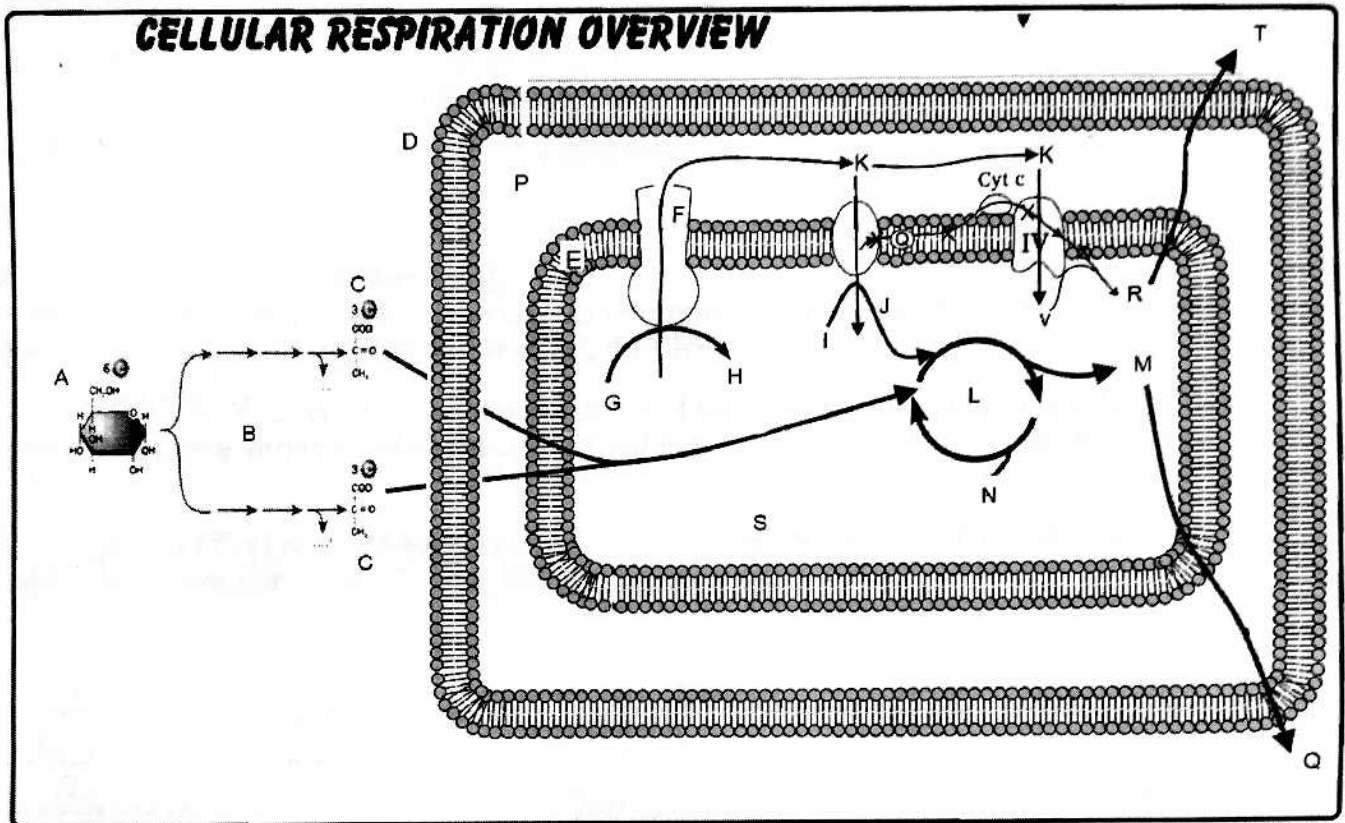


Name \_\_\_\_\_

Date \_\_\_\_\_

Use this diagram to answer the questions as indicated.



Name any 3 of the following lettered structures, regions, molecules or processes: (2 pts each)

1. C (mol) Pyruvate
2. G (mol) ADP
3. J (mol) NADH / NAD<sup>+</sup> \*
4. S (reg) Matrix

Describe what is HAPPENING in 2 of the following processes: (3 pts. each)

5. G to H  
(ADP + P = ATP) (H<sup>+</sup> Gradient) (ATP Synthase)

6. L to M to Q  
(Pyruvate → 3CO<sub>2</sub>) (electrons removed) (CO<sub>2</sub> out of body)

7. X + V to R  
(electrons From ETC) (2H<sup>+</sup> + 2e<sup>-</sup> + O → H<sub>2</sub>O) (H<sub>2</sub>O out of mito)

There are 3 technical errors on the diagram where I have changed things. They can be additions (things there that should not), deletions (missing things that should be there) or modifications (changing something about things that are in the correct place).

Two are major (5 points each) and would totally destroy the process of cellular respiration. One is less significant (3 points) and would decrease the efficiency of the process but not stop it.

Identify **ANY 2** errors. For each, you must

- Identify the error using the letters. (1 pt)
- Describe how the error differs from the correct information. (Don't tell me what it now shows and/or what should be there. Tell me what is DIFFERENT. (1 pt)

i.e. - A, B, C, D, F, E, G, H, I - tell me the order of the letters has changed. DON'T tell me which letters are wrong or what the correct order is. Just tell me in what way they are different

- Tell me what the effect of the change would be on Cellular Respiration. Explain why the change would have that effect. (1 pt for minor, 3 pt for major)

Major Error 1. A. F/K

~~B.~~ B. Direction of  $e^-$  flow is backwards

C. Resp would not produce 32 ATP from ETC, Only 4 from Glyc/Krebs.

Reasons: (ETC won't transport  $H^+$  in, no chemiosmotic phosphor.)

(ATPSynth can't generate ATP in that direction, no phosphor from gradient)

(ATPSynth can't move  $H^+$ ,  $\therefore$  no gradient at all)

Major Error 2. A. I/J

B. (Direction / origin + Destination) of  $NAD^+$  /  $NADH$  backwards

(Direction  $e^-$  being trans is backwards)

C. Resp = 4 ATP, not 36

Reasons: (There are no elec<sup>-</sup> to pick up from  $H^+$  trans, PD in Krebs)

$\circ$  No  $e^-$  to power  $H^+$  Pump

(Krebs backup of  $e^-$  b/c  $NAD^+$  not picking up.  $e^-$  Prod stop, goes Anaerobic)

Minor Error

A. X (ETC  $H^+$  Pump)

B. One of 3  $H^+$  Pump missing

C. ( $1/3$  reduction in  $H^+$  Gradient) ( $1/3$  reduction in  $ADP \rightarrow ATP$ )

Reason:  $1/3$  fewer  $H^+$  in IMS.  $\therefore$   $1/3$  fewer  $H^+$  through ATPSyn.

$\circ$   $1/3$  less phosphor

A++ \* (Total shutdown due to  $e^-$  backup

Reason. Coenz Q has no one to give  $e^-$  to. Backup to Glycol)