

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD
UNIVERSITY OF MALTA, MSIDA
MATRICULATION EXAMINATION
INTERMEDIATE LEVEL
MAY 2017

SUBJECT: ENVIRONMENTAL SCIENCE
DATE: 29th April 2017
TIME: 9:00 a.m. to 12:05 p.m.

Answer ALL questions in Section A and any TWO questions from Section B.

Section A carries 80 marks and Section B carries 40 marks. You are advised to spend about two hours on Section A and one hour on Section B.

SECTION A: Answer ALL questions from this section.

1. (a) Complete the table below by choosing the appropriate term from the following list. Each term can be used once, more than once or not at all.

upwelling zone
coastal zone

photic zone
tides

open sea
thermocline

Statement	Term
Result from the gravitational interaction between the Sun and the moon.	
The interface between the land and water.	
A sharp temperature gradient between surface waters and the deep sea.	
Highly productive marine zone where strong vertical currents carry deep waters up to the surface of the ocean.	
The short term periodic rise and fall of the world's oceans.	
The upper layer of a body of water delineated by the depth to which enough sunlight can penetrate to permit photosynthesis.	

(6)

- (b) Name and briefly describe **ONE** strategy used to harvest freshwater.

(2)

DO NOT WRITE ABOVE THIS LINE

(c) Name and briefly describe **ONE** strategy used to provide freshwater.

(2)

(Total: 10 marks)

2. (a) Distinguish between the following pairs of terms and give **ONE** example for each:

(i) Biotic resources: _____

_____ Example: _____ (2)

Abiotic resources: _____

_____ Example: _____ (2)

(ii) Renewable sources of energy: _____

_____ Example: _____ (2)

Non-renewable sources of energy: _____

_____ Example: _____ (2)

(b) (i) Briefly explain the term resource substitution.

(2)

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(ii) Describe **TWO** ways how resource substitution can be utilised to reduce environmental damage.

(4)

(c) (i) State **ONE** safety measure that should be in place when using nuclear energy.

(1)

(ii) State **TWO** important procedures that should be observed when disposing of nuclear waste.

(2)

(Total: 17 marks)

3. This question focuses on photochemical smog.

(a) (i) What causes photochemical smog?

(2)

(ii) Name **ONE** typical situation where photochemical smog is common.

(1)

(iii) Name **ONE** pollutant found in photochemical smog.

(1)

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(b) Indicate **ONE** possible effect on human health and **ONE** environmental effect brought about by pollution from photochemical smog.

Effect on human health: _____
_____ (2)

Environmental effect: _____
_____ (2)

(Total: 8 marks)

4. (a) Some toxic substances tend to bioaccumulate in living organisms while others undergo biomagnification. Distinguish between the terms bioaccumulation and biomagnification by making reference to **ONE** suitable example in each case.

(i) Bioaccumulation: _____

_____ Example: _____
_____ (2, 1)

(ii) Biomagnification: _____

_____ Example: _____
_____ (2, 1)

(b) Give **ONE** reason why sugar, salt and some naturally produced toxins do not undergo bioconcentration and bioaccumulation within living organisms.

_____ (2)

(Total: 8 marks)

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5. (a) Complete the table below by choosing the appropriate term from the following list of solid waste disposal methods. Each term can be used once, more than once or not at all.

- Composting**
Waste-to-energy
Sanitary Landfills
Encapsulation
Incineration
Recycling

Waste Disposal Method	Description
	The waste is placed in thin layers, compacted and allowed to degrade naturally.
	High temperature treatment of waste involving combustion of organic material.
	Reprocessing of used materials into new useful products in order to reduce the utilisation of raw materials and energy.
	A natural biodegradation process that converts organic waste into a fertiliser and soil conditioner.
	A process converting non-recyclable material into heat and electricity.
	Converting hazardous waste into a solid mass of cement-like material that is resistant to leaching.

(6)

(b) (i) Briefly explain the meaning of the term hazardous waste.

(2)

(ii) Give **TWO** examples of waste products that are considered as hazardous.

Waste Product 1: _____

Waste Product 2: _____ (2)

(Total: 10 marks)

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6. Complete the table below by choosing the appropriate term from the following list. Each term can be used once, more than once or not at all.

- | | | |
|-------------------|-------------------|------------------|
| Ecosystem | Succession | Organism |
| Abiotic | Biotic | Community |
| Population | Biosphere | Niche |

Term	Description
	Living part of the environment.
	All of the living things in a given area, interacting with each other, and also with their non-living environments.
	A single living thing that can reproduce.
	Individuals of the same species living and interbreeding in the same area.
	The part of the earth's crust, oceans, and atmosphere that supports life.
	An interacting group of various species in the same area.
	Non-living part of the environment.

(Total: 7 marks)

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7. Briefly explain the following interactions between organisms. Give **ONE** suitable example of each.

(a) Predation: _____

Example: _____ (2, 1)

(b) Parasitism: _____

Example: _____ (2, 1)

(c) Mutualism: _____

Example: _____ (2, 1)

(d) Commensalism: _____

Example: _____ (2, 1)

(Total: 12 marks)

8. Briefly explain how each of the following agricultural practices reduces biodiversity.

(a) Monocropping: _____

_____ (2)

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(b) Clearing of land: _____

_____ (2)

(c) Use of pesticides: _____

_____ (2)

(d) Genetically modified crops: _____

_____ (2)

(Total: 8 marks)

SECTION B: Answer any TWO questions from this section.

Write your answers in the space provided in this booklet. If you need more space to continue your answers you may request another booklet from your invigilator.

1. (a) Name the **THREE** basic types of rocks and explain how each type is formed. (6)
 - (b) Explain the rock cycle. The following terms should be included in your explanation: weathering; erosion; geological uplift and volcanism. (9)
 - (c) Explain how the rocks of the Maltese Islands are the result of biogenic sedimentation. Give the order of the five main rock strata of the Maltese Islands starting with the youngest layer. (5)
- (Total: 20 marks)**

2. (a) Explain how soil is formed and describe the A, B and C soil horizons. (6)
 - (b) Name and explain **FOUR** soil conservation techniques. (8)
 - (c) Outline **THREE** negative effects of agriculture on water reserves. (6)
- (Total: 20 marks)**

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3. (a) Explain the terms greenhouse effect, global warming and climate change. Explain how they are related to one another. (11)
- (b) Describe **THREE** human activities that play a significant role in the current global warming trend. (6)
- (c) List **THREE** pieces of scientific evidence that clearly indicate the occurrence of global warming and rapid climate change. (3)

(Total: 20 marks)

4. (a) Eutrophication is a type of pollution of freshwater bodies and aquatic ecosystems. Describe the cause of this form of water pollution, the impact on aquatic life and on the quality of water. Outline **ONE** measure which can be taken to treat such polluted waters. (8)
- (b) Pollution of water resources originate from point sources and non-point sources. Distinguish between these **TWO** sources of water pollution, illustrating your answer with relevant examples. (6)
- (c) Explain why water polluted by sewage is considered as a health hazard even though sewage itself is mainly biodegradable. (4)
- (d) Suggest **ONE** way of reducing water pollution. (2)

(Total: 20 marks)

5. This question is about energy and matter transfer in ecosystems.

- (a) Distinguish between producers, primary consumers and secondary consumers. (6)
- (b) Detritivores, such as earthworms and millipedes are organisms that feed on dead plant and animal matter (i.e. detritus). How does the way decomposers feed differ from that of detritivores? (4)
- (c) Discuss the **THREE** types of ecological pyramids. (10)

(Total: 20 marks)

6. (a) Discuss how natality, mortality, immigration and emigration affect population dynamics. (8)
- (b) Describe how various density-dependent and density-independent factors control population growth. (12)

(Total: 20 marks)

Please turn the page.

