dioxide
Y = Acetyl coenzyme A (ACCEPT Acetyl CoA)
Z = Water

3

(b) (i) Cytoplasm

1

(ii) Mitochondrion (IGNORE named part)

1

(c) <u>On the diagram:</u>

(i) '**A**' (ATP used) – <u>between</u> glucose and triose phosphate

1

(ii) '**B**' <u>Any **two** from</u>:

(ATP produced) – between triose phosphate and pyruvate
in Krebs cycle
from electron carriers
(to right of bracket & not below grey box)

max 2

(d) <u>Any **three** from</u>:

Source of energy / of phosphate
Active transport
Phagocytosis / endo- / exocytosis / pinocytosis
Bile production
Cell division / mitosis
Synthesis of: glycogen
protein / enzymes
DNA / RNA
lipid / cholesterol
urea

max 3

[11]

TT LIVE CLASS #4

Q3.

(a)

Statement	Glycolysis	Krebs cycle	Light-dependent reaction of photosynthesis
NAD is reduced	✓	✓	
NADP is reduced			✓
ATP is produced	✓	✓	✓
ATP is required	✓		

4

(b) (i) pyruvate / succinate / any suitable Krebs cycle substrate

1

(ii) ADP and phosphate forms ATP
oxygen used to form water / as the terminal acceptor

2

(iii) Y X W Z
order of carriers linked to sequence of reduction / reduced
carriers cannot pass on electrons when inhibited

2

[9]