



SUBJECT: **Environmental Science**
DATE: 26th June 2021
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) What is the difference between a rock and a mineral?

_____ (2)

(b) How are the following types of rock formed?

(i) Sedimentary: _____

_____ (2)

(ii) Igneous: _____

_____ (1)

(iii) Metamorphic: _____

_____ (2)

(c) Briefly explain the theory of plate tectonics.

_____ (2)

(Total: 9 marks)

2. (a) In the space below draw a simple labelled diagram to illustrate the greenhouse effect. (4)

(b) Explain what would happen if greenhouse gases were absent from the atmosphere.

(c) Complete the table by selecting the appropriate term from the list below. Each term may be used once, more than once or not at all. (4)

- | | | | |
|-----------------------|---------------------|-----------------|-------------------|
| Hadley cells | Ferrel cells | Climate | Weather |
| Coriolis force | Albedo | Sunshine | Insolation |

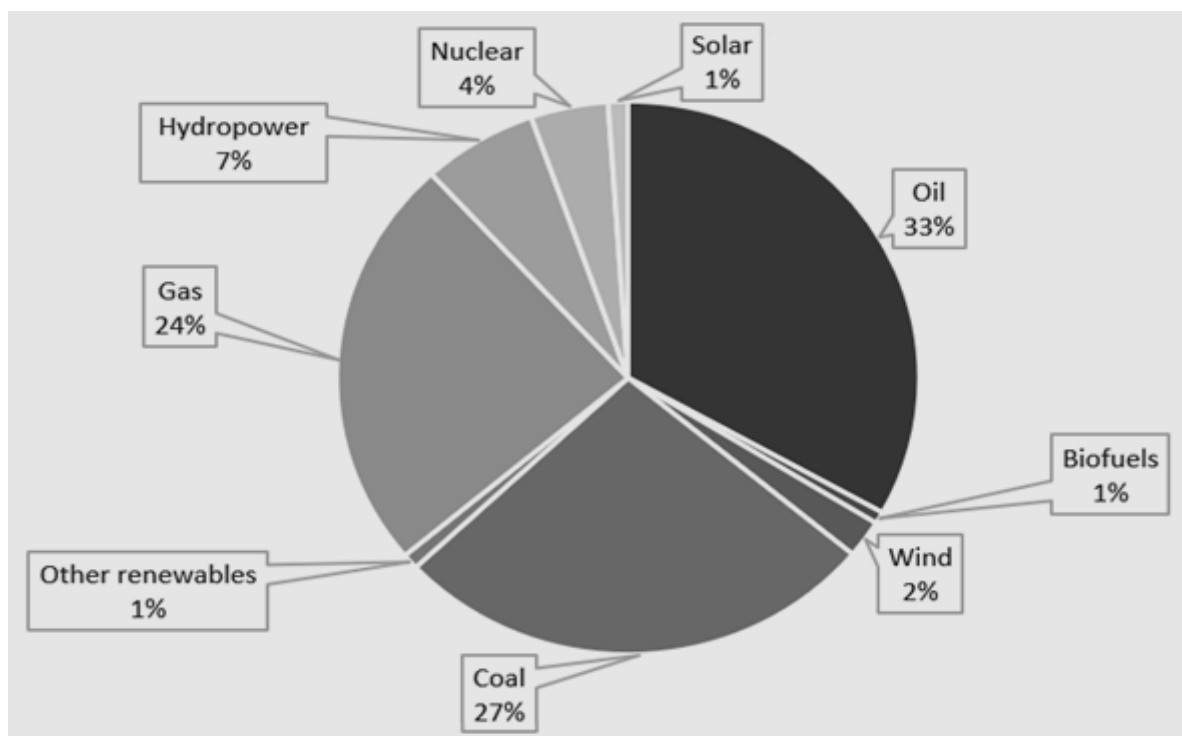
Definition	Term
The amount of incoming solar radiation that reaches the Earth's surface.	
The portion of incident radiation that is reflected by a surface.	
Convection cells that develop at the Equator due to intense heating.	
General pattern of atmospheric conditions and seasonal variations in a region over a long period.	

(Total: 10 marks)

3. (a) Complete the table below by filling in the correct energy source. (4)

Energy Source	Features of energy sources
	Releases CO ₂ on combustion but overall use can be carbon neutral.
	Supply is unpredictable.
	Generated and stored inside the Earth.
	Harnesses the power of water in motion.

(b) The diagram below shows the global primary energy consumption by source.



What does the diagram show about the overall preferred use of energy sources?

(2)

This question continues on the next page.

(c) How does resource substitution help to minimize the extraction of finite resources?

_____ (2)

(Total: 8 marks)

4. Describe **each** of the following terms related to various aspects of environmental degradation, giving examples where necessary.

(a) Bioaccumulation: _____

_____ (2)

(b) Biomagnification: _____

_____ (2)

(c) Persistent pollutant: _____

_____ (2)

(d) Primary air pollutants: _____

_____ (2)

(e) Secondary air pollutants: _____

_____ (2)

(f) Volatile organic compounds (VOC): _____

_____ (2)

(g) Diffuse source pollution: _____

_____ (2)

(h) Deforestation: _____

_____ (2)

(i) Pathogenic microorganisms: _____

_____ (2)

(Total: 18 marks)

5. This question is about the problem of ozone depletion.

(a) What does CFC stand for **and** what are the elements that make it up?

_____ (2)

(b) Name **TWO** human activities that increase the amount of CFCs in the atmosphere.

_____ (2)

(c) Briefly explain how the presence of CFCs in the atmosphere leads to ozone depletion.

_____ (4)

(d) What is the impact of ozone depletion on:

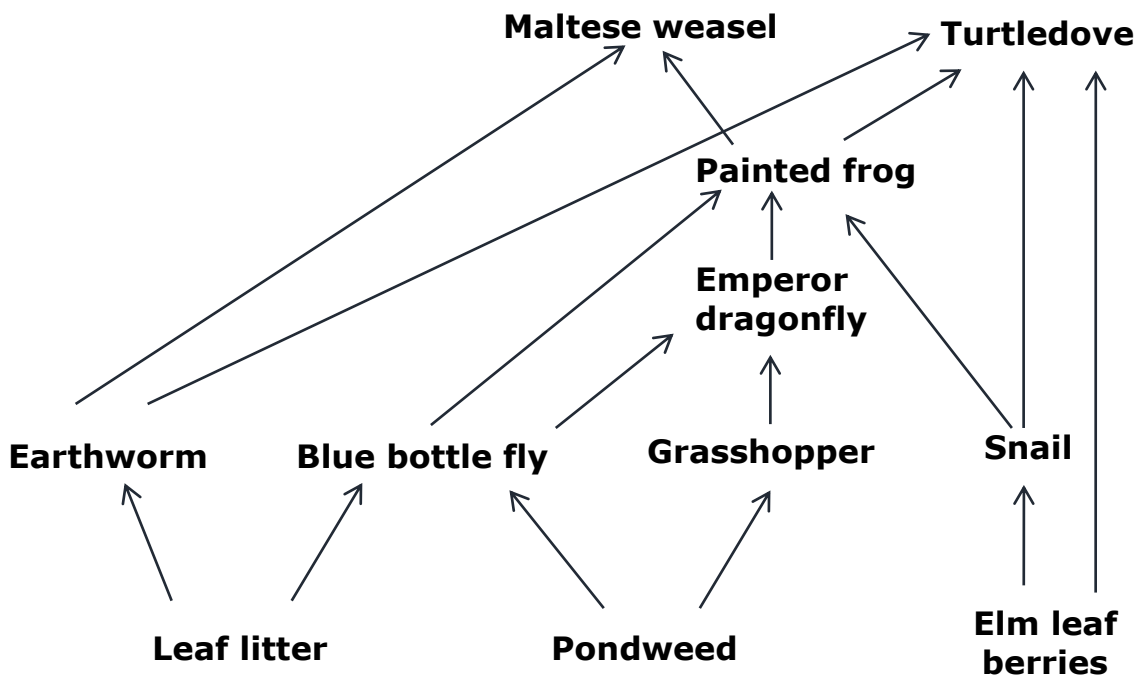
(i) human health; _____
_____ (1)

(ii) the environment. _____
_____ (1)

(Total: 10 marks)

Questions continue on next page.

6. The diagram below shows a food web in a Maltese ecosystem.



(a) Pondweed makes its own food by using light energy through the process of photosynthesis. State the term used to refer to this organism in a food web.

_____ (1)

(b) In the space below, write a food chain with **FIVE** trophic levels using the information available from the food web above.

 _____ (3)

(c) In the space below, draw a pyramid of numbers that represents the food chain in your answer to part (b).

(4)

(d) Mention **ONE** local abiotic factor that might negatively affect the population growth of the painted frogs.

_____ (1)

(e) Predict the impact on the population of Maltese weasels in this food web, if turtledoves experience a drastic decrease in their population.

_____ (2)

(Total: 11 marks)

7. (a) Explain the following terms and give an example for **each** to illustrate your explanation.

(i) Resistance of an ecosystem: _____

_____ (2)

Example: _____

_____ (1)

(ii) Resilience of an ecosystem: _____

_____ (2)

Example: _____

_____ (1)

(iii) Autogenic succession: _____

_____ (2)

Example: _____

_____ (1)

(iv) Allogenic succession: _____

_____ (2)

Example: _____

_____ (1)

This question continues on the next page.

(b) Briefly explain the following statement:

“Fungi and lichen are the most common pioneer species in primary succession.”

(2)

(Total: 14 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. Distinguish between **each** pair of terms.

- (a) Interception and infiltration in the hydrologic cycle. (5)
- (b) Photic zone and abyssal zone. (5)
- (c) Upper (perched) and lower (mean sea level) aquifers. (5)
- (d) Thermocline and temperature inversion. (5)

(Total: 20 marks)

2. The development of agriculture has been essential for the development of human societies yet it has also created significant environmental problems. Describe how **each** of the following environmental problems are brought about by unsustainable agriculture practices.

- (a) Soil erosion. (8)
- (b) Reduction of biodiversity. (6)
- (c) Water pollution. (6)

(Total: 20 marks)

3. (a) Briefly explain how the following measures help in safeguarding the quality of our living environment:

- (i) the use of catalytic converters; (4)
- (ii) flue gas desulfurization (flue gas scrubbing); (4)
- (iii) reduced energy consumption. (4)
- (b) What is meant by pollution from particulate matter? (2)
- (c) Briefly explain **each** of the following aspects of particulate matter pollution:
 - (i) the origin of particulate matter in air; (2)
 - (ii) the impact of such pollution on humans; (2)
 - (iii) list **TWO** ways of reducing this form of atmospheric pollution. (2)

(Total: 20 marks)

4. (a) Explain each of the following statements related to solid waste management:

- (i) The landfill is the least desirable option of waste disposal. (3)
- (ii) Modern waste incineration plants can be used for energy recovery. (3)
- (iii) Recycling of plastic can be a challenging process. (3)
- (iv) There are many household and commercial products that can be reused several times before being ultimately disposed of in a landfill. (3)

