

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

---

**SUBJECT:** ENVIRONMENTAL SCIENCE  
**DATE:** 31<sup>st</sup> August 2017  
**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. (a) Briefly describe **TWO** ways in which biodiversity is endangered through agriculture.

(i) \_\_\_\_\_  
\_\_\_\_\_ (2)

(ii) \_\_\_\_\_  
\_\_\_\_\_ (2)

(b) Briefly explain how the following processes occur:

(i) Soil erosion: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ (2)

(ii) Desertification: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ (2)

(c) Briefly explain how the following agricultural practices can negatively impact the environment:

(i) Overcultivation: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ (2)

*This question continues on next page.*

DO NOT WRITE ABOVE THIS LINE

---

(ii) Use of pesticides: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_ (2)

**(Total: 12 marks)**

2. (a) Briefly explain how each of the following act as natural drivers of climate change:

(i) Milankovitch cycles: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_ (2)

(ii) Change in Earth's albedo: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_ (2)

(b) The Earth's atmosphere is made up of five different layers. The lowest layer is the Troposphere and the highest layer is the Exosphere. Fill in the **THREE** missing layers in the spaces below.

Exosphere

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Troposphere

(3)

**(Total: 7 marks)**

3. (a) Name **ONE** major physical difference between a planet and a star.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ (3)

DO NOT WRITE ABOVE THIS LINE

---

(b) Briefly explain the following terms:

(i) Converging plate boundary: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

(ii) Diverging plate boundary: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

(iii) Conservative plate boundary: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

(6)

**(Total: 9 marks)**

4. Define the following terms, all related to water pollution.

(a) Algal bloom: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_ (2)

(b) Biodegradation: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_ (2)

(c) Biological oxygen demand (BOD): \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_ (2)

(d) Chemical oxygen demand (COD): \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_ (2)

*This question continues on next page.*

DO NOT WRITE ABOVE THIS LINE

(e) Oxygen sag: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ (2)

(f) Pathogenic organisms: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ (2)

(g) Thermal pollution \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ (2)

**(Total: 14 marks)**

5. Complete the following passage on the use of biofuels by choosing the appropriate term from the list below. Each term is only to be used **ONCE**.

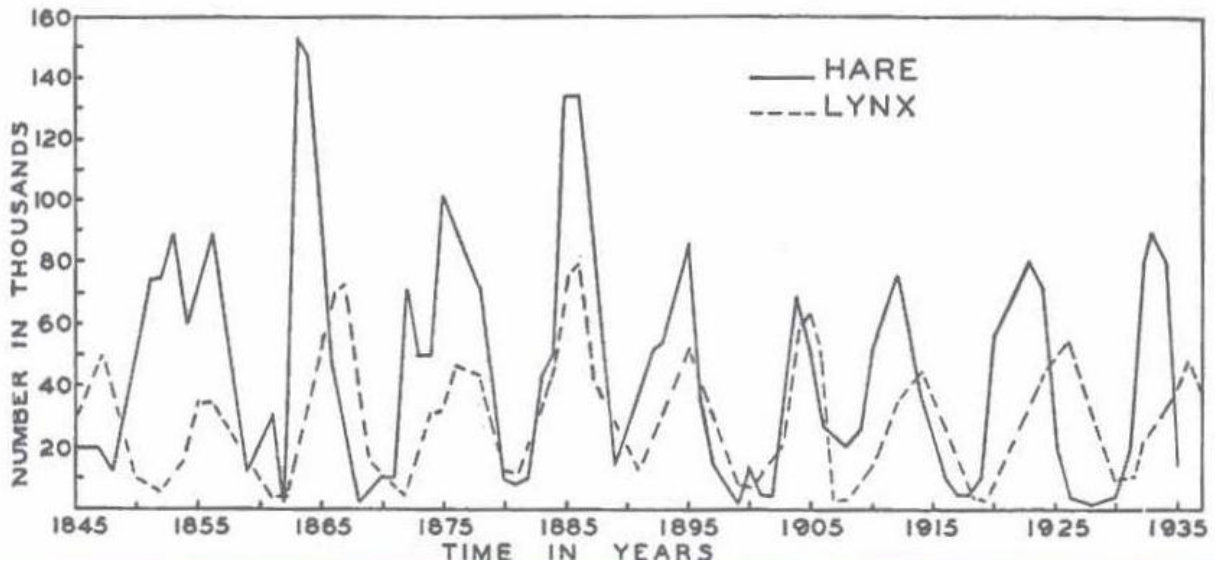
- |                |            |             |           |
|----------------|------------|-------------|-----------|
| acid rain      | combustion | non-toxic   | climate   |
| atmospheric    | dioxide    | particulate | monoxide  |
| biodegradation | global     | petroleum   | renewable |
| carcinogenic   | greenhouse |             |           |

Biodiesel is made from \_\_\_\_\_ resources. It is \_\_\_\_\_ and undergoes complete \_\_\_\_\_. The use of biofuels such as biodiesel and bioethanol reduces \_\_\_\_\_ pollution caused by \_\_\_\_\_ based fuels. Biofuels eliminate the emission of \_\_\_\_\_ substances and others that cause \_\_\_\_\_. Combustion of biodiesel also produces less carbon \_\_\_\_\_ and \_\_\_\_\_ matter. Most of the carbon \_\_\_\_\_ that is produced by biodiesel during complete \_\_\_\_\_ is reabsorbed into the earth as it cycles through the environment. So it does not enhance the \_\_\_\_\_ effect and does not contribute to \_\_\_\_\_ warming and \_\_\_\_\_ change.

**(Total: 14 marks)**

DO NOT WRITE ABOVE THIS LINE

6. The graph below shows the population cycles of snowshoe hares and their lynx predators.



Source: <http://www.psms29.com/cgi/lynx-hare-graph>

(a) Distinguish between predator and prey.

---

---

---

(2)

(b) Why are there always more hares than lynx?

---

---

---

---

(4)

(c) Explain why the lynx and hare populations vary together.

---

---

---

---

(4)

*This question continues on next page.*

DO NOT WRITE ABOVE THIS LINE

---

(d) Using the hare-lynx example, briefly explain the term carrying capacity.

---

---

---

(2)

(e) Identify **TWO** variables, other than the size of the lynx population, that can affect the size of the hare population.

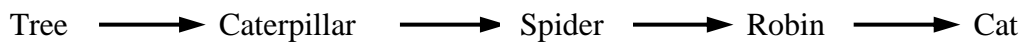
---

---

(2)

**(Total: 14 marks)**

7. In the space below draw (i) a pyramid of biomass and (ii) a pyramid of numbers for the following food chain.



(i) pyramid of biomass

(ii) pyramid of numbers



(6)

(b) Distinguish between a pyramid of numbers and a pyramid of biomass.

---

---

---

---

(4)

**(Total: 10 marks)**

DO NOT WRITE ABOVE THIS LINE

---

**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) The following terms are all associated with the water cycle: precipitation; cloud formation; infiltration; run-off; and evaporation. Explain **EACH** term and explain the processes and/or phenomena which bring about each process. (10)
- (b) Briefly explain **THREE** main causes of fresh water scarcity and give **TWO** strategies which can be used to improve the situation. (5)
- (c) Discuss how light intensity varies as the depth of the ocean increases. In your discussion include the effect of light intensity on life in the sea. (5)

**(Total: 20 marks)**

2. (a) Distinguish between renewable and non-renewable energy sources. (6)
- (b) Name and describe **FOUR** renewable sources of energy which can be applied to the Maltese Islands. Give an example of how your chosen sources can be utilized. (8)
- (c) Briefly explain how the Greenhouse Effect is caused. How does the use of fossil fuels contribute to an increase in global warming? (6)

**(Total: 20 marks)**

3. Recycling is a form of waste management that aims to convert waste and other used materials into reusable goods.

- (a) Name **TWO** types of solid waste materials that can be separated, reprocessed and recycled into new products. (2)
- (b) Identify and explain **FIVE** benefits of recycling, making specific reference to pollution, natural resources, landfill sites, global warming and the use of energy. (10)
- (c) Describe **TWO** potential problems associated with recycling. (4)
- (d) Explain why the composting technique can be considered as a form of recycling. (2)
- (e) Describe another measure (apart from recycling and composting) which one can adopt in order to reduce or make better use of waste generated at source. (2)

**(Total: 20 marks)**

*Please turn the page.*











