



## **FACULTY OF SCIENCE**

### **DEPARTMENT OF ZOOLOGY**

**MODULE        ZOO0067**

**CAMPUS        APK**

**SSA EXAM        DECEMBER 2014**

**DATE:            DECEMBER 2014**

**SESSION        08:30**

**ASSESSOR(S)**

**PROF GM WAGENAAR**

**INTERNAL MODERATOR**

**DR C VAN DYK**

**EXTERNAL MODERATOR**

**PROF P KING**

**DURATION       3 HOURS**

**MARKS        100**

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**NUMBER OF PAGES: 4 PAGES**

**INSTRUCTIONS:        Answer all the questions.**

### **QUESTION 1**

Aquatic environments are often contaminated by industrial effluents and urban sewage which may have an effect on important physiological processes of aquatic organisms such as fish. Explain how histopathology could be used as a biomarker to show the effect of pollution.

**[25]**

### **QUESTION 2**

Figures 1 A and B are photos taken during a micrograph and histological assessments in the laboratory.

- 2.1 Write explanatory notes on your macroscopic observation of Figure 1 A.  
(5)
- 2.2. How will you determine the gonadosomatic index (GSI)?. (2)
- 2.3 Discuss the importance of including the gonadosomatic index as part of a fish health assessment. In your answer you should also refer to what the expected range of normal values for the GSI is for mature fish. (6)
- 2.4 Discuss the histopathological changes in Figure 1 B. (7)

**[20]**

### **QUESTION 3**

Question 3 refers to Figures 1 C and D.

- 3.1 Discuss the importance of selecting the gills as a target organ in a research project which aims to determine the effect of pollutants on the health status of fish. (8)
- 3.2 Identify and discuss the histopathological changes and possible causes for these changes. (7)

**[15]**

#### **QUESTION 4**

Figure 1 E is a photo taken during field sampling.

- 4.1 Discuss the macroscopic changes in Figure 1E of the 11 testes that were photographed in figure 1E. (10)
- 4.2 Explain which toxicant(s) could possibly cause these changes. (10)

**[20]**

#### **QUESTION 5**

Like many dams in South Africa, the Rietvlei Dam is known to be in a hypertrophic state, caused by nitrogen and phosphate enrichment from urban, industrial and agricultural runoff. This leads to blooms of toxic cyanobacteria (blue-green algae) which could be harmful to humans, cause odours and bad taste in the water and clog water treatment filters. Fish are bio-indicators which could be used to assess the health status of the ecosystem.

Write a motivation for the Management of the Rietvlei Reserve where you discuss the advantages of, including fish histology in the biomonitoring of the Rietvlei Dam. Your motivation should also provide information about the types of analyses and assessments that should be included in addition to fish histology.

**[20]**

**TOTAL (100)**

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