



NTNU – Trondheim
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Department of Biology

Examination paper for: BI2020 Zoophysiology

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Ved sensur teller alle oppgavene likt.

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Question 1.

In order to maintain a given level of activity an animal is required to supply all of its cells with a sufficient amount of oxygen. With an increasing level of activity (e.g. an increase of VO_2 with a factor of 4) there are many physiological mechanisms that come into play helping the animal in matching the new level of O_2 -transport.

Describe these mechanisms and explain their physiological effects.

Use a combination of circulatory and respiratory physiology, Fick's principle and the oxygen dissociation curve to give a comprehensive overview.

$$\text{Fick's principle: } VO_2 = C.O. \times (C_aO_2 - C_vO_2)$$

Question 2.

The content of water and electrolytes in the extracellular fluids has a direct effect on the arterial blood pressure. Depending of what the underlying cause is, the human body has multiple ways of responding to and regulating a change blood pressure. The kidney plays an important part in this regulation.

Following a drop in blood pressure, explain in what way the kidneys are involved in the regulation of blood pressure. Focus on the hormonal links that exist between the kindeys (nephrons), adrenal glands and the hypothalamus.

Question 3.

Describe the sensory system and general properties of sensory receptor cells. Give an account for sensory organs conveying information about mechanical stimulation.

Question 4.

Give a description of the relationship between ambient temperature and the metabolic rate in a homeothermic animal. Explain the relationship.

What are the physiological mechanisms enabeling homeothermic animals to adapt to cold environments?