Dugga in Technical Biology

November 8, 2011, kl 15.00-17.00, K:A

Note: Hand in your answer in two separate cover paper according to:
A = Questions 1-5
B = Questions 6-8

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1. Explain how peptidoglycan influences the results of Gram staining, specifically Gram-positive staining and Gram-negative staining. (0.5 p)

2. Discuss how some bacterial species can adjust the lipid content of their plasma membranes in response to lower temperatures. (1 p)

3. Why is the intracellular pH reduced more effectively by acetic acid than hydrochloric acid? Explain. (1 p)

4. a) What happens to the generation time of bacteria withstanding a cytoplastic pH drop caused by acetic acid? (0.5 p)
   b) Why? (0.5 p)

5. a) Briefly describe the procedure of HTST pasteurization. (0.5 p)
   b) Explain the reason for high safety, and (0.5 p)
   c) extended shelf-life from a microbiological point of view. (0.5 p)

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6. Proteins have four levels of structures: primary, secondary, tertiary and quaternary.
   a) What are the two most common secondary structures of proteins? (0.5 p)
   b) What is(are) the most important force(s) that stabilize(s) these secondary structures? (0.5 p)

7. For enzymes that follow the Michaelis-Menten kinetics, the reaction rate can be expressed by the Michaelis-Menten equation:

$$V = V_{max}[S] / (K_M + [S]) = k_{cat}[E_{tot}][S] / (K_M + [S])$$

   What is the meaning of V_{max} and K_M? (1 p)

8. Enzyme inhibition: what is the difference between competitive and non-competitive inhibition? (1 p)