Index Number: _____ IM11.26s

L-Università ta' Malta

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD

INTERMEDIATE MATRICULATION LEVEL
2026 SECOND SESSION

SUBJECT:	**Environmental Science**
DATE:	4th September 2026
TIME:	4:00 p.m. to 7:05 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. Complete the following table with the appropriate term from the list below.

GMO	sustainable harvesting	silting	desertification
off-roading	soil	over-cultivation	deforestation
gullying	wind breaks	overgrazing	monocropping

Term	**Description**
	Continuously planting the same crop year after year leads to soil nutrient depletion and reduces its ability to resist erosion.
	A barrier consisting of one or more rows of trees, shrubs, or other tall vegetation planted to reduce wind speed.
	This occurs where surface water flow has become trapped in a small, concentrated stream and begins to erode deep channels in the ground surface.
	An animal, plant, or microbe whose genetic material (DNA) has been altered using genetic engineering techniques to have certain desired traits.
	The management of living resources to ensure they replenish and remain available for future generations.
	A dynamic system comprising of mineral particles, detritus, air, water and living organisms interacting together.
	The process where land becomes unsuitable for plant growth and unable to support life.

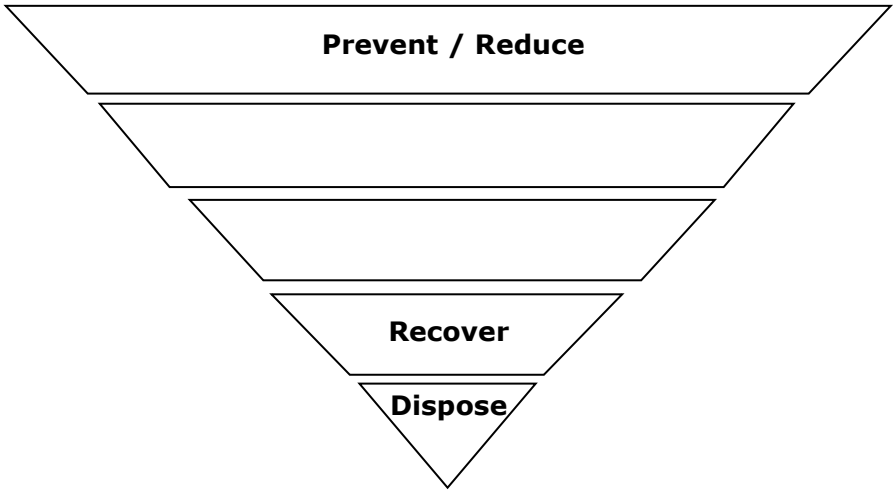
(Total: 7 marks)

Please turn the page.

© The MATSEC Examinations Board reserves all rights on the examination questions in all examination papers set by the said Board.

2. (a) Integrated waste management is based on the waste hierarchy shown in the diagram below, with prevention being the most desirable and disposing of waste being the least desirable option. Fill in the **TWO** missing processes.

(1)



(b) Discuss **ONE** advantage and **ONE** disadvantage for each of the following methods of waste disposal:

(i) Landfilling

Advantage: _____

_____ (1)

Disadvantage: _____

_____ (1)

(ii) Incineration

Advantage: _____

_____ (1)

Disadvantage: _____

_____

_____ (1)

(c) (i) Why are conventional (open dump) landfills harmful to the environment when compared to engineered landfills?

_____

_____

_____ (2)

(ii) Sketch a simple labelled diagram of an engineered landfill.

(5)

(Total: 12 marks)

3. (a) Define carbon footprint.

_____

_____

_____ (2)

(b) Distinguish between non-renewable and renewable energy sources. Give **ONE** example of each.

_____

_____

_____(2)

Example Non-Renewable Source: _____ (1)

Example Renewable Source: _____ (1)

(c) State **TWO** facts about global energy use showing that, despite sustainability concerns, most energy still comes from non-renewable sources.

_____

_____

_____(2)

(Total: 8 marks)

Please turn the page.

4. (a) Explain why unpolluted rain is slightly acidic and provide the chemical equation for this process.

Explanation: _____

_____ (2)

Chemical equation:

(1)

(b) Identify **TWO** primary pollutants responsible for acid precipitation and provide equations for their reaction with water.

Primary Pollutants: _____

_____ (2)

Chemical equation (1):

(1)

Chemical equation (2):

(1)

(c) Mention **THREE** environmental consequences of acid rain.

_____

_____

_____

_____ (3)

(Total: 10 marks)

5. (a) Distinguish between the formation of industrial smog and photochemical smog.

Industrial smog: _____

_____ (2)

Photochemical smog: _____

_____ (2)

(b) Explain how temperature inversion enhances smog formation in urban areas.

_____

_____

_____ (2)

(Total: 6 marks)

6. (a) Define Biological Oxygen Demand (BOD) and explain what high levels of BOD indicate in water bodies.

Definition: _____

_____ (2)

Explanation: _____

_____ (2)

(b) Describe the process of eutrophication, identifying the main pollutants and their sources.

Process: _____

_____

_____

_____ (4)

Main Pollutants: _____

_____ (1)

Source of Pollution: _____

_____ (1)

(c) Outline **TWO** effects of eutrophication on aquatic ecosystems.

_____

_____

_____ (2)

(Total: 12 marks)

7. (a) Fill in the table below considering two models of population growth.

Represented as	**Name of model**	**Description**
J-shaped curve		
	Sigmoid growth	

(4)

Question continues on the next page.

(b) In the space below, sketch a labelled graph to show a sigmoid curve:

(6)

(c) Explain why algae are always found at the base of food chains.

_____

_____

_____ (3)

(d) Explain the irruptive growth pattern commonly observed in algal populations.

_____

_____

_____

_____ (4)

(Total: 17 marks)

8. Read the following passage and then answer the questions that follow:

According to a team of researchers, the great white sharks face extinction due to the intensification of industrial fishing and illegal fishing practices. Reacting to the study, National Aquarium curator Daniel de Castro said, "Overfishing is the biggest threat to great whites," pointing out that there were fewer fish in the Mediterranean for these sharks to feed on.

"The problem is that fish, such as tuna or mackerel, are being harvested too early, before they get the chance to breed and spawn more fish. We also tend to catch fish too early," he said. "By catching fish too early you are also getting rid of another generation. As a result, the main predator is the one which suffers the most," he pointed out.

Adapted from: https://timesofmalta.com/article/great-white-sharks-risk-extinction-mediterranean.1123089

(a) Find the term that refers to:

(i) the complete and permanent disappearance of a species.

_____ (1)

(ii) harvesting fish faster than populations can naturally replace themselves.

_____ (1)

(iii) an organism that hunts, kills, and eats other organisms for food.

_____ (1)

(b) Briefly describe **ONE** method of conservation that is already benefitting or could benefit the white shark population.

_____

_____

_____ (2)

(c) Referring to the passage above, describe the importance of predator–prey relations and their wider effects on the food web in ensuring sustainable population growth.

_____

_____

_____ (3)

(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) Distinguish between the lithosphere and the asthenosphere. (4)

(b) Draw simple labelled diagrams to show the differences between divergent (oceanic-oceanic boundary), convergent (oceanic-continental boundary), and conservative plate boundaries. (6)

(c) (i) Explain the process of weathering. (1)

(ii) Describe how the **THREE** types of weathering (physical, chemical, and biological) differ. (9)

(Total: 20 marks)

2. (a) Outline how volcanic activity, sunspot cycles and asteroid impacts can trigger natural changes in the global climate. (6)

(b) Explain how the melting of ice sheets and thermal expansion contribute to rising sea levels. (4)

(c) Distinguish between climate mitigation and climate adaptation, providing **TWO** specific examples for each. (6)

(d) Explain how individuals and local communities can contribute to both mitigation and adaptation efforts by giving **TWO** examples for each. (4)

(Total: 20 marks)

Please turn the page.

3. (a) Define the following terms in the context of the hydrological cycle: interception, infiltration, and percolation. (3)
   (b) Using a labelled diagram or detailed description, distinguish between Malta's perched (upper) aquifer and the mean sea level (lower) aquifer. (4)
   (c) Explain how over-extraction of groundwater in Malta leads to saltwater intrusion. (4)
   (d) List **THREE** factors that contribute to the scarcity of water resources in the Maltese islands. (3)
   (e) In many regions, including Malta, Reverse Osmosis (RO) is essential for providing freshwater.
      (i) Explain the basic principle of reverse osmosis. (2)
      (ii) Discuss **TWO** socio-economic or environmental implications of relying on RO for a nation's potable water supply. (4)

(Total: 20 marks)

4. (a) Ozone (O_3) is a gas that can be either beneficial or harmful depending on its location in the atmosphere. Distinguish between the roles of stratospheric ozone and tropospheric ozone in relation to human health and the environment. (4)
   (b) Provide the **TWO** chemical equations representing the natural formation of ozone in the stratosphere. (2)
   (c) Describe, using chemical equations, how chlorofluorocarbons (CFCs) react with stratospheric ozone. (2)
   (d) Recall **TWO** main agents of stratospheric ozone depletion and identify **TWO** anthropogenic sources for these chemical substances. (4)
   (e) Explain how nitrogen oxides contribute to both the formation and destruction of tropospheric ozone, and describe the conditions under which each process occurs. (4)
   (f) Atmospheric pollution can be mitigated through various technologies.
      (i) Describe the role of catalytic converters in reducing the precursors of tropospheric ozone. (3)
      (ii) Identify a technology used to reduce or remove pollutants from industrial emissions. (1)

(Total: 20 marks)

5. (a) Define restoration ecology. (2)
   (b) Mention and distinguish between the two types of intervention restoration. (4)
   (c) Outline the steps involved in ecological restoration. (13)
   (d) Name a local example of an ecological restoration project. (1)

(Total: 20 marks)

6. (a) Explain how plants adapt to arid or desert-like environments, with particular reference to leaf modifications. (5)
   (b) Describe the impact of pesticides on biodiversity. (5)
   (c) Discuss the role of nature reserves and explain whether activities such as hunting or trapping are permitted within them. (5)
   (d) Describe the importance of keystone species in maintaining ecosystem stability, using *Posidonia oceanica* as an example. (5)

(Total: 20 marks)

DO NOT WRITE ABOVE THIS LINE

DO NOT WRITE ABOVE THIS LINE

DO NOT WRITE ABOVE THIS LINE

DO NOT WRITE ABOVE THIS LINE