



THE OPEN UNIVERSITY OF SRI LANKA  
MASTER OF SCIENCE / POST GRADUATE DIPLOMA IN  
ENVIRONMENTAL SCIENCE -2011/2012  
ENVIRONMENTAL STUDIES UNIT  
NEP 2202 BIODIVERSITY CONSERVATION AND MANAGEMENT  
FINAL EXAMINATION- LEVEL 7

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Date: 18<sup>th</sup> March 2012

Time 13.30 p.m to 16. 30 p.m

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Answer Four (04) Questions only

**Question 1**

“Distinctly different reefs comprising coral, sandstone, and rocky reefs have been identified around the island, occurring separately or mixed together. Once famed for their spectacular beauty, coral reefs are still among Sri Lanka’s most valuable shallow water marine ecosystems in terms of biodiversity and ecosystem services. There are about 208 hard coral species from 71 genera and 9 families, and at least 300 species of reef fishes are associated with these reefs, many of which are important in the ornamental and food fishery. Coral reefs are important for protection of the coast from coastal erosion due to wave action, and are important habitats for many marine organisms that live within the shelter of coral reefs. They also form nursery grounds for many marine organisms. In areas such as Hikkaduwa, coral reefs are economically important for the nature tourism industry. Coral mining for the lime industry in the south and southwest coasts had caused extensive damage to coral reefs during the 1980s and 1990s. The ‘El Nino’ effect in 1998 led to mass scale coral bleaching and death, and such events are occurring even now in some places. The regeneration process after coral bleaching may cause considerable changes in coral reef species composition and structure which will affect the other organisms associated with coral reefs. Also, reefs disturbed by coral bleaching are affected by invasive organisms such as *Halimeda* (red algae). Coral reefs are also affected by destructive fishing practices.

- (1) Define Extractive/consumptive and non-consumptive uses of coral reef ecosystems and the species they support using examples from the paragraph. .
- (2) (a) What are the two main human induced threats to Sri Lanka's coral reefs that are exemplified in the paragraph above? (b) What is the other main threat and how can these affect coral reefs?
- (3) How are the two main human induced practices specifically addressed by recommendations in the biodiversity conservation action plan?
- (4) Define and briefly discuss the difference between direct and indirect values of biodiversity using examples from the above paragraph.

### Question 2

You have been given a leaflet by a friend. This leaflet states that:

***Chemical weapons with potential for bioprospecting in the biological gold rush . . .***

*Even though bio-prospecting marine resources for medicinal use is considered time-consuming and economically risky, many are used in technology and industry . . . "so far, relatively few marine plants, animals and microbes are responsible for an impressive yield of more than 12,000 new chemicals used in medicine. More can be expected to be found in the future. Most bioprospecting experiments have been carried out in the tropical seas. Coral reef ecosystems are first choice targets because they are characterized by high biodiversity and intense competition for space, leading to a chemical warfare among sessile organisms. Soft bodied sessile invertebrates in particular, such as sponges, soft corals, sea-fans and sea-squirts, are renowned for their refined chemical arsenals of bioactive compounds because they lack the means for mechanical defence."*

④ Your friend wants to know what is meant by a marine resource in this paragraph. Explain in one paragraph indicating its link to biodiversity.

(2) Your friend also wants to know what is meant by a sponges, soft corals, and sea squirts. Explain to what Kingdom and Phylum/Phyla they belong to.

(3) Which type of bio-resource use is **exemplified** in the paragraph above? (answer in one sentence)

(4) Select the main value/s of the resources mentioned in the paragraph above from the following and explain your choice:

- (a) Direct Extractive use value?
- (b) Indirect use value?
- (c) Optional use value?
- (d) Ethical value?
- (e) Bequest value?

(5).

(a) Which is the most relevant article of the CBD in terms of bioprospecting by a developed country party to the CBD in the territorial sea of a developing country party?

(b) What sub-article describes ownership of the genetic resources? What does it mean in terms of ownership?

(c) What are the conditions that are imposed on the developed country to assist the country of origin?

(d) What is the main benefit expected of this article? Explain in one sentence.

**Question 3**

1. Analyse in point form the advantages and disadvantages of in-situ and ex-situ conservation of the sloth bear in Sri Lanka.
2. Compare the suitability of *ex-situ* conservation measures through captive breeding for an endemic ornamental fish that is present in the Dehiwala Zoo and a rainforest living primate.
3. How relevant are species and ecosystem based approaches for conservation of the endangered sloth bear in Sri Lanka? Explain in point form what approach/es should be used and why.

**Question 4**

- (1) Classify these two species according to Kingdom and plant Division.  
(a) Spruce: (b) Hora (*Shorea*) species in the Sinharaja forest:
- (2) Which of these two species is naturally found in a biome that harbours the grizzly bear, elk and caribou?
- (3) Name and describe the biome that contains *Shorea* species indicating the biome's worldwide location, notable features in terms of structure, and other specific characteristics of trees in this biome, specific features of climate and soil and animal life.
- (4) What are the important functions of the biome in which *Shorea* species are found in?

**Question 5**

1. Which of the four systems recognised in the Biodiversity Conservation Action Plan (BCAP) of Sri Lanka of 1999 would contain the Sinharaja forest?
2. State 5 main recommendations that are present for conservation of the above system.
3. (a) What are the two main laws in Sri Lanka that govern conservation of the above system? (b) What two organisation/s are directly responsible for implementing each of these laws?
4. (a). To what type/s of international protected area does the Sinharaja forest belong to and what is/are their IUCN category/ies?  
  
(b) What is/are the international institution/s that decides on accepting the nominations of these PAs by country parties?
5. Which IUCN category of protected areas contains a core zone, a buffer Zone and a Transition zone?
- 6.(a) Which IUCN category of protected area should be of outstanding universal value?  
(b) What forests in Sri Lanka are designated under this category in Sri Lanka?
7. Assign these Protected Areas to IUCN categories: Ruhuna National Park, Ritigala SNR, Hurulu Biosphere Reserve.
8. What is the main difference between nature tourism and eco-tourism, in view of the key factors that are essential for eco-tourism? Explain briefly, using Ruhuna National Park as an example.

**Question no 6:**

**Two of your friend's children have observed these animals at the Singapore Zoo. And have brought back a handout from the Zoo.**

**(a) Help them to classify these animals and fill in table below.**

<b>Animal</b>	<b>Class</b>	<b>Sub-class (only for mammals)</b>	<b>Order (only for Eutherian mammals)</b>	<b>Presence in the African Savannah biome (tick correct cell with a cross)</b>	<b>Presence in the tundra biome (tick correct cell with a cross)</b>	<b>Presence in ..... Zoo geograp hic region (tick correct cell with a cross)</b>
Zebra	Mamalia					
Rhinoceros	Mamalia					
Lion	Mamalia					
Reindeer						
Orang-utan						
Harmdrays baboon						
Jungle fowl						
Toque macaque						
Giant sloth						
Giraffe						
Duck billed platypus						
Royal Bengal						

<b>Animal</b>	<b>Class</b>	<b>Sub class (only for mammals)</b>	<b>Order (only for Eutherian mammals)</b>	<b>Presence in the African Savannah biome (tick correct cell with a cross)</b>	<b>Presence in the tundra biome (tick correct cell with a cross)</b>	<b>Presence in ..... Zoo geograp hic region (tick correct cell with a cross)</b>
<b>Tiger</b>						
<b>African Civet</b>						
<b>Ostrich</b>						
<b>Indian Gavial</b>						
<b>Grey langur</b>						

(Please reproduce this table in your answer sheet)

b). i. Which of these species is the most closely related to us humans?

ii. In which zoogeographic region is this animal found in?

c) i. Which of these species are indigenous to Sri Lanka?

ii. Which of the above listed species are endemic to Sri Lanka?

iii. Explain the difference of meaning between indigenous and endemic using the animals that should be listed under (c) above.

d) Into which biogeographic zone listed by Wallace can you assign the Sri Lanka's endemic species?