



SUBJECT: **Environmental Science**
DATE: 2nd September 2022
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) What is soil erosion?

_____ (2)

(b) Explain how the following agricultural practices promote soil erosion:

(i) overgrazing: _____
_____ (2)

(ii) deforestation: _____
_____ (2)

(c) Explain how the following agricultural practices help to reduce soil erosion:

(i) multicropping: _____
_____ (2)

(ii) terracing: _____
_____ (2)

(d) Briefly explain **TWO** agricultural practices that cause water pollution.

_____ (4)

(Total: 14 marks)

2. (a) Give **ONE** negative impact that land extraction incurs for each of the following:

(i) soil: _____ (1)

(ii) biodiversity: _____ (1)

(iii) visibility: _____ (1)

(iv) terrain: _____ (1)

(b) Give **TWO** advantages and **TWO** disadvantages associated with the use of nuclear power.

Advantages:

(i) _____ (1)

(ii) _____ (1)

Disadvantages:

(i) _____ (1)

(ii) _____ (1)

(Total: 8 marks)

3. (a) Name **ONE** natural source and **ONE** anthropogenic source of nitrate pollution.

(i) natural source: _____ (1)

(ii) anthropogenic source: _____ (1)

(b) Briefly describe **ONE** major human disease caused by contaminated water.

_____ (2)

(c) Name **THREE** methods that can be applied to prevent or minimise nitrate pollution.

(3)

(Total: 7 marks)

4. Briefly describe each of the following terms or phrases related to various aspects of pollution.

(a) Acid rain: _____

_____ (2)

(b) Biomagnification: _____

_____ (2)

(c) Bioaccumulation: _____

_____ (2)

(d) Diffuse or non-point source of pollution: _____

_____ (2)

(e) Stationary or point source of pollution: _____

_____ (2)

(f) Ocean acidification: _____

_____ (2)

(g) Soil salinisation because of climate change: _____

_____ (2)

(h) Suspended particulate matter: _____

_____ (2)

(Total: 16 marks)

Questions continue on the next page.

5. Complete the following table with the appropriate term from the list of environmental pollutants given below.

- carbon dioxide (CO₂) pathogens chlorofluorocarbons (CFC)
- carbon monoxide (CO) mercury volatile organic compounds (VOC)
- nitrogen oxides (NO_x)

| Description | Term |
|--|------|
| A heavy metal that is highly toxic to humans and the environment. | |
| Organic substances that vaporize from petroleum fuels, solvents and dry-cleaning agents and contribute to photochemical smog. | |
| Gases produced during combustion of fuels and lightning, which react to form acid rain and photochemical smog. | |
| Microorganisms (referred to as germs) that cause disease upon entering the body of living organisms. | |
| A non-toxic colourless odourless acidic gas that results from complete combustion of fossil fuels. | |
| A toxic colourless odourless gas that results from incomplete combustion of fossil fuels. | |
| Non-toxic and low boiling point substances used in old refrigerators and air-conditioners, and as solvents, which deplete the stratospheric ozone. | |

(Total: 7 marks)

6. (a) Define the term biome.

_____ (2)

(b) (i) Name the typical biome that is found in the Amazon Forest.

_____ (1)

(ii) List **FOUR** characteristics of the typical biome of the Amazon Forest.

_____ (4)

(c) Deforestation is threatening the Amazon Forest. List **THREE** reasons that are driving this deforestation.

_____ (3)

(d) Define restoration ecology.

(2)

(e) List **FOUR** required steps in restoration ecology.

(4)

(Total: 16 marks)

7. State **ONE** similarity and **ONE** difference between the following terms:

(a) Grazing food chain and decomposer food chain.

Similarity: _____

(1)

Difference: _____

(2)

(b) Fundamental niche and realized niche.

Similarity: _____

(1)

Difference: _____

(2)

(c) Interspecific competition and intraspecific competition.

Similarity: _____

(1)

Difference: _____

(2)

(d) Amensalism and commensalism.

Similarity: _____

(1)

Difference: _____

(2)

(Total: 12 marks)

Questions continue on the next page.

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) Explain the difference between rocks and minerals. (2)
(b) Name the **THREE** main rock types and give **ONE** characteristic for **each** rock type. (6)
(c) Explain how plate tectonics are responsible for the formation of:
(i) volcanoes; (2)
(ii) mountains; (2)
(iii) ocean trenches; (2)
(iv) mid-ocean ridges. (2)
(d) Briefly explain the process by which Maltese rocks were formed. Provide **ONE** proof for your answer. (4)
(Total: 20 marks)

2. Give brief explanations for the following:
(a) The difference between weather and climate. (4)
(b) The main characteristics and differences between the Troposphere and the Stratosphere. (4)
(c) The greenhouse effect as an important phenomenon to sustain life on Earth. (4)
(d) The formation and shielding effect of the ozone layer. (4)
(e) Temperature inversion and pollution. (4)
(Total: 20 marks)

3. Thermal pollution is considered as a real and persistent problem in water bodies.
(a) Briefly explain the term thermal pollution. (3)
(b) List **THREE** possible sources of thermal pollution. (3)
(c) Describe **FOUR** harmful effects brought about by thermal pollution of a water body. (8)
(d) Describe **THREE** measures that can be used to prevent this type of water pollution. (6)
(Total: 20 marks)

4. There is sufficient scientific evidence confirming that rapid climate change is the result of human intervention on planet earth.
(a) Briefly describe **THREE** significant observations made by scientists which prove the occurrence of climate change and global warming. (6)
(b) Name **THREE** greenhouse gases which are partly responsible for the enhanced greenhouse effect. (3)
(c) Name **TWO** human activities that have significantly increased the concentrations of greenhouse gases in the earth's atmosphere since the industrial revolution. (2)
(d) List **THREE** consequences of increased concentrations of greenhouse gases in the atmosphere. (3)
(e) Outline **THREE** measures which would help minimise the enhanced greenhouse effect and global warming. (6)
(Total: 20 marks)

5. (a) Describe the stages of ecological succession that occur in a terrestrial biome. In your account clearly identifying the pioneer community and the climax community. (10)
(b) Distinguish between:
(i) primary succession and secondary succession; (4)
(ii) autogenic succession and allogenic succession. (4)
(c) Mention **TWO** legislative tools that protect the natural environment. (2)
(Total: 20 marks)

6. (a) Define the term population. (2)
- (b) Briefly explain how each of the following factors affects population size:
- (i) natality; (2)
 - (ii) mortality; (2)
 - (iii) immigration; (2)
 - (iv) emigration. (2)
- (c) Explain how each of the following factors limit population growth:
- (i) environmental resistance; (3)
 - (ii) carrying capacity. (3)
- (d) Briefly discuss the following statement: the rate at which the global human population is growing is considered as being unsustainable. (4)

(Total: 20 marks)
