FIRST OPPORTUNITY EXAMINATION QUESTION PAPER

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THIS QUESTION PAPER CONSISTS OF 5 PAGES (EXCLUDING THIS FRONT PAGE)

INSTRUCTIONS

1. Answer all questions
2. Please write clearly and neatly
3. Number the answers clearly

PERMISSIBLE MATERIALS

1. Examination paper
2. Examination script
3. The Criteria for identifying wetlands of international importance
QUESTION 1

1.1 Study the map below and:
A. Name the impoundments 1-6 and name of the river each is on.
B. Name the lacustrine wetlands 7 – 10.
C. Name the coastal wetlands 11 – 13.
D. Name the geothermal springs, 14 and 15.

1.2 Say what the following terms have in common and then clearly distinguish between them:
a) Linear Oasis and Biological Corridor
b) Oshana and Ondombe
c) Epigean and Hypogean
d) Springs and Seeps.
QUESTION 2 RAMSAR

2.1 What is the Ramsar Convention, when was it established and where did it get its name? (3)

2.2 Name Namibia’s newest Ramsar site, where we celebrated World wetland and water day this year, name the towns at either end of it and write a paragraph to show how it meets four Ramsar criteria. Use the criterion list, outline each criterion it meets and say how. (10)

2.3 When is World Wetland Day celebrated and what was the international theme for 2015? (2) [15]

QUESTION 3 COASTAL WETLANDS

3.1 Name Namibia’s three coastal Ramsar sites. (3)

3.2 What is the NL MPA, how large is it? and name the northern-most and southern most islands within the MPA? (4)

3.3 Name 3 very important, globally threatened, species of seabirds which breed in the safety of Namibia’s offshore islands. (3) [10]

QUESTION 4 EPHEMERAL RIVERS AND DAMS

4.1 As a member of the Ugab Basin Management Committee, you are concerned about a new dam proposed at Donkersan to provide water to Khorixas. Prepare a short discussion for the next meeting of the UBMC, on the conservation issues related to the impacts of building a dam on this ephemeral river and the impacts it is likely to have, both at the new dam and on the river downstream in the Skeleton Coast Park where you are the chief warden. (10)

4.2 Draw and accurately label, a sketch to illustrate the differences between the epilimnion and hypolimnion in a stratified impoundment in summer in Namibia. (12)

4.3 Give the main growth limiting factor in a) the Epilimnion and b) the Hypolimnion in stratified impoundments in summer. (2) [24]

QUESTION 5 PERENNIAL RIVERS

5.1 Use the information given in the table below to motivate which dam site on the Kunene River would:
   A. Be ecologically less damaging for a hydropower dam. (3)
   B. Be socially more acceptable to the Himba people living alongside the river. (3)
   C. As an ecologist, motivate your personal recommendation about a hydropower dam on the Kunene. (2)
<table>
<thead>
<tr>
<th></th>
<th>Epupa Dam (Site B)</th>
<th>Baynes Dam (Site E)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume of water/capacity</td>
<td>8937 Mm³</td>
<td>2800 Mm³</td>
</tr>
<tr>
<td>Height of dam wall (m)</td>
<td>145 m</td>
<td>180 – 200 m</td>
</tr>
<tr>
<td>Distance flooded back from wall (km)</td>
<td>90 km</td>
<td>40 km</td>
</tr>
<tr>
<td>Area inundated by impoundment (km²)</td>
<td>300 km²</td>
<td>54 km²</td>
</tr>
<tr>
<td>Nature of river in area to be flooded</td>
<td>Epupa water fall, terraces with palms + riparian forest, diversity of trees</td>
<td>Deep narrow valley, River bank lined with Ficus capreifolia</td>
</tr>
<tr>
<td>Cultural units to be flooded</td>
<td>Over 200 sites including graves</td>
<td>At least 10 graves, ≥ 40 sites</td>
</tr>
<tr>
<td>Distance to the sea (km)</td>
<td>190 km</td>
<td>150 km</td>
</tr>
</tbody>
</table>

Note: Both dams are designed to produce 430 MW of power and the cost of construction is the same.

5.3 Sketch and accurately label the life-cycle of the parasite that causes intestinal bilharzias in Namibia’s northern perennial wetlands. (12)

QUESTION 6 CUVELAI SYSTEM

6.1 Complete the table that compares aspects of the Upper, Middle and Lower Cuvelai Basin. (6)
   No need to redraw the table, simply give answers A – F.

<table>
<thead>
<tr>
<th>Wetland type</th>
<th>Upper Cuvelai</th>
<th>Middle Cuvelai</th>
<th>Lower Cuvelai</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fish fauna</td>
<td>16/17 fish species</td>
<td>D</td>
<td>E</td>
</tr>
<tr>
<td>Conservation status</td>
<td>Protected</td>
<td>Unprotected – potential Ramsar site</td>
<td>F</td>
</tr>
</tbody>
</table>

6.2 Answer either A or B.

A. Based on your excursion to Etosha National Park and using the attached Criteria list to clearly explain how Etosha Pan meets the Ramsar Criteria. (10)

or

B. The Town Council of Oshakati is concerned about flooding and want to stop floodwaters in the Cuvelai. As a biologist working in Etosha, write a short motivation on the ‘efundja’ and why it is important to the southern African population of Lesser and Greater Flamingoes and link this to the investigation into breeding success done from 1956–1995. (16)

QUESTION 7 LACUSTRINE AND PALUSTRINE WETLANDS

7.1 Give the scientific and common names of the endemic fish species from the Karst sinkholes and caves, name the lake or cave where each is found and discuss two conservation threats to these special fish. (6)

7.2 List and briefly explain four threats faced by seeps and springs in the Karstveld. (8)

7.3 Name the two crustacean groups (order and common name) that we managed to hatch from mud in the tanks in the lab as well as a fish species (scientific and common name) that are specially adapted to living in ephemeral rainwater pools and briefly discuss the adaptations that make it possible for them to survive. (20)
9.1 You are asked by a community living alongside the Okavango River to help them set up a fish farm. Give a simple, labelled sketch to show your design of an extensive, open, low technology, community fish farm linked to a gardening project.

9.2 Discuss the main economic advantage as well as the economic and ecological disadvantages of an intensive, commercial aquaculture venture that uses non-indigenous (exotic) tilapia species fed on pellets, and kept in temperature controlled tanks.

TOTAL- 150
The Criteria for Identifying Wetlands of International Importance

Group A. Sites containing representative, rare or unique wetland types

Criterion 1: A wetland should be considered internationally important if it contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region.

Group B. Sites of international importance for conserving biological diversity

Criteria based on species and ecological communities

Criterion 2: A wetland should be considered internationally important if it supports vulnerable, endangered, or critically endangered species or threatened ecological communities.

Criterion 3: A wetland should be considered internationally important if it supports populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region.

Criterion 4: A wetland should be considered internationally important if it supports plant and/or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions.

Specific criteria based on waterbirds

Criterion 5: A wetland should be considered internationally important if it regularly supports 20,000 or more waterbirds.

Criterion 6: A wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of waterbird.

Specific criteria based on fish

Criterion 7: A wetland should be considered internationally important if it supports a significant proportion of indigenous fish subspecies, species or families, life-history stages, species interactions and/or populations that are representative of wetland benefits and/or values and thereby contributes to global biological diversity.

Criterion 8: A wetland should be considered internationally important if it is an important source of food for fishes, spawning ground, nursery and/or migration path on which fish stocks, either within the wetland or elsewhere, depend.

Specific criteria based on other taxa

Criterion 9: A wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of wetland-dependent non-avian animal species.