

# Forum:Seminar papers/Biophysics/2. LF/2017-2018/Group 3B (Capucine): MCQ - Thermodynamics, Biophysics of Cells and Tissues

## Article to be checked

Check of this article is requested.

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## THERMODYNAMICS

1. what are the different thermodynamic parameters:

- A. pressure, volume, temperature and entropy
- B. internal energy, entropy, pressure and Gibbs free energy
- C. Gibbs free energy, enthalpy, volume and temperature
- D. enthalpy, entropy, volume and temperature

2. which statement is true about closed systems and adiabatic systems

- A. closed system: only exchanges energy; adiabatic system: can exchange heat and energy but not matter
- B. closed system: exchange heat, energy and matter; adiabatic system: can exchange energy but not heat and matter
- C. closed system: exchange heat and matter but not energy; adiabatic system: can exchange only heat
- D. closed system: exchange heat and energy but not matter; adiabatic system : can exchange energy but not heat and matter

3. what are some sources of direct energy loss of an organism?

- A. radiation , conduction, convection
- B. convection, evaporation from body surface, radiation
- C. convection, conduction, evaporation from lungs
- D. evaporation from lungs, evaporation from body surface and radiation

4. Cryotherapy is used in medicine for

- A. along side chemotherapy or radiotherapy against tumours
- B. in cryosurgery to destroy damaged tissues by a frozen probe (usually liquid nitrogen)
- C. for « ice pack therapy » to provide vasoconstriction with reflexive vasodilatation, increase oxygen demand locally and increase nerve conduction to reduce the pain small injuries
- D. DNA repair because it will increase the number of unpaired DNA breaks induced by radiation

5. Which of the following statement is FALSE about thermoregulation of the body

- A. fever is an important mechanism to cool a body down
- B. metabolism increase is used by the body to lower the temperature
- C. vasodilation is a mechanism important to decrease an organism's temperature
- D. vasoconstriction is important to increase an organism's temperature

## BIOPHYSICS OF THE CELL AND TISSUE

6. what is the energetic equation of ATP production by a mitochondrion

- A.  $\text{NADH} + \text{O}_2 + \text{H}^+ + \text{ADP} + \text{P}_i \rightarrow \text{NAD}^+ + 2 \text{H}_2\text{O} + \text{ATP}$
- B.  $\text{NAD}^+ + 1/2 \text{O}_2 + \text{H}^+ + \text{ADP} + \text{P}_i \rightarrow \text{NADH} + \text{H}_2\text{O} + \text{ATP}$
- C.  $\text{NADH} + 1/2 \text{O}_2 + \text{H}^+ + \text{ADP} + \text{P}_i \rightarrow \text{NAD}^+ + \text{H}_2\text{O} + \text{ATP}$
- D.  $\text{NAD}^+ + \text{O}_2 + \text{H}^+ + \text{ADP} + \text{P}_i \rightarrow \text{NADH} + 2 \text{H}_2\text{O} + \text{ATP}$

7. What is osmosis?

- A. Diffusion of water through a semi-permeable membrane
- B. When you take water out of a cell
- C. When you put water into the cell
- D. none of the above

8. when a cell is placed in hypotonic medium:

- A. Concentration of solutes outside a cell is higher than that inside, resulting in swelling of cells.
- B. Concentration of solutes inside a cell is lower than that outside, resulting in shrinking of cells.
- C. Concentration of solutes inside a cell is higher than that outside, resulting in swelling of cells.
- D. Concentration of solutes outside a cell is lower than that inside, resulting in shrinking of cells.

9. a substance can only be accumulated against its electrochemical gradient by:

- A. facilitated diffusion
- B. Passage through ion channels
- C. Diffusion through a uniport
- D. Active transport

10. for diffusion to occur which condition is mandatory

- A. an hypotonic external medium is required
- B. a concentration gradient must exist
- C. an hypertonic external environment is required
- D. dynamic equilibrium must exist

## THERMODYNAMICS ANSWERS

- 1 A
- 2 D
- 3 A
- 4 B
- 5 B

## BIOPHYSICS OF THE CELL AND TISSUE ANSWERS

- 6 C
- 7 A
- 8 C

9 D

10 B