

Department of Biology

## Examination paper for BI2064 Fish anatomy and physiology

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Examination date: 25/5-2018

Examination time (from-to): 09.00-13.00

Permitted examination support material: None

Other information:

Language: English

Number of pages (front page excluded):

Number of pages enclosed:

<b>Informasjon om trykking av eksamensoppgave</b>			
<b>Originalen er:</b>			
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## Exam questions

The answers will be weighted according to the following:

Question 1 25%

Question 2 12,5%

Question 3 37,5%

Question 4 12,5%

1. From seminar series (1 hour, all questions count the same).
  - a. Describe and explain one example on functional organisation of swimming musculature in fish.
  - b. Describe and explain the function of the swim-bladder.
  - c. Can fish feel pain? Give a short reasoning for your answer.
  - d. Describe and explain fish-hearing.
  
2. From fish health (30 minutes)
  3. In 2009, at least 223 salmon farming localities in Norway were affected by the viral disease infectious pancreas necrosis (IPN). In 2016, only 23 outbreaks were registered. Explain three control strategies/prophylactic measures for IPN.
  
4. From stress in fish (1,5 hour, all questions count the same)
  - a. What is stress, and why do fish have a stress-response?
  - b. Show how the plasma levels of catecholamines and cortisol evolves over time following stress.
  - c. What are the main functions of adrenaline and cortisol. Describe also how they supplement each other.
  - d. Describe how acute and chronic stress affects the body. Use examples in some organs as described in the lectures.
  
5. Gills, heart (30 minutes)
  - a. Explain the principle for the countercurrent exchange system for gas-exchange in fish gills. Please also draw figure.
  - b. How can cardiac output be regulated in fish? What can you say about the cardiac output to a fish by looking at heart (macroscopically and microscopically)?