Which of the following are true?  
a. the glycerophosphate shuttle and the malate-aspartate shuttle yield the same number of ATP's starting from NADH in the cytosol  
b. the glycerophosphate shuttle yields the same number of ATP's per 2 electrons donated as complex II of the electron transport chain  
c. the malate-aspartate shuttle is more energy efficient than the glycerophosphate shuttle  
d. the glycerophosphate shuttle can donate electrons to the electron transport chain even when the cytosolic [NADH] is low  
e. the malate-aspartate shuttle is essentially irreversible

|  |  |  |
| --- | --- | --- |
|  |  | b, c, d, and e |
| http://owl.cengage.com/owlimages/check.GIF |  | b, c, and d |
|  |  | a, b, and c |
|  |  | all but a |
|  |  | All of the Above |

If the E°' for the NAD/NADH half cell is -0.32V and for the fumarate/succinate half cell is 0.031V, calculate the ΔG°' for the reaction  
NADH + H+ + fumarate → NAD+ + succinate given F = 96.5 kJ/Vmol.

|  |  |  |
| --- | --- | --- |
|  |  | 67.74 kJ/mol |
|  |  | 55.78 kJ/mol |
|  |  | -12.55 kJ/mol |
| http://owl.cengage.com/owlimages/check.GIF |  | -67.74 kJ/mol |
|  |  | -55.78 kJ/mol |

The terminal electron acceptor in eukaryotic aerobes is:

|  |  |  |
| --- | --- | --- |
|  |  | NADH |
|  |  | FADH2 |
| http://owl.cengage.com/owlimages/check.GIF |  | molecular oxygen |
|  |  | cytochrome a3 |

Which complex of the electron transport chain does not contain a cytochrome?

|  |  |  |
| --- | --- | --- |
| http://owl.cengage.com/owlimages/check.GIF |  | NADH-coenzyme Q reductase |
|  |  | complex IV |
|  |  | succinate-coenzyme Q reductase |
|  |  | complex II |

Dinitrophenol, a hydrophobic weak acid with a pKa of 9, is an uncoupler of oxidative phosphorylation. It:

|  |  |  |
| --- | --- | --- |
|  |  | inhibits proton flow by binding to the F0 unit of ATP synthase |
|  |  | collapses the membrane potential |
|  |  | competes wth O2 for binding to the a3-CuB bimetallic site in complex IV |
| http://owl.cengage.com/owlimages/check.GIF |  | collapses the proton gradient |

Which of the following is a mobile, lipid-soluble electron carrier found in the inner mitochondrial membrane?

|  |  |  |
| --- | --- | --- |
|  |  | FAD |
|  |  | cytochrome c |
|  |  | Fe-S center |
| http://owl.cengage.com/owlimages/check.GIF |  | coenzyme Q |