BioEnergy

1/ From largest to smallest, order these food stores in terms of the largest amount of glucose stored:

Liver
Blood
Adipose tissue
Intramuscular stores

2/ Explain the difference between direct calorimetry and indirect calorimetry.

3/ Calculate the energy charge in a cell when the ATP concentration is 4.60mM, the ADP concentration is 0.33mM, and the AMP concentration is 0.46mM.

[0.884]

4/ How much energy in kcal is produced when 7.46L of O_2 is used by a person?

[37.3kcal]

5/ Calculate the Respiratory Exchange Ratio (RER) for a person when they are burning 70% carbohydrate and 30% fat.

[0.910]

6/ Calculate the number of daily calories from the following diets. Remember, 1g of CHO is ~ 4kcal, 1g of fats is ~ 9kcal, and 1g of protein is ~ 4kcal.

300G of CHO / 50g of fats / 110g of protein
250g of CHO / 70g of fats / 155g of protein
200g of CHO / 50g of fats / 170g of protein
350g of CHO / 100g of fats / 80g of protein

[2090kcal, 2250kcal, 1930kcal, 2620kcal]

7/ What is the catabolic rate in Watts of an athlete with an oxygen intake of 4.79L/min?

[1600W]

8/ An athlete spends 20 minutes on an exercise bike. The flywheel resistance is set to 30N, the distance travelled per revolution is 6m, and the athlete cycles at 60 rpm. Calculate the amount of work done in kJ and kcal.

[216kJ, 51.6kcal]

9/ How much O_2 is absorbed by an athlete taking 45 breaths per minute for 25 minutes with a tidal volume of 3.5L. Inhaled air has 21% O_2, exhaled air 16% O_2.

[197L]

10/ Using the empirical equation from the notes, calculate the amount of energy used when a 71.4kg person runs a distance of 8.1km. Give your answer in kJ and Cal.

[2250kJ, 536Cal]